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PLANNING REPORT NO. 25

WISCONSIN-REGIONS-SOUTHEAST

A REGIONAL LAND USE PLAN AND A REGIONAL TRANSPORTATION PLAN FOR SOUTHEASTERN WISCONSIN--2000



volume two

ALTERNATIVE AND RECOMMENDED PLANS

P.647
649

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Planning Report Number 25

A REGIONAL LAND USE PLAN AND A REGIONAL TRANSPORTATION PLAN FOR SOUTHEASTERN WISCONSIN—2000

Volume Two

ALTERNATIVE AND RECOMMENDED PLANS

Prepared by the
Southeastern Wisconsin Regional Planning Commission
Continuing Regional Land Use-Transportation Study

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May 1978

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May 30, 1978

STATEMENT OF THE CHAIRMAN

In 1972 the Regional Planning Commission undertook a reevaluation of the regional land use and transportation plans adopted in 1966. This reevaluation included an extensive and exhaustive reinventory of the many factors affecting land use and transportation system development within the Region. The results of that reinventory, delineating the striking changes in population, economic activity, public finance, land use development, community plans and zoning, transportation facilities, and travel characteristics, that have taken place within the Region since 1963, the base year upon which the initial regional land use and transportation plans were based, were documented in Volume 1 of this report published in April 1975.

Existing and continuing functional and institutional fragmentation attendant to both the planning process, as well as implementation actions, served as an ever present constraint in the development of the new regional land use and transportation system plans for the design year 2000 contained in this volume. Consistent with previously prepared plan elements, specific recommendations toward plan implementation are also set forth herein. Thus, this volume documents a second generation of land use and transportation system development plans for the Region.

The second generation plans reflect not only the significant changes in population and economic activity growth rates that have occurred within the Region since 1963, and in the attendant land use and travel demand, but importantly, reflects the public reaction to the vigorous attempts which were made to implement the first generation plans. Interestingly, this public reaction led to even stronger support of the concepts contained in both the original and the new regional land use plans. This public reaction, however, and the attendant fiscal and legislative constraints indicated the need to significantly scale back the capital improvements recommended in the 1966 transportation system plan and to substitute in the new plan measures to better manage the existing system and, to the extent possible, suppress travel demand.

Although there may be concern over this scaling back on the part of some segments of the public, nevertheless, it is hoped that both the new regional land use and transportation system plans recommended herein will serve this Region until the next reevaluation as well as did the old plans.

Very truly yours,

George C. Berteau
Chairman

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Chapter I

INTRODUCTION

This volume is the second of two which together present the major findings and recommendations of the reevaluation of the regional land use and transportation plans adopted by the Southeastern Wisconsin Regional Planning Commission in December 1966. The first volume, published in April 1975, set forth the basic principles and concepts underlying the plan reevaluation and presented in summary form the basic factual information pertinent to sound, long-range areawide land use and transportation system planning in southeastern Wisconsin. More specifically, the first volume presented not only data on the demography, economy, and public financial resource base; the land use pattern; the natural resource and public utility base; the configuration, capacity, and use of the regional transportation system; travel habits and patterns; and the status of community plans and land use control ordinances as of 1972, but data on the changes in these factors which have occurred within the Region since the initial benchmark inventories of these same factors conducted by the Commission in 1963. In addition, the first volume included a brief summary description of the adopted 1990 regional land use and transportation plans, together with a summary of the progress from 1966 to 1972 in the implementation of those plans.

This, the second volume, is concerned with the revalidation of the regional land use and transportation development objectives, principles, and standards formulated in the initial planning effort; with new forecasts of economic activity, population levels, and of land use, transportation, and natural resource demands; and with the presentation and evaluation of alternative land use and transportation plans designed to meet anticipated growth and change in the Region through 2000. Finally, this second volume presents the new regional land use and transportation plans selected from among the alternatives considered after public evaluation and recommended for adoption and implementation. This volume also includes an environmental assessment of the recommended plans, a proposed staging of land use and major transportation facilities, and specific recommendations for land use and transportation system plan implementation.

THE LAND USE-TRANSPORTATION PLANNING PROCESS—A BRIEF REVIEW

The nature of the land use-transportation planning problem, the basic principles and concepts underlying the land use-transportation planning process, and the process itself all were described in the first volume of this two-volume report; and reference should be made to that volume for a more detailed discussion of the need for, purposes of, and methods of planning for regional land use and transportation system development. It is important to note in review, however, that the alternative land use and transportation plans and the recommended plans presented in this volume have been developed through a seven-step planning process. Through this process the Region and its principal functional relationships can be accurately described, both graphically and numerically; the complex movement of people and vehicles on highway and transit facilities simulated; and the effects of different courses of action with respect to regional land use and transportation system development quantitatively and qualitatively evaluated. The seven steps involved in this planning process are: 1) study design; 2) formulation of objectives and standards; 3) inventory; 4) analysis and forecast; 5) plan design; 6) plan test and evaluation; and 7) plan selection and adoption. Plan implementation, although necessarily a step beyond the foregoing planning process, must be considered throughout the process if the plans are to be realized. In fact, one of the primary objectives of the critical plan test and evaluation step is to test plan proposals for feasibility of implementation.

The first of these seven steps in the planning process—study design—has been described and its results set forth in a series of detailed study designs, staff memoranda, and "benchmark" reports.[1] The third step—inventory—has been described and its findings set forth in Volume One of this report. This important step provided the necessary information base for step 4—analysis and forecast; step 5—plan design; step 6—plan test and evaluation; and step 7—plan selection and adoption. This volume will describe and present the results of these four steps in the planning process, together with the results of step 2, the formulation of objectives and standards. A brief explanation of each of the steps to which this volume relates is included here in order to clarify its function in the planning sequence.

Formulation of Objectives and Standards

Since planning is a rational process for formulating and meeting objectives, the formulation of objectives is an essential task which must be undertaken before plans can be prepared. The objectives chosen guide the preparation of alternative plans and, when converted to standards, provide the criteria for evaluating and selecting from among the alternatives. Since objectives provide the logical basis for plan synthesis, the formulation of sound objectives is a crucial step in the planning process. In order to be useful in plan design, the objectives must not only

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[1] *For citations to each of the study design documents, see SEWRPC Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin—2000, Volume One, Inventory Findings, p. 19.*

be stated clearly and be sound logically, but must be related in a demonstrable way to alternative physical development proposals. Only if the objectives are clearly related to physical development and subject to objective test can a choice be made from among alternative plans in order to select that plan which best meets the agreed-upon objectives.

It is important to recognize that because the formulation of objectives involves a formal definition of a desirable physical system by listing, in effect, the broad needs which the system aims to satisfy, the objectives explicitly reflect an underlying value system. Thus, every physical development plan is accompanied by its own unique value system. The diverse and often conflicting nature of value systems in a complex urban society complicates this process of goal formulation and makes it one of the most difficult tasks in the planning process. This difficulty relates in part to the lack of a clear-cut basis of choice between value systems and in part to the reluctance of public officials to make an explicit choice of ultimate goals. Although, because of the differing value systems involved, there may be no single argument to support a given choice of objectives, it is possible to state certain planning principles which provide at least some support for the choice; and this was done in both the initial planning effort and in the plan reevaluation effort.

Objectives cannot be intelligently chosen without the knowledge of the causal relationships existing between objectives and means. This suggests that the formulation of objectives is best done by people with prior knowledge of the social, economic, and technical means of achieving the objectives, as well as the underlying value systems. Even so, it must be recognized that the objectives may change as a selection is attempted from among alternative means or plans. In the process of evaluating alternative plans, the various alternatives are ranked according to ability to meet objectives. If the best plan identified nevertheless falls short of the chosen objectives, either a better plan must be designed or the objectives must be compromised. The plan evaluation provides the basis for deciding which objectives to compromise. The compromises may take three forms: certain objectives may be dropped because their satisfaction has been proven unrealistic, new objectives may be suggested, or conflicts between inconsistent objectives may be balanced out. Thus, the formulation of objectives must proceed with plan design and implementation as part of a continuing planning process.

The regional development objectives formulated as part of the initial land use-transportation planning effort were necessarily conditioned by the then existent knowledge of conditions within the Region, and by the contemporary status of planning at the federal, state, regional, and local levels. With the passage of time and the attainment of additional knowledge about the Region; with fulfillment of certain adopted regional development objectives through plan implementation and the failure to fulfill others, a major reevaluation of regional development objectives and supporting standards was deemed necessary as an integral part of the overall plan reevaluation process.

Under the initial regional land use-transportation study, the advisory committee structure created for that purpose provided a practical and effective means for involving public officials, technicians, and citizen leaders in formulation of the regional land use and transportation system development objectives. The continued validity of these basic objectives, as well as the relative priorities which the citizens of the Region may assign to each of these objectives and to other objectives, are all, as already noted, ultimately derived from community values. These values can probably be best assessed through the process of human interaction which takes place in the established political system as the implementation actions for various plan proposals are advanced over time. Consequently, a very pragmatic approach was taken to the reappraisal of the regional development objectives. This approach consisted of assessment by the Commission staff, the Technical and Citizen Advisory Committees, and the Commission itself of the community reaction experienced over the past decade to specific plan implementation actions growing out of the adopted regional land use and transportation plans. Under this approach, continued adverse public reaction or response to plan implementation proposals was viewed as an indication of a need to reevaluate the specific objectives, principles, and standards involved for continued relevance. Conversely, favorable public reaction was deemed to be expressed through effective plan implementation, itself facilitated by favorable public response.

Care must be exercised in this respect to ensure that any reaction to plan implementation proposals—adverse or favorable—truly reflects the values of a majority of the citizen body within the Region and not the values of small "pressure groups," and also that the reaction reflects long-term, stable community values and not ephemeral opinions. Toward this end, the plan reevaluation process incorporated attitudinal and personal opinion surveys not only to provide information on current public preferences for various types and levels of transportation facilities and services and for various housing types and locations, but also to assess the changes in these preferences which may have occurred within the Region since the initial planning effort. When considered with the results of the accompanying behavioral studies of travel habits and patterns and of housing types and locations, the attitudinal surveys provide the best available measure of not only current public opinion but of underlying attitudes and of changes in these opinions and attitudes over time. Taken together, then, the attitudinal and behavioral surveys and studies provided a sound basis for considering needed revisions in regional development objectives, principles, and standards.

Forecasting—The Determination of Future Needs

Although the preparation of forecasts is not planning, the preparation of all plans must begin with some kind of forecast. In any planning effort, forecasts are required

of all future events and conditions which are outside the scope of the system to be planned but which will affect plan design or implementation. For example, the future demand for land, transportation, and natural resources will depend primarily upon the size of the future population and the nature of future economic activity within the Region. Control of changes in population and economic activity levels lies largely outside of the scope of governmental activity at the regional and local levels, outside the scope of the physical planning process, and certainly outside the scope of regional land use and transportation plans. Future population and economic activity levels must, therefore, be forecast. These levels, in turn, determine the aggregate future land use demand. This is not to say, however, that governmental policies at the regional and local level cannot influence the course of economic development and, consequently, of population growth. For example, the provision of efficient regional transportation and utility systems can contribute to favorable industrial location decisions even though the provision of such systems cannot directly generate economic growth.

The preparation of a transportation plan by itself, as has been the practice in some metropolitan areas, requires that the spatial distribution of future land use also be considered outside the scope of the plan and, therefore, as an element to be forecast. In the regional land use-transportation planning process initially established for the Southeastern Wisconsin Region in 1963, however, the spatial distribution of future land uses was considered to be within the scope of the system being planned and, therefore, became a design rather than a forecast problem. Indeed, the preparation of a forecast of the spatial distribution of land use would be a contradiction of the basic principles and concepts underlying the regional land use and transportation process as that process was established in southeastern Wisconsin.

Even though it is not necessary to forecast the spatial distribution of these land uses, it is essential to forecast the future gross regional requirements for each of the major land use categories. This is so because the land use plans to be prepared must meet the forecast regional need. These forecasts of gross land use requirements, along with the forecasts of probable future levels of population and employment on which they are based, are presented herein, as are forecasts of probable future personal income levels, automobile and truck availability, and public revenues.

Two important considerations involved in the preparation of necessary forecasts are the forecast target date and the forecast accuracy requirements. Both the land use pattern and the transportation system must be planned for anticipated demand at some future point in time. In the planning of transportation systems, this "design year" is usually established by the expectant life of the first facilities to be constructed in the implementation of the plan. This also permits associated forecasts to be more readily tempered by predictable changes in technology. Although it may be argued that the design year for land use development should be extended further into the future than that for transportation facilities because of the basic irreversibility of many land use development decisions, practical considerations dictate that the land use planning design year be scaled to the facility design year requirement.

Forecast accuracy requirements depend on the use to be made of the forecasts; and as applied to land use and transportation planning, the critical question relates to the effect of any forecast inaccuracies on the basic structure of the plans to be produced. It is important to keep the forecast tolerances within that range wherein only the timing and not the basic structure of the plans will be affected. Experience has indicated that if the basic population, employment, personal income, and automobile and truck availability forecasts can be made to within plus or minus 10 percent per decade, it is likely that only the timing, and not the structure, of the plans will be affected.

As documented in Volume One of this report, surveillance activities conducted under the continuing regional land use-transportation study indicate that employment, motor vehicle availability, land use demand, and total travel demand expressed in terms of vehicle miles of arterial travel are increasing within the Region approximately as forecast under the initial regional land use-transportation planning effort. Population growth, however, is occurring at a rate somewhat below that originally forecast, while transit utilization continues to decline at a rapid rate at variance with the original forecast and 1990 plan recommendations. The decrease in the rate of population growth coupled with the need to select a new plan design year dictated that new basic forecasts of population and employment be prepared as part of the plan reevaluation process. The year 2000 was selected as the new plan design year in order to continue to provide an approximately 20-to-25-year design period for major transportation facilities as required by federal regulations concerning transportation system planning and as generally dictated by good planning and engineering practice.

Plan Design

Plan synthesis or design forms the heart of the planning process. The most well-conceived objectives; the most sophisticated data collection, processing, and analysis operation; and the most accurate forecasts are of little value if they do not ultimately result in sound plans to meet the objectives in light of forecast need. The outputs of each of the three planning operations: 1) formulation of objectives and standards; 2) inventory; and 3) forecast—become inputs to the design problem of plan synthesis or design.

The land use plan design problem consists essentially in determining the allocation of a scarce resource—land—between competing and often conflicting demands. This allocation must be accomplished so as to satisfy the aggregate needs for each land use and comply with the design standards derived from the plan objectives, all at a feasible cost. The transportation plan design problem requires a similar reconciliation between travel demand derived from the given land use plan, transportation design standards, existing facilities, and new facility costs.

The task of designing two of the major components of a total environment for the lives of over two million people is a most complex and difficult one. Not only is each component in itself a major problem in terms of the sheer size of the system to be designed, but the pattern of interaction between the components is exceedingly complex and constantly changing. The land use pattern must enable people to live in close cooperation and yet freely pursue an enormous variety of interests. It must minimize conflicts between population growth and limited land and water resources; maintain an ecological balance of human, animal, and plant life; and avoid gross public health, safety, and welfare problems. The transportation system must not only serve and promote a desirable land use pattern, but do so without creating a demand which aggravates its own congestion. The combined land use-transportation system must be organized so that its construction and reconstruction does not constantly disrupt its performance.

The magnitude of such a design problem approaches an almost insoluble level of complexity, yet no substitute for intuition in plan design has so far been found, much less developed at a practical level. Means do exist, however, for reducing the gap between the necessary intuitive and integrative grasp of the problem and its growing magnitude; and these have been fully applied in the regional land use-transportation study. These means center primarily on the application of systems engineering techniques to the quantitative test of both the land use and transportation system plans. Yet, the quantitative tests involved in these techniques, while powerful aids to the determination of the adequacy of the plan design, are of strictly limited utility in actual plan synthesis. Consequently, it is necessary to develop both the land use and transportation plans by traditional graphic and analytical "cut and try" methods, then to quantitatively test the resulting designs by application of simulation model techniques, and then make necessary adjustments in the designs until workable plans have been evolved.

In order to overcome the limitations of individual intuitive grasp of the design problem, maximum resort was made to team effort in the actual plan synthesis. The knowledge and experience of those state and local planners and engineers, public officials, and concerned citizens most familiar with the geographic and functional areas concerned were applied to the plan synthesis process through careful advisory committee review and, where necessary, interchange of staff. Finally, and most importantly, it should be noted that in both the land use and transportation plan synthesis, the Commission had at its disposal far more definitive information bearing on the problem than has ever before been available; and this fact alone makes the traditional plan synthesis techniques applied far more powerful.

In the initial land use-transportation planning study, a concerted effort was made to prepare and present for public evaluation all of the alternatives that were practically available to the Region with respect to land use and transportation system development. Accordingly, three alternative land use plans were prepared—a satellite city, a corridor, and a controlled existing trend land use plan.[2] In addition, a fourth alternative land use pattern, consisting of the land use pattern which might be expected to exist within the Region if existing land use development trends were assumed to continue to the design year of the plan, was prepared and evaluated.[3] Alternative transportation system plans were then designed to serve each of these four alternative land use patterns.

Because the work conducted under the initial regional land use-transportation planning effort clearly demonstrated that the controlled existing trend plan was the best of the four alternative land use patterns considered; because the surveillance activities conducted since plan adoption reveal that population growth within the Region was less than originally forecast; because the new regional population growth forecast indicates that the total population in the Region for the plan design year 2000 may be expected to be substantially less than that initially forecast for the plan design year 1990; and because the controlled existing trend plan was the most energy efficient of the plans previously considered insofar as the transportation implications were concerned, it was determined that in the land use plan reevaluation process, work efforts would be centered on revisions to the basic controlled existing trend plan that was selected as the adopted regional land use plan for the initial plan design year 1990.

It was further determined that in the revision of the controlled existing trend plan as initially prepared, two somewhat different development concepts would be explored, resulting in the preparation of two different alternative controlled existing trend land use plans for the year 2000. In the first such revised plan, the development concept emphasized was one of centralization with virtually all new urban development located within areas readily served by such important urban facilities as centralized public sanitary sewer, water supply, and mass transit. Under this development concept, new urban development would occur in planned neighborhood development units, primarily at medium population density levels. This development concept is identical to that utilized in the preparation of the adopted regional land use plan for 1990.

In the second such revised plan, the development concept placed less emphasis on centralization, on the planned neighborhood unit, and on the attainment of medium population density levels, and more emphasis on permanent reliance on onsite soil absorption sewage disposal systems (septic tanks) and private water supply wells. This second plan was prepared at the specific request of cer-

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[2] *See SEWRPC Planning Report No. 7, The Regional Land Use-Transportation Study, Volume Two, Forecasts and Alternative Plans—1990.*

[3] *See SEWRPC Planning Report No. 7, The Regional Land Use-Transportation Study, Volume Three, Recommended Regional Land Use-Transportation Plans—1990.*

tain local and state officials and private individuals who envisioned the need -even within the broad concept of a controlled existing trend land use plan—to accommodate low-density, unsewered urban development. In each case, the refinements in the plan were to reflect actual land use development that had occurred since adoption of the initial regional land use plan in 1966, the information and recommendations provided by other regional planning programs completed since 1966, and the new employment, population, and land use demand forecasts.

Studies conducted in the initial regional land use-transportation planning effort clearly established that a fixed rail rapid transit system would be inferior to the more flexible and economic rapid bus system, providing a lower level of service at a higher cost. Subsequent plan implementation studies conducted within the Region, in particular the preparation of the Milwaukee area transit plan, revalidated this initial finding. In addition, contemporary studies conducted by the U. S. Department of Transportation have indicated the superiority of a bus over a rapid transit system with respect to cost, pollutant emission, and energy consumption.[4] For these reasons, the Commission staff recommended, and the Technical Coordinating and Advisory Committee endorsed, that no further consideration be given in the plan reevaluation to forms of rapid transit other than those utilizing the motor coach as the vehicle.

In considering this most important determination, the Citizens Advisory Committee, while agreeing that no further consideration should be given to the traditional forms of "heavy" rail rapid transit, requested that flexibility be retained in the plan reevaluation process so that consideration could be given to the evaluation of "light" rail rapid transit systems in certain travel corridors.[5] In response to this request, the study design for the reevaluation was amended to provide for flexibility in the selection of a particular transit mode within specific travel corridors. Such selection would be based upon the analysis of travel demand characteristics within such corridors, an evaluation of the interrelationships among such corridors, and an analysis of the ability of each of the two modes to meet the plan objectives, including minimization of capital and operating costs.

Thus, except with respect to consideration of a "heavy" rail rapid transit system, a complete reevaluation of thc adopted regional transportation plan was deemed essential, with particularly careful attention being given to the balance to be effected between the transit and highway modes for person trip movements, to alternative means for providing the necessary transportation capacity in the major travel corridors of the Region, and to an analysis of a "no build" alternative. This reevaluation would incorporate and be based upon the changes that have taken place over the last decade in travel demand and in the factors affecting this demand, as revealed by the reinventory of travel within the Region conducted as part of the plan reevaluation effort.

For each of the two alternative regional land use plans described above, two alternative regional transportation plans were prepared along with an analysis of the "no build" alternative. The design of all of the alternative plans drew upon the initial 1990 adopted regional transportation plan, as amended by the Milwaukee area transit plan, the Racine and Kenosha area transit development programs, and the seven-county jurisdictional highway system plans.[6] The two alternative transportation plans prepared with respect to each alternative land use plan were: a transit supported highway plan and a highway supported transit plan. It should be clearly understood that each of the two alternative transportation plans contain significant proposals for both highway and transit facility improvements and that the labels attached to the alternatives refer only to the degree to which, in the one case, highway improvements are proposed and, in the other case, transit improvements are proposed. The labels are attached merely to facilitate ready identification of the alternatives.

Both the transit supported highway and highway supported transit alternative plans can probably best be understood when viewed against the adopted 1990 regional transportation plan, as amended. In general, the transit supported highway alternative transportation plans for the year 2000 propose fewer highway improvements, particularly in the urbanized areas of the Region, than the adopted regional transportation plan, while proposing transit improvements equal to, and in some

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[4] *Evaluation of Rail Rapid Transit and Express Bus Service in the Urban Commuter Market, U. S. Department of Transportation, October 1973.*

[5] *For definition of the terms "heavy" and "light" rail, see SEWRPC Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin—2000, Volume One, Inventory Findings, p. 286.*

[6] *For documentation of these plan elements see: SEWRPC Planning Report No. 7, The Regional Land Use-Transportation Study, Volume Three, Recommended Regional Land Use-Transportation Plans—1990; The Milwaukee Area Transit Plan; SEWRPC Community Assistance Planning Report No. 3, Racine Area Transit Development Program 1975-1979; SEWRPC Community Assistance Planning Report No. 7, Kenosha Area Transit Development Program 1976-1980; SEWRPC Planning Report No. 11, A Jurisdictional Highway System Plan for Milwaukee County; SEWRPC Planning Report No. 15, A Jurisdictional Highway System Plan for Walworth County; SEWRPC Planning Report No. 17, A Jurisdictional Highway System Plan for Ozaukee County; SEWRPC Planning Report No. 18, A Jurisdictional Highway System Plan for Waukesha County; SEWRPC Planning Report No. 22, A Jurisdictional Highway System Plan for Racine County; SEWRPC Planning Report No. 23, A Jurisdictional Highway System Plan for Washington County; and SEWRPC Planning Report No. 24, A Jurisdictional Highway System Plan for Kenosha County.*

cases beyond, those initially proposed in the 1990 plan. Furthermore, the transit supported highway transportation plan alternatives are based upon an assumption that the current relationship between automobile parking costs, automobile operating costs, and transit fares will remain relatively constant over the design period of the plan. In contrast, the highway supported transit alternative transportation plans propose significantly fewer highway improvements in the urbanized areas of the Region than the initial 1990 regional transportation plan. To compensate for the lower level of highway improvement in the urbanized areas, the highway supported transit alternatives propose a higher level of transit service through the establishment of a more extensive network of exclusive rights-of-way and reserved lanes for transit operations. In addition, the highway supported transit alternatives are based on an assumption that the current relationship between automobile parking and operating costs and transit fares would be changed, in that transit fares would be reduced through additional public subsidy to the equivalent of one-half of the current transit fare and that a minimum all day parking fee equivalent to a round trip transit fare would be established in the Milwaukee central business district.

Plan Test and Evaluation

If the plans developed in the design stage of the planning process are to be practical and workable and thereby realized in terms of actual land use and transportation system development, some measures must be applied to quantitatively test alternative plans in advance of their adoption and implementation. Traffic simulation models have been developed over the two decades for application in transportation planning that make it possible to calculate the existing and potential travel demand on any proposed transportation network as a function of the land use pattern to be served. The complete sequence of traffic simulation is applied in four stages:

1. Trip generation, in which the total number of future trips generated in each subarea of the Region is determined, using the relationships found to exist between land use and travel from analyses of the planning inventory data.

2. Trip distribution, in which the originating trips so generated are then allocated to destination zones and the interzonal travel desire lines established, using a trip distribution model.

3. Modal split, in which the distributed trips are divided into those using transit and those using private automobiles, using a modal split model.

4. Traffic assignment, in which the interzonal trips are then assigned to existing and proposed transit and highway facility networks, using a traffic assignment model.

Using this simulation procedure, it is possible to test and verify the workability and efficiency of any proposed combination of transportation network and land use pattern. The quantitative assignment of traffic to the network will reveal areas of over or under capacity and provide the basis for network modifications ultimately resulting in a practical and efficient transportation plan for which capital and operating costs can be calculated. Such assignment also permits the calculation of user benefits for benefit-cost analyses. Finally, such assignment provides a more precise basis for the application of planning standards so that the degree to which each alternative transportation plan meets the chosen objectives can be better determined.

While the validity and usefulness of this transportation simulation technique has been proven in numerous urban transportation studies, similar model techniques suitable for testing the feasibility of proposed land use plans have not been successfully applied previously. Conventional land use planning techniques normally involve quantitative tests only to the degree that the aggregate areas allocated to the various land uses in the alternative plans are scaled against the various forecast land use demands. Evaluation beyond such scaling of supply versus demand normally involves qualitative evaluation of the degree to which each alternative land use plan meets stated development objectives and of the legal feasibility of the alternatives. These conventional techniques were all applied, both in the initial land use-transportation study and in the plan reevaluation effort. In addition, the potential impacts of each alternative land use plan on the natural resource base were both quantitatively and qualitatively evaluated and the financial feasibility of each alternative set of land use-transportation plans established.

Since many private decisions by land developers, builders, and individual households, as well as public decisions by units of government, determine the regional land use pattern, a need exists for testing the feasibility of any land use plan proposals even beyond that provided by the expanded conventional techniques. In the initial regional land use-transportation study for southeastern Wisconsin, therefore, an experimental land use simulation model capable of representing the decision processes of households and business firms influential in land development was developed and applied. The basic problem of land use plan test using simulation model techniques may be stated as: given a target plan, determine whether this plan can be attained considering behavioral patterns of land developers, builders, and households; public land use controls; and public works programs. Using a land use simulation model, a number of experimental simulation runs can be performed with differing land use control policies and the practicality of the plan determined.

Experience in utilizing the land use simulation model in the initial regional land use-transportation study was favorable in the sense that it afforded the only means available for quantitatively integrating the land use and transportation planning effort with respect to testing the effects of changes in accessibility provided by alternative transportation systems on land use distribution within the Region; yet this experience with the land use simulation model only served to underscore the basic conceptual

difference between land use simulation and land use planning. The preparation of a regional land use plan is based upon many factors and considerations of which accessibility is only one. Perhaps more important in the preparation of a regional land use plan is the impact of urban land use development on the natural resource base in the Region, particularly with respect to the identified primary environmental corridors and prime agricultural lands. Even if, for example, it could be shown that a given transportation facility in a system would improve accessibility to a given subarea in the Region, such improved accessibility may not at all influence the plan design process, since overriding environmental and public utility considerations would control the design of the accompanying land use plan. Given the growing concern for environmental preservation, as well as the more recent concern for energy conservation, it has become even more apparent that the traditional method of land use plan design is sound even though in and of itself it is not able to quantitatively test the changes in accessibility provided by transportation systems. Accordingly, it was determined not to exercise the land use simulation model in the land use plan reevaluation process.

With the exception of the land use simulation model application, then, the original means adopted for plan test and evaluation under the initial regional land use-transportation planning effort proved sound. Accordingly, no basic changes in this procedure were made under the plan reevaluation. The transportation simulation model utilized in the test and evaluation were recalibrated, revalidated, and somewhat refined based upon the new information base available from the reinventory of travel demand within the Region. This revalidation, recalibration, and refinement included a redelineation of the traffic analysis zones, a refinement of the arterial street and highway and transit networks, and certain refinements of submodels of the traffic simulation models.

The evaluation of the alternative regional land use and transportation plans for the year 2000 was expanded to include the impacts of such plans on ambient air quality within the Region. In the initial regional land use-transportation study, the Commission had prepared estimates of the relative amounts of air pollutants produced by alternative transportation systems and used these estimates in a relative manner in its evaluation of alternative plan proposals. The effect of such emissions on ambient air quality, however, was not considered. The growing interest in, and importance of, air quality management within the Region, together with new federal requirements concerning air pollution control planning and management, led the Commission to establish a concurrent regional air quality maintenance planning program to provide the basis for a comprehensive approach to regional air quality management.[7] Rather than simply intensify air pollution studies under the continuing regional land use-transportation study, directing that study toward the narrow single-functional purpose of evaluating the air quality implications of alternative regional transportation plans, the comprehensive regional air quality maintenance planning program includes consideration of all point, line, and area sources of air pollution, relating such sources to land use as well as transportation system development, thereby meeting both the federal requirement for the evaluation of air quality impacts of alternative regional transportation plans and the federal requirement for the preparation in southeastern Wisconsin of a regional air quality maintenance plan.

The basic analytic tool for integrating land use and transportation system planning and air quality maintenance planning is an ambient air quality simulation model. Under the regional air quality maintenance planning effort, the University of Wisconsin-Madison air quality simulation model, considered to be one of the most advanced in the United States at the present time, was further developed, properly calibrated, and applied to the Southeastern Wisconsin Region. This planning tool was used to determine the decisions required to maintain adequate air quality in the Region over the next two to three decades while evaluating alternative regional land use and transportation plans vis-a-vis maintenance of adequate ambient air quality. The results of the application of the ambient air quality simulation model to the alternative regional land use and transportation plans described above are reported herein.

Plan Selection and Adoption

As noted above, two alternative regional land use patterns together with a number of supporting transportation system plans were developed. The general approach used for the selection of a single set of land use and transportation plans from among these alternatives was to proceed through the use of the advisory committee structure and public informational meetings and hearings to a final decision and plan adoption by the Commission, all in accordance with the provisions of the state enabling legislation. Due consideration must be given in such selection and adoption to the ability of the public financial resource base of the Region to meet the cost of plan implementation. Moreover, plan selection and adoption necessarily involve both technical and nontechnical policy determinations and must, therefore, be founded in the active involvement of the various governmental bodies, technical agencies, and private interest groups concerned with regional development in the planning process. Such involvement is particularly important in light of the advisory role of the Commission in shaping regional development. The use of advisory committees and both formal and informal public hearings appears to be the most practical and effective procedure for involving public officials, technicians, and citizens in the planning process and of openly arriving in agreement among the affected governmental bodies and agencies on objectives and on plans which can be jointly implemented. No major changes were effected in the plan selection and adoption procedure. However, in the overall plan reevaluation effort, particularly with reference to public participation, extensive public informational meetings were held

[7] *See SEWRPC Regional Air Quality Maintenance Planning Program Prospectus.*

throughout the Region; and every effort was taken to give full consideration to constructive public input.

After review by the advisory committees concerned, the regional development alternatives presented in Chapter V of this volume and compared and evaluated in Chapter VI of this volume were presented for formal public evaluation at a regional planning conference held on April 14, 1976. Following this conference, a series of subregional public informational meetings and hearings was held in an effort to obtain maximum public official and citizen participation in the plan selection process. Documentation of these public information efforts is provided in Chapter VI of this volume. The regional land use plan selected for adoption is documented in Chapter VII of this volume. The regional transportation system plan finally selected for adoption is documented in Chapter VIII of this volume, along with a set of final regional transportation alternatives that were the subject of a series of public hearings held in late November and early December of 1977. The new regional land use and transportation plans have been staged for the year 1985 in an effort to facilitate the preparation of federal, state, and local capital improvement programs relating to land use and transportation systems development. In addition, the initial staging of the long-range regional transportation plan provides in part a basis for the preparation by the Commission on an annual basis of the federally required transportation systems management plan and transportation improvement program.[8]

SCHEME OF PRESENTATION

The major findings and recommendations of the regional land use-transportation plan reevaluation are presented in this two-volume report replacing, in effect, the three-volume SEWRPC Planning Report No. 7. This, the second volume of the report, presents in summary form the new long-range areawide land use and transportation system plans for southeastern Wisconsin. The new land use and transportation system development objectives, principles, and standards are set forth in Chapter II. New forecasts of regional growth and change are presented in Chapter III, while the development and application of transportation system planning models are described in Chapter IV. The new regional alternatives for land use and transportation system development are described in Chapter V and compared and evaluated in Chapter VI. The new recommended regional land use and transportation system plans are described and compared with the old 1990 plans in Chapters VII and VIII, respectively. Chapter IX contains the specific plan implementation actions required to carry out the new set of plans. Finally, Chapter X provides an overview summary of the entire second volume report. An environmental assessment of the recommended plans is set forth in Appendix K.

This report can only summarize in brief fashion the large volume of information generated in the forecasting, plan design, plan test and evaluation, and plan selection and adoption phases of the land use-transportation plan reevaluation effort. Although the reproduction of these data in conventional report format is impossible due to the magnitude and complexity of the data generated, data from the Commission files are available to member units and agencies of government and to the general public upon specific request. This report, therefore, serves the additional purpose of indicating the type of data available from the Commission which may be of value in assisting federal, state, and local units and agencies of government and private investors in making better decisions concerning community development within the Region.

This planning report is supplemented by certain other Commission publications. These include the SEWRPC technical report and technical record series, which deal with certain phases of the work in greater depth and detail than is possible in this final planning report. These additional publications set forth the procedures and findings of the major work elements of the plan reevaluation, including particularly the results and findings of the Commission's socioeconomic inventories and forecasts and planning law studies.

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[8] *The transportation systems management plan is intended to comprise the short-range element of the long-range areawide transportation plan. It is intended to be distinct from, but compatible with, the long-range element, and together with the long-range element comprise the regional transportation plan. The objective of the transportation systems management plan is to make more efficient use of the highway and transit systems already in place through low capital investment projects or new policy initiatives and, in so doing, reduce or postpone the need for new major capital investments in transportation facilities. The short-range transportation systems management plan is, thus, intended to emphasize such relatively low capital investment solutions to transportation problems as traffic engineering and public transportation pricing, management, and operation.*

The transportation improvement program is intended to be a staged multi-year program of both capital and operating projects designed to implement the regional transportation plan, including the long-range element and the short-range transportation systems management element. The program is intended to cover a period of from three to five years and is to include the transportation improvements recommended for implementation during the program period; indicating the areawide priorities of those improvements; summarizing the estimated costs and revenues associated with the improvements; and describing how the recommended improvements relate to both the long- and short-range elements of the regional plan. The program must include an annual element for the ensuing year consisting of a list of transportation improvement projects proposed for implementation during the first program year. The transportation improvement program must be annually updated so that it always consists of a two to four year period beyond the annual element.

For a detailed discussion concerning the transportation systems management plan and the transportation improvement program, see SEWRPC Benchmark Report No. 6, Procedure for Preparing a Regional Transportation Systems Management Plan and Regional Transportation Improvement Program.

Chapter II

OBJECTIVES, PRINCIPLES, AND STANDARDS

INTRODUCTION

Planning is a rational process for formulation and meeting objectives. The formulation of objectives, therefore, is an essential task which must be undertaken before plans can be prepared. The formulation of objectives for organizations whose functions are directed primarily at a single purpose or interest and, therefore, are direct and clear cut is a relatively easy task. The seven-county Southeastern Wisconsin Planning Region is composed, however, of many diverse and often divergent interests; consequently, the formulation of objectives for the preparation of advisory comprehensive regional development plans is a very difficult task.

Soundly conceived regional development objectives should incorporate the combined knowledge of many people who are informed about the Region and should be established by duly elected or appointed representatives legally assigned this task, rather than by planning technicians. This consideration is particularly important because of the value system implications inherent in any set of development objectives. Active participation by duly elected or appointed public officials and by citizen leaders in the regional planning program is implicit in the structure and organization of the Southeastern Wisconsin Regional Planning Commission itself. Moreover, very early in its existence, the Commission recognized that the task of guiding the broad spectrum of related public and private development programs which would influence and be influenced by a comprehensive regional planning program would require an even broader opportunity for the active participation of public officials and private interest groups in the regional planning process. In light of this recognition, the Commission since its inception has provided for the establishment of advisory committees to assist the Commission and its staff in the conduct of the regional planning program.

The advisory committee structure established by the Commission for the reevaluation of the adopted regional land use and transportation plans has been described in Volume One of this report. The use of these advisory committees has been, and still appears to be, the most practical and effective procedure available for involving interested and knowledgeable public officials, technicians, and private citizens in the regional planning process and of openly arriving at decisions and action programs which can shape the future physical development of the Region. Only by combining the accumulated knowledge and experience about the Region which the various advisory committee members possess can a meaningful expression of the desired direction, magnitude, and quality of future regional development be obtained. One of the major tasks of these committees in the initial regional land use transportation planning effort was, therefore, to assist in the formulation of regional development objectives and supporting planning principles and standards.

Because of the passage of time, the attainment of additional knowledge about the Region, the formulation of additional development objectives under other related regional and subregional planning programs, the degree of attainment of each of the various adopted regional development objectives, and both adverse and favorable public reaction to plan implementation proposals, careful review of the regional development objectives and supporting principles and standards was deemed essential to proper reevaluation of the adopted regional land use and transportation plans. This chapter sets forth the results of that review in the form of revised regional land use and transportation system development objectives, principles, and standards which have been adopted by the Commission after careful review and upon recommendations by the Commission staff and the advisory committees concerned.

BASIC CONCEPTS AND DEFINITIONS

Definitions for the term "objective" as well as for the terms "principle," "standard," "plan," "policy," and "program" were established for use as a common frame of reference in the initial land use-transportation study. The process of definition was needed because the term "objective" was subject to a wide range of interpretation and application and was closely linked to other terms often used in planning work which were equally subject to a wide range of interpretation and application. These definitions have remained valid over time and for convenience are set forth below as originally established:

1. Objective: a goal or end toward the attainment of which plans and policies are directed.

2. Principle: a fundamental, primary, or generally accepted tenet used to support objectives and prepare standards and plans.

3. Standard: a criterion used as a basis of comparison to determine the adequacy of plan proposals to attain objectives.

4. Plan: a design which seeks to achieve agreed upon objectives.

5. Policy: a rule or course of action used to ensure plan implementation.

6. Program: a coordinated series of policies and actions to carry out a plan.

Although this chapter deals with only the first three of these terms, an understanding of the interrelationship between the foregoing definitions and the basic concepts which they represent is essential to the following discussion of objectives, principles, and standards.

OBJECTIVES

In order to be useful in the regional land use-transportation planning process, objectives must be sound logically and related in a demonstrable and measurable way to alternative physical development proposals. This is necessary because it is the legal duty and function of the Commission to prepare a comprehensive plan for the physical development of the Region and, more particularly, because it is the purpose of the regional land use-transportation study to prepare two of the key elements of such a plan: a land use plan and a transportation plan. Only if the objectives are clearly relatable to physical development and only if they are subject to objective tests can an intelligent choice be made from among alternative plans in order to select the one plan or combination of plans which best meets the agreed upon objectives.

Recognizing that: 1) various public and private interest groups within a Region as large and diverse as southeastern Wisconsin may have varying and at times conflicting objectives; 2) many of these objectives are of a qualitative nature and, therefore, difficult to quantify; and 3) many objectives which may be held to be important by the various interest groups within the Region may not be related in a demonstrable manner to physical development plans, the Commission identified two basic types of objectives under the initial regional land use-transportation planning effort. These were general development objectives—often referred to by other agencies as "goals"—which are by their very nature either qualitative or difficult to relate directly to development plans, and specific development objectives, which can be directly related to physical development plans and at least crudely quantified. The rationale for using these two types of objectives remains valid; and, for the most part, the general and specific regional development objectives which have been adopted for use in the land use-transportation plan reevaluation are quite similar to those formulated and adopted in the initial regional land use-transportation planning effort. Thus, the broad needs which the regional land use and transportation plans are to be designed to satisfy—as expressed in the form of the regional land use and transportation system development objectives—have remained essentially the same.

General Objectives

The following general development objectives have been adopted by the Commission after careful review and recommendation by the Citizens Advisory Committee and the Technical Coordinating and Advisory Committee on Regional Land Use-Transportation Planning:

1. Economic growth at a rate consistent with regional resources including land, labor, and capital, and primary dependence on free enterprise in order to provide needed employment opportunities for the expanding labor force of the Region.

2. A wide range of employment opportunities through a broad, diversified economic base.

3. Conservation and protection of desirable existing residential, commercial, industrial, and agricultural development in order to maintain desirable social and economic values; renewal of obsolete and deteriorating residential, commercial, and industrial areas in the rural as well as in the urban areas of the Region; and prevention of slums and blight.

4. A broad range of choice among housing designs, sizes, types, and costs, recognizing changing trends in age group composition, income, and family living habits.

5. An adequate, flexible, and balanced level of community services and facilities.

6. An efficient and equitable allocation of fiscal resources within the public sector of the economy.

7. An attractive and healthful physical and social environment with ample opportunities for education, cultural activities, and outdoor recreation.

8. Protection, wise use, and sound development of the natural resource base.

9. Development of communities having distinctive individual character, based on physical conditions, historical factors, and local desires.

The foregoing general development objectives are proposed as goals which public policy within the Region should promote over time. They are all necessarily general but, nevertheless, provide the broad framework within which regional planning can take place and the more specific goals of the various functional elements and component parts of the Region stated and pursued. The statement of these objectives is concerned entirely with ends and not with means, and the principal emphasis of these general objectives is on those aspects of regional development which relate either to the expenditure of public funds or to the effects of government actions and regulations. With respect to these general development objectives, it was deemed sufficient to arrive at a consensus among the advisory committees and the Commission itself that the plan proposals do not conflict with the objectives. Such a consensus represents the most practical evaluation of the ability of the alternative plan proposals to meet the general development objectives.

Specific Development Objectives

Within the framework established by the general development objectives, a secondary set of more specific objectives can be postulated which will be directly relatable to physical development plans and can be at least crudely quantified. The quantification is facilitated by complementing each specific objective with a set of quantifiable

planning standards which are, in turn, directly relatable to a planning principle which supports the chosen objective. The planning principles thus augment each specific objective by asserting its inherent validity as an objective.

The specific objectives which have been adopted by the Commission, after careful review and recommendation by both Commission staff and advisory committees are herein listed separately for land use and transportation planning purposes. It should be emphasized, however, that land use and transportation are inextricably linked; and, therefore, land use planning objectives cannot be separated from transportation planning objectives. The separate listing of the specific objectives herein is only for convenience of organization and presentation.

Land Use Development Objectives: The specific objectives adopted for the regional land use plan are largely self-descriptive. They are concerned primarily with spatial allocation to, and distribution of, the various land uses, land use compatibility, resource protection, and accessibility. The following specific land use development objectives were adopted by the Commission in 1966 and readopted in 1977 after careful review and recommendation by the Citizens Advisory Committee and the Technical Coordinating and Advisory Committee on Regional Land Use-Transportation Planning:

1. A balanced allocation of space to the various land use categories which meet the social, physical, and economic needs of the regional population.

2. A spatial distribution of the various land uses which will result in a compatible arrangement of land uses.

3. A spatial distribution of the various land uses which will result in the protection and wise use of the natural resources of the Region, including its soils, inland lakes and streams, wetlands, woodlands, and wildlife.

4. A spatial distribution of the various land uses which is properly related to the supporting transportation, utility, and public facility systems in order to assure the economical provision of transportation, utility, and public facility services.

5. The development and conservation of residential areas within a physical environment that is healthy, safe, convenient, and attractive.

6. The preservation, development, and redevelopment of a variety of suitable industrial and commercial sites both in terms of physical characteristics and location.

7. The preservation and provision of open space to enhance the total quality of the regional environment, maximize essential natural resource availability, give form and structure to urban development, and facilitate the ultimate attainment of a balanced year-round outdoor recreational program providing a full range of facilities for all age groups.

8. The preservation of land areas for agricultural uses to provide for certain special types of agriculture, provide a reserve or holding zone for future needs, and ensure the preservation of those areas which provide wildlife habitat and which are essential to shape and order urban development.

These land use development objectives are substantially identical to those adopted in the initial study. In addition to the eight foregoing objectives, an objective concerned with minimizing regional energy use through the proper spatial distribution of the various land uses was considered. Although such an objective would have been highly desirable in light of increasing energy demands and costs and the decreasing supply of currently demanded energy sources, it was determined that such an objective would more properly be incorporated into functional plans for transportation and for power generation and distribution. This determination was dictated by the lack of any practical means for measuring and evaluating the energy efficiency of alternative land use patterns at the regional scale except through the energy efficiency of supporting transportation and power generation and distribution plans.

Transportation System Development Objectives: The specific objectives adopted for the regional transportation plan are concerned primarily with providing a balanced, flexible transportation system, alleviating traffic congestion, reducing travel time and accident exposure, and minimizing costs and disruptive effects upon communities and natural resources. The following specific transportation development objectives have been adopted by the Commission after careful review and recommendation by the Citizens Advisory Committee and the Technical Coordinating and Advisory Committee on Regional Land Use-Transportation Planning:

1. An integrated transportation system which, through its location, capacity, and design, will effectively serve the existing regional land use pattern and promote the implementation of the regional land use plan, meeting the anticipated travel demand generated by the existing and proposed land uses.

2. A flexible, balanced transportation system which will provide the appropriate types of transportation needed by all residents of the various subareas of the Region regardless of race, color, or national origin at an adequate level of service, and which will permit ready adaptation to both changes in travel demand and in transportation technology, including travel modes and transportation management.

3. The facilitation of traffic flow between component parts of the Region.

4. The reduction of accident exposure and the provision of increased travel safety.

5. A transportation system which is economical and efficient, satisfying all other objectives at the lowest possible cost.

6. Minimization of disruption of existing neighborhood and community development, including adverse effects upon the property tax base, and minimization of the deterioration and/or destruction of the natural resource base.

7. A transportation system with a high aesthetic quality whose major facilities will possess the proper visual relation to the land- and cityscape.

These transportation development objectives are very similar but not identical to those adopted under the initial study since the review and evaluation of those initial objectives by the Commission staff, advisory committees, and the Commission itself indicated that the basic needs which a transportation system should seek to satisfy in the Region have not changed appreciably in the past decade.

PRINCIPLES AND STANDARDS

Complementing each of the foregoing specific land use and transportation development objectives are a planning principle and a set of planning standards. These are set forth in Tables 1 and 2. Each set of standards is directly relatable to the planning principle, as well as to the objective, and serves to facilitate quantitative application of the objectives in plan design, test, and evaluation. The planning principle, moreover, supports each specific objective by asserting its validity. In the preparation of the necessary planning principles for the initial regional land use-transportation planning effort, a careful search of planning literature failed to reveal a documented set of comprehensive principles which were universally accepted as tenets basic to the physical planning process. It was necessary, therefore, to adapt such principles as could be found to the regional planning effort and then to draw upon the collective experience of the practitioners of the many technical disciplines represented on the Technical Coordinating and Advisory Committee to formulate additional principles to augment those adapted from the literature. Thus, through the combined knowledge of experienced technicians, a set of comprehensive planning principles was formulated. These principles were used as guidelines in the initial regional land use-transportation planning process. The planning principles adopted by the Commission for use in the reevaluation of the initial regional land use-transportation plans are virtually identical to those adopted under the initial study since a review by Commission staff, advisory committees, and the Commission itself revealed that the original principles continued to support the regional development objectives in a sound and comprehensive manner.

The planning standards herein adopted fall into two groups: comparative and absolute. Because of their very nature, the comparative standards can be applied only through a comparison of alternative plan proposals. An example of such a standard is minimizing the total vehicle hours of travel within the Region. No desirable value can be realistically assigned to this standard. Its application, therefore, must be a comparative one in which the alternative plan resulting in the lowest vehicle miles of travel is deemed to best meet this standard. Absolute standards can be applied individually to each alternate plan proposal since they are expressed in terms of maximum, minimum, or desirable values. An example of such a standard is the desirable maximum walking distance of one-half mile from any home to a local park.

While the eight land use development objectives and seven transportation system development objectives prepared in 1963 were readopted in the major plan reevaluation effort without significant change, several important changes were made in the supporting development standards. Summaries of these changes with respect to the land use and transportation development standards are set forth in Tables 3 and 4, respectively.

Perhaps the most important change in the land use development standards was the creation of a new suburban residential land use category in addition to the high-, medium-, and low-density urban residential land use categories previously provided. The addition of this standard has important implications for the design of alternative land use and transportation system plans since, unlike the former standards, this new standard permits the design of an alternative land use plan which would accommodate urban residential development at a density of one and one-half acres per dwelling unit in areas not served by centralized sanitary sewer, water supply, mass transit, or other urban services, but covered by soils which permit use of septic tanks for onsite sewage disposal and private wells for onsite water supply. Furthermore, such suburban density development would not be accommodated in planned neighborhood units. This standard was prepared in direct response to comments of elected and appointed public officials and advisory committee members, supported by continued strong public preference for low-density residential development, a preference shown in both attitudinal and behavioral surveys.

The most important of the changes made to the standards supporting the seven transportation system development objectives are as follows:

1. The freeway warrant standard was increased from 25,000 to 30,000 vehicles per day for freeways serving urban areas.

2. A new mass transit warrant was created relating fare box revenues and public subsidies. This warrant indicates that the provision of mass transit facilities should be considered where the equivalent fare box revenue may be expected to meet 50 percent of the operating costs. The warrant further assumes that all of the capital costs will be publicly subsidized. The former transit stan-

dards assumed no public subsidy for either operating or capital costs.

3. The standard relating to transit operating headways was altered to reduce the maximum peak hour headway from one hour to 30 minutes.

4. A new standard was added relating to the provision of transit services to the elderly and the handicapped.

5. Standards relating to overall operating speeds on arterial facilities were altered to provide reduced speeds on freeways and divided standard arterials and to provide new speeds for transit vehicles.

6. A new standard was added indicating that the amount of energy used in operating the transportation system, particularly motor fuel, should be minimized.

7. A new standard was added providing that residents of urbanized areas should be within specified overall travel times of jobs and other specified land uses.

8. A new standard was added to provide that 90 percent of all mass transit users in central business districts should walk no more than one block to obtain service.

9. A new standard was added providing that the direct benefits to be derived from transportation system improvements should exceed the direct cost of such improvements.

10. A new standard was added indicating that the transportation system should minimize harmful and annoying noise levels.

For the most part, the new and revised transportation system development standards strengthen the criteria used to determine the adequacy of plan proposals to meet the agreed-upon objectives, including the provision of criteria relating to such emerging concerns as energy consumption, noise levels, and public subsidies for mass transit.

Table 1

LAND USE DEVELOPMENT OBJECTIVES, PRINCIPLES, AND STANDARDS

OBJECTIVE NO. 1

A balanced allocation of space to the various land use categories which meets the social, physical, and economic needs of the regional population.

PRINCIPLE

The planned supply of land set aside for any given use should approximate the known and anticipated demand for that use.

STANDARDS

1. For each additional 100 dwelling units to be accommodated within the Region at each residential density, the following minimum amounts of residential land should be set aside:

No.	Residential Density Category	Net Area[a] (Acres/100 Dwelling Units)*	Gross Area[b] (Acres/100 Dwelling Units)*
1a	High Density Urban[c]	8	13
1b	Medium Density Urban[c]	23	32
1c	Low Density Urban[c]	83	109
1d	Suburban[d]	167	204
1e	Rural[d]	500	588

*NOTE: In order to convert dwelling units to resident population, factors ranging from a minimum of 2.6 persons per dwelling unit in Milwaukee County to a maximum of 3.5 persons per dwelling unit in Waukesha and Ozaukee Counties were used. This represents an average of 2.9 persons per dwelling unit for the Region as a whole.

2. For each additional 1,000 persons to be accommodated within the Region, the following minimum amounts of public park and recreation land should be set aside:

No.	Public Park and Recreation Land Category[e]	Net Area[a] (Acres/1,000 Persons)	Gross Area[f] (Acres/1,000 Persons)
2a	Major	4	5
2b	Other	8	9

3. For each additional 100 industrial employees to be accommodated within the Region, the following minimum amounts of industrial land should be set aside:

No.	Industrial Land Category	Net Area[a] (Acres/100 Employees)	Gross Area[g] (Acres/100 Employees)
3a	Major and Other	7	9

4. For each additional 100 commercial employees to be accommodated within the Region, the following minimum amounts of commercial land should be set aside:

No.	Commercial Land Category	Net Area[a] (Acres/100 Employees)	Gross Area[g] (Acres/100 Employees)
4a	Major	1	3
4b	Other	2	6

5. For each additional 1,000 persons to be accommodated within the Region, the following minimum amounts of governmental and institutional land should be set aside:

No.	Governmental and Institutional Land Category	Net Area[a] (Acres/1,000 Persons)	Gross Area[h] (Acres/1,000 Persons)
5a	Major and Other	9	12

OBJECTIVE NO. 2

A spatial distribution of the various land uses which will result in a compatible arrangement of land uses.

PRINCIPLE

The proper allocation of uses to land can avoid or minimize hazards and dangers to health, safety, and welfare and maximize amenity and convenience in terms of accessibility to supporting land uses.

STANDARDS

1. Urban high-, medium-, and low-density residential uses should be located within planning units which are served with centralized public sanitary sewerage and water supply facilities and contain, within a reasonable walking distance, necessary supporting local service uses, such as neighborhood park, local commercial, and elementary school facilities, and should have reasonable access through the appropriate component of the transportation system to employment, commercial, cultural, and governmental centers and secondary school and higher educational facilities.

2. Rural and suburban density residential uses should have reasonable access through the appropriate component of the transportation system to local service uses; employment, commercial, cultural, and governmental centers; and secondary school and higher educational facilities.

3. Industrial uses should be located to have direct access to arterial street and highway facilities and reasonable access through an appropriate component of the transportation system to residential areas and to railway, seaport, and airport facilities and should not be intermixed with commercial, residential, governmental, recreational, or institutional land uses.

4. Regional commercial uses should be located in centers of concentrated activity on only one side of an arterial street and should be afforded direct access[i] to the arterial street system.

OBJECTIVE NO. 3

A spatial distribution of the various land uses which will result in the protection and wise use of the natural resources of the Region, including its soils, inland lakes and streams, wetlands, woodlands, and wildlife.

PRINCIPLE

The proper allocation of uses to land can assist in maintaining an ecological balance between the activities of man and the natural environment which supports him.

1. Soils

Principle

The proper relation of urban and rural land use development to soils type and distribution can serve to avoid many environmental problems, aid in the establishment of better regional settlement patterns, and promote the wise use of an irreplaceable resource.

STANDARDS

1a. Sewered urban development, particularly for residential use, should not be located in areas covered by soils identified in the regional detailed operational soil survey as having severe or very severe limitations for such development.

1b. Unsewered suburban residential development should not be located in areas covered by soils identified in the regional detailed operational soil survey as having severe or very severe limitations for such development.

1c. Rural development, including agricultural and rural residential development, should not be located in areas covered by soils identified in the regional detailed operational soil survey as having severe or very severe limitations for such uses.

2. Inland Lakes and Streams

Principle

Inland lakes and streams contribute to the atmospheric water supply through evaporation; provide a suitable environment for desirable and sometimes unique plant and animal life; provide the population with opportunities for certain scientific, cultural, and educational pursuits; constitute prime recreational areas; provide a desirable aesthetic setting for certain types of land use development; serve to store and convey flood waters; and provide certain water withdrawal requirements.

STANDARDS

2a (1). A minimum of 25 percent of the perimeter or shoreline frontage of lakes having a surface area in excess of 50 acres should be maintained in a natural state.

2a (2). Not more than 50 percent of the length of the shoreline of inland lakes having a surface area in excess of 50 acres should be allocated to urban development, except for park and outdoor recreational uses.

2a (3). A minimum of 10 percent of the shoreline of each inland lake having a surface area in excess of 50 acres should be maintained for public uses, such as a beach area, pleasure craft marina, or park.

2b (1). It is desirable that 25 percent of the shoreline of each inland lake having a surface area less than 50 acres be maintained in either a natural state or some low-intensity public use, such as park land.

2c (1). A minimum of 25 percent of both banks of all perennial streams should be maintained in a natural state.

2c (2). Not more than 50 percent of the length of perennial streams should be allocated to urban development, except for park and outdoor recreational uses.

2d. Floodlands[j] should not be allocated to any urban development[k] which would cause or be subject to flood damage.

2e. No unauthorized structure or fill should be allowed to encroach upon and obstruct the flow of water in the perennial stream channels[l] and floodways.[m]

3. Wetlands

Principle

Wetlands support a wide variety of desirable and sometimes unique plant and animal life; assist in the stabilization of lake levels and streamflows; trap and store plant nutrients in runoff, thus reducing the rate of enrichment of surface waters and obnoxious weed and algae growth; contribute to the atmospheric oxygen supply; contribute to the atmospheric water supply; reduce storm water runoff by providing area for floodwater impoundment and storage; trap soil particles suspended in runoff and thus reduce stream sedimentation; and provide the population with opportunities for certain scientific, educational, and recreational pursuits.

STANDARD

3a. All wetland areas[n] adjacent to streams or lakes, all wetlands within areas having special wildlife and other natural values, and all wetlands having an area in excess of 50 acres should not be allocated to any urban development except limited recreation and should not be drained or filled. Adjacent surrounding areas should be kept in open-space use, such as agriculture or limited recreation.

4. Woodlands[o]

Principle

Woodlands assist in maintaining unique natural relationships between plants and animals; reduce storm water runoff; contribute to the atmospheric oxygen supply; contribute to the atmospheric water supply through transpiration; aid in reducing soil erosion and stream sedimentation; provide the resource base for the forest product industries; provide the population with opportunities for certain scientific, educational, and recreational pursuits; and provide a desirable aesthetic setting for certain types of land use development.

STANDARDS

4a. A minimum of 10 percent of the land area of each watershed[p] within the Region should be devoted to woodlands.

4b. For demonstration and educational purposes, the woodland cover within each county should include a minimum of 40 acres devoted to each major forest type: oak-hickory, northern hardwood, pine, and lowland forest. In addition, remaining examples of the native forest vegetation types representative of the pre-settlement vegetation should be maintained in a natural condition and be made available for research and educational use.

4c. A minimum regional aggregate of five acres of woodland per 1,000 population should be maintained for recreational pursuits.

5. Wildlife[q]

Principle

Wildlife, when provided with a suitable habitat, will supply the population with opportunities for certain scientific, educational, and recreational pursuits; comprises an integral component of the life systems which are vital to beneficial natural processes, including the control of harmful insects and other noxious pests and the promotion of plant pollination; provides a food source; offers an economic resource for the recreation industries; and serves as an indicator of environmental health.

STANDARD

5a. The most suitable habitat for wildlife—that is, the area wherein fish and game can best be fed, sheltered, and reproduced—is a natural habitat. Since the natural habitat for fish and game can best be achieved by preserving or maintaining in a wholesome state other resources such as soil, air, water, wetlands, and woodlands, the standards for each of these other resources, if met, would ensure the preservation of a suitable wildlife habitat and population.

OBJECTIVE NO. 4

A spatial distribution of the various land uses which is properly related to the supporting transportation, utility, and public facility systems in order to assure the economical provision of transportation, utility, and public facility services.

PRINCIPLE

The transportation and public utility facilities and the land use pattern which these facilities serve and support are mutually interdependent in that the land use pattern determines the demand for, and loadings upon, transportation and utility facilities; and these facilities, in turn, are essential to, and form a basic framework for, land use development.

STANDARDS

1. Urban development should be located so as to maximize the use of existing transportation and utility systems.

2. The transportation system should be located and designed to provide access not only to all land presently devoted to urban development but to land proposed to be used for such urban development.

3. All land developed or proposed to be developed for urban medium-, high-, and low-density residential use should be located in areas serviceable by an existing or proposed public sanitary sewerage system and preferably within the gravity drainage area tributary to such systems.

4. All land developed or proposed to be developed for urban medium-, high-, and low-density residential use should be located in areas serviceable by an existing or proposed public water supply system.

5. All land developed or proposed to be developed for urban medium- and high-density residential use should be located in areas serviceable by existing or proposed primary, secondary, and tertiary mass transit facilities.

6. The transportation system should be located and designed to minimize the penetration of existing and proposed residential neighborhood units by through traffic.

7. Transportation terminal facilities, such as off-street parking, off-street truck loading, and mass transit loading facilities, should be located in close proximity to the principal land uses to which they are accessory.

OBJECTIVE NO. 5

The development and conservation of residential areas within a physical environment that is healthy, safe, convenient, and attractive.

PRINCIPLE

Residential areas developed in designed neighborhood units can assist in stabilizing community property values, preserving residential amenities, and promoting efficiency in the provision of public and community service facilities; can best provide a desirable environment for family life; and can supply the population with improved levels of safety and convenience.

STANDARDS

1. Urban high-, medium-, and low-density residential development should be located in neighborhood units which are physically self-contained within clearly defined and relatively permanent isolating boundaries, such as arterial streets and highways, major park and open space reservations, or significant natural features, such as rivers, streams, or hills.

2. Urban residential neighborhood units should contain enough area to provide: housing for the population served by one elementary school and one neighborhood park; an internal street system which discourages penetration of the unit by through traffic; and all of the community and commercial facilities necessary to meet the day-to-day living requirements of the family within the immediate vicinity of its dwelling unit.

3. Suburban and rural density residential development should be located in areas where onsite soil absorption sewage disposal systems and private wells can be accommodated and access to other services and facilities can be provided through appropriate components of the transportation system at the community or regional level, thereby properly relating such development to a rural environment.

To meet the foregoing standards, land should be allocated in each urban and rural development category as follows:

	Percent of Area in Land Development Category					
Land Use Category	Urban High-Density (7.0 - 17.9 Dwelling Units/Net Residential Acre)	Urban Medium-Density (2.3 - 6.9 Dwelling Units/Net Residential Acre)	Urban Low-Density (0.7 - 2.2 Dwelling Units/Net Residential Acre)	Suburban Density (0.2 - 0.6 Dwelling Units/Net Residential Acre)	Rural Density (0.1 - 0.2 Dwelling Units/Net Residential Acre)	Agricultural (<0.2 Dwelling Units/Net Residential Acre)
Residential	66.0	71.0	76.5	82.0	85.0	6.0
Streets and Utilities	25.0	23.0	20.0	18.0	15.0	4.0
Parks and Playgrounds	3.5	2.5	1.5	--	--	--
Public Elementary Schools	2.5	1.5	0.5	--	--	--
Other Governmental and Institutional	1.5	1.0	1.0	--	--	--
Retail and Service	1.5	1.0	0.5	--	--	--
Nonurban	--	--	--	--	--	90.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

OBJECTIVE NO. 6

The preservation, development, and redevelopment of a variety of suitable industrial and commercial sites both in terms of physical characteristics and location.

PRINCIPLE

The production and sale of goods and services are among the principal determinants of the level of economic vitality in any society, and the important activities related to these functions require areas and locations suitable to their purpose.

STANDARDS

1. Regional industrial development should be located in planned industrial districts which meet the following standards:

a. Minimum gross site area of 320 acres or a minimum employment of 3,500 persons.

b. Direct access to the arterial street and highway system and access within two miles to the freeway system.

c. Direct access to railroad facilities.

d. Direct access to primary, secondary, and tertiary mass transit service.

e. Access to a basic transport airport within a maximum travel time of 30 minutes and access to seaport facilities within a maximum travel time of 60 minutes.

f. Available adequate water supply.

g. Available adequate public sanitary sewer service.

h. Available adequate storm water drainage facilities.

i. Available adequate power supply.

j. Site should be covered by soils identified in the regional soils survey as having very slight, slight, or moderate limitations for industrial development.

2. Regional commercial development, which would include activities primarily associated with the sale of shopper's goods, should be concentrated in regional commercial centers which meet the following minimum standards:

a. Accessibility to a population of between 75,000 and 150,000 persons located within either a 20-minute one-way travel period or a 10-mile radius.

b. A minimum gross site area of 60 acres.

c. At least two general sales and service department stores offering a full range of commodities and price levels.

d. Direct access to the arterial street system.

e. Direct access to the primary, secondary, and tertiary mass transit service.

f. Available adequate water supply.

g. Available adequate sanitary sewer service.

h. Available adequate storm water drainage facilities.

i. Available adequate power supply.

j. The site should be covered by soils identified in the regional soils survey as having very slight, slight, or moderate limitations for commercial development.

In addition to the above minimum standards, the following site development standards are desirable:

k. Provision of off-street parking for at least 5,000 cars.

l. Provision of adequate off-street loading facilities.

m. Provision of well-located points of ingress and egress which are controlled to prevent traffic congestion on adjacent arterial streets.

n. Provision of adequate screening to serve as a buffer between the commercial use and adjacent noncommercial uses.

o. Provision of adequate building setbacks from major streets.

3. Local industrial development should be located in planned industrial districts which meet the following standards:

a. Direct access to the arterial street and highway system.

b. Direct access to mass transit facilities.

c. Available adequate water supply.

d. Available adequate public sanitary sewer service.

e. Available adequate storm water drainage facilities.

f. Available adequate power supply.

g. Site should be covered by soils identified in the regional soils survey as having very slight, slight, or moderate limitations for industrial development.

4. Local commercial development, which includes activities primarily associated with the sale of convenience goods and services, should be contained within the residential planning units, the total area devoted to the commercial use varying with the residential density:

a. In urban low-density areas, land devoted to local commercial centers should comprise at least 0.5 percent of the total gross neighborhood area, or about 3.2 acres per square mile of gross neighborhood area.

b. In urban medium-density areas, land devoted to local commercial centers should comprise at least 1.0 percent of the total gross neighborhood area, or about 6.4 acres per square mile of gross neighborhood area.

c. In urban high-density areas, land devoted to local commercial centers should comprise at least 1.5 percent of the total gross neighborhood area, or about 9.6 acres per square mile of gross neighborhood area.

OBJECTIVE NO. 7

The preservation and provision of open space[r] to enhance the total quality of the regional environment, maximize essential natural resource availability, give form and structure to urban development, and facilitate the ultimate attainment of a balanced year-round outdoor recreational program providing a full range of facilities for all age groups.

PRINCIPLE

Open space is the fundamental element required for the preservation, wise use, and development of such natural resources as soil, water, woodlands, wetlands, native vegetation, and wildlife; it provides the opportunity to add to the physical, intellectual, and spirtual growth of the population; it enhances the economic and aesthetic value of certain types of development; and it is essential to outdoor recreational pursuits.

STANDARDS[s]

1. Major or regional park and recreation sites should be provided within a 10-mile service radius of every dwelling unit in the Region, and should have a minimum gross site area of 250 acres.

2. Local park and recreation sites should be provided within a maximum service radius of one mile of every dwelling unit in an urban area, and should have a minimum gross site area of 5 acres.

3. Areas having unique scientific, cultural, scenic, or educational value should not be allocated to any urban or agricultural land uses; and adjacent surrounding areas should be retained in open space use, such as agriculture or limited recreation.

OBJECTIVE NO. 8

The preservation of land areas for agricultural uses in order to provide for certain special types of agriculture, provide a reserve or holding zone for future needs, and ensure the preservation of those unique rural areas which provide wildlife habitat and which are essential to shape and order urban development.

PRINCIPLE

Agricultural areas, in addition to providing food and fiber, can supply significant wildlife habitat; contribute to maintaining an ecological balance between plants and animals; offer locations proximal to urban centers for the production of certain food commodities which may require nearby population concentrations for an efficient production-distribution relationship; support the agricultural and agricultural-related economy of the Region; and provide open spaces which give form and structure to urban development.

STANDARDS

1. All prime agricultural areas[t] should be preserved.

2. All agricultural lands surrounding adjacent high-value scientific, educational, or recreational resources should be preserved.

In addition to the above, attempts should be made to preserve agricultural areas which are covered by soils rated in the regional detailed operational soil survey as having moderate limitations if these soils: a) generally occur in concentrations greater than five square miles and surround or lie adjacent to areas which qualify under either of the above standards, or b) occur in areas which may be designated as desirable open spaces for shaping urban development.

[a] *Net land use area is defined as the actual site area devoted to a given use, and consists of the ground floor site area occupied by any buildings plus the required yards and open spaces.*

[b] *Gross residential land use area is defined as the net area devoted to this use plus the area devoted to all supporting land uses, including streets, neighborhood parks and playgrounds, elementary schools, and neighborhood institutional and commercial uses, but not including freeways and expressways and other community and areawide uses.*

[c] *Areas served, proposed to be served, or required to be served by public sanitary sewerage and water supply facilities; require neighborhood facilities.*

[d] *Areas not served, not proposed to be served, nor required to be served by public sanitary sewerage and water supply facilities; do not require neighborhood facilities.*

[e] *These categories do not include large open-space areas not developed for active recreation use or school playgrounds.*

[f] *Gross public park and recreation area is defined as the net area devoted to active or intensive recreation use plus the adjacent "backup" lands and lands devoted to other supporting land uses such as roads and parking areas.*

[g] *Gross commercial and industrial area is defined as the net area devoted to these uses plus the area devoted to supporting land uses, including streets and off-street parking.*

[h] *Gross governmental and institutional area is defined as the net area devoted to governmental and institutional use plus the area devoted to supporting land uses, including streets and onsite parking.*

[i] *Direct access implies adjacency or immediate proximity.*

[j] *Floodlands are herein defined as those lands inundated by a flood having a recurrence interval of 100 years where hydrologic and hydraulic engineering data are available, and as those lands inundated by the maximum flood of record where such data are not available.*

[k] *Urban development, as used herein, refers to all land uses except agriculture, water, woodlands, wetlands, open lands, and quarries.*

[l] *A stream channel is herein defined as that area of the floodplain lying either within legally established bulkhead lines or within sharp and pronounced banks marked by an identifiable change in flora and normally occupied by the stream under average annual high-flow conditions.*

[m] *Floodway lands are herein defined as those designated portions of the floodlands that will safely convey the 100-year recurrence interval flood discharge with small, acceptable upstream and downstream stage increases.*

[n] *Wetland areas, as used herein, are defined as those lands which are partially covered by marshland flora and generally covered with shallow standing water, open lands intermittently covered with water, or lands which are wet and spongy due to a high water table or character of the soil and encompassing an area of one acre or more.*

[o] *The term woodlands, as used herein, is defined as a dense, concentrated stand of trees and underbrush encompassing an area of one acre or more.*

[p] *A watershed, as used herein, is defined as a portion of the surface of the earth occupied by a surface drainage system discharging all surface water runoff to a common outlet and an area 25 square miles or larger in size.*

[q] *Includes all fish and game.*

[r] *Open space is defined as land or water areas which are generally undeveloped for urban residential, commercial, or industrial uses and are or can be considered relatively permanent in character. It includes areas devoted to park and recreation uses and to large land-consuming institutional uses, as well as areas devoted to agricultural use and to resource conservation, whether publicly or privately owned.*

[s] *It was deemed impractical to establish spatial distribution standards for open space, per se. Open spaces which are not included in the spatial distribution standards are: forest preserves and arboreta; major river valleys; lakes; zoological and botanical gardens; stadia; woodland, wetland, and wildlife areas; scientific areas; and agricultural lands whose location must be related to, and determined by, the natural resource base. It is intended that the park and open space standards set forth herein be supplemented by the more detailed park and open space standards set forth in SEWRPC Planning Report No. 27, A Regional Park and Open Space Plan for Southeastern Wisconsin.*

[t] *Prime agricultural areas are defined as those areas which have been designated as exceptionally good for agricultural production by agricultural specialists and which a) contain soils rated in the regional detailed operational soil survey as very good or good for agriculture and b) occur in concentrated areas over five square miles in extent.*

Source: SEWRPC.

Table 2

TRANSPORTATION SYSTEM DEVELOPMENT OBJECTIVES, PRINCIPLES, AND STANDARDS

OBJECTIVE NO. 1

An integrated transportation system which, through its location, capacity, and design, will effectively serve the existing regional land use pattern and promote the implementation of the regional land use plan, meeting the anticipated travel demand generated by the existing and proposed land uses.

PRINCIPLE

An integrated regional transportation system serves to freely interconnect the various land use activities within the Region, thereby providing the attribute of accessibility essential to the support of these activities. Through its effect on accessibility, the regional transportation system can be used to induce development in desired locations.

STANDARDS

1. The transportation system should provide such service within each urbanized area of the Region that all residents of each subarea of the urbanized area without regard to color, race, or national origin are within:

   a. 30 minutes overall travel time[a] of 40 percent of that urbanized area's employment opportunities;

   b. 35 minutes overall travel time of three major retail and service centers;

   c. 40 minutes overall travel time of a major medical center and/or 30 minutes overall travel time of a hospital and/or medical clinic;

   d. 40 minutes overall travel time of a major park and outdoor recreation area;

   e. 40 minutes overall travel time of a vocational school, college, or university; and

   f. 60 minutes overall travel time of a scheduled air transport airport.

2. The relative accessibility provided by the regional transportation system should be adjusted to the land use plan by providing to areas in which development is to be induced a higher relative accessibility than that provided to areas which should be protected from development.

OBJECTIVE NO. 2

A transportation system which is economical and efficient, satisfying all other objectives at the lowest possible cost.

PRINCIPLE

The total resources of the Region are limited, and any undue investment in transportation facilities and services must occur at the expense of other public and private investment; therefore, total transportation costs should be minimized for the desired level of service.

STANDARDS

1. The sum of transportation system operating and capital investment costs should be minimized.

2. The direct benefits derived from transportation system improvements should exceed the direct costs of such improvements.

3. Full use of all existing major transportation facilities should be encouraged through low- and non-capital-intensive techniques[b] cooperatively fostered by government, business, and industry.

4. The amount of energy utilized in operating the transportation system, particularly the petroleum-based fuels, should be minimized.

OBJECTIVE NO. 3

A flexible, balanced transportation system which will provide the appropriate types of transportation needed by all residents of the various subareas of the Region regardless of race, color, or national origin at an adequate level of service, and which will permit ready adaptation to both changes in travel demand and in the transportation technology, including travel modes and transportation management.

PRINCIPLE

A flexible, balanced regional transportation system, consisting of highway and mass transit transportation and terminal facilities for the movement of people and goods, is necessary to provide an adequate level of transportation service to all segments of the population, to support essential economic and social activities, and to achieve economy and efficiency in the provision of transportation service, and be so located and designed as to be readily adaptable to changes in transportation technology of travel modes and traffic management. The highway component supplies transportation service primarily for passenger movements utilizing automobiles, taxicabs, and buses and for goods movements utilizing trucks and buses. The mass transit component supplies transportation service for those passenger movements utilizing buses, vans, and taxicabs, and particularly for that segment of the population which cannot or does not utilize automobiles regularly including, but not limited to, the handicapped, the elderly, and the isolated rural populations where specialized transportation service is required. In addition, the mass transit component supplies additional passenger transportation system capacity which can alleviate peak loadings on highway facilities and assist in reducing the demand for land necessary for parking facilities at major regional land use activities.

STANDARDS

1. Arterial Street and Highway System

1a. Arterial streets and highways should be provided at intervals of no more than one-half mile in each direction in urban high-density areas, at intervals of no more than one mile in each direction in urban medium-density areas, at intervals of no more than two miles in each direction in urban low-density and suburban density areas, and at intervals of no less than two miles in each direction in rural areas.

1b. Freeways or expressways should be considered for those travel corridors[c] within the Region which meet all of the following criteria:

1. The corridor provides intercommunity service;

2. The desired speeds or a volume-to-capacity ratio of 1.0 requires control of access and uninterrupted flow;

3. Potential average weekday traffic exceeds 30,000 vehicles per day in urban areas and 15,000 vehicles per day in rural areas.

2. Mass Transit System

2a. Intraregional mass transit facilities should be provided as warranted[d] to connect[e] noncontiguous urban development with the urban center[f] of an urbanized area, and within urbanized areas to serve[g] all residential neighborhoods regardless of the race, color, or national origin of the residents and to connect such neighborhoods to the following land areas:

1. Transportation terminal facilities including interregional and intraregional primary and secondary transit service loading and unloading points and scheduled air transport airports;

2. Major and community retail and service centers;

3. Major and community industrial centers;

4. Major parks and special use areas which as zoological and botanical gardens, civic centers, senior citizen centers, band shells, fairgrounds, arenas, and stadiums; and

5. Institutions such as universities, colleges, vocational schools, secondary schools, community libraries, hospitals, mental health centers and sanitariums, and seats of state, county, and local governments.

2b. The public subsidy required per transit ride should be minimized.

2c. Primary rapid intraregional mass transit service should be provided in travel corridors[c] where:

1. Transit vehicles utilizing the transitway save at a minimum 10 minutes over alternative routings; and

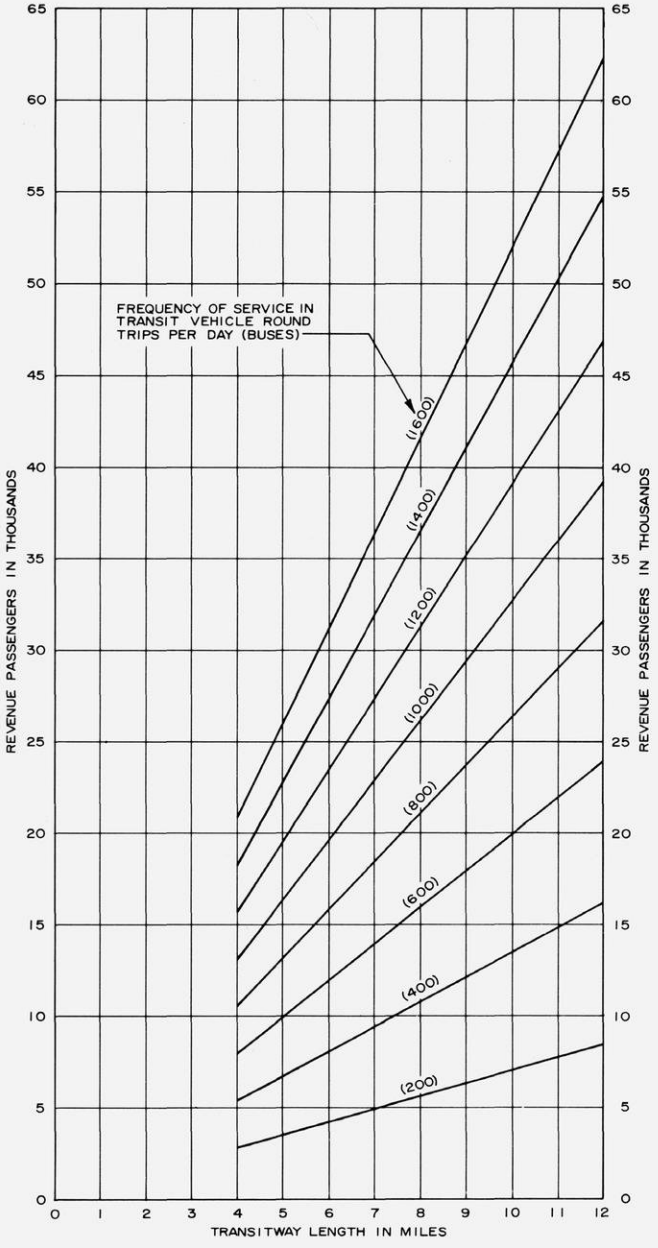
2. The two-way average weekday passenger loading equals or exceeds that identified in the accompanying warrant curves (see Figures 1 and 2).

2d. Primary or secondary intraregional mass transit service should be provided as necessary to reduce peak loadings on arterial streets and highways in order to maintain a desirable level of transportation service between component parts of the Region.

2e. Primary and secondary mass transit service should be extended as warranted to perform a collection and distribution function in order to maximize the convenience of the transit service.

Figure 1

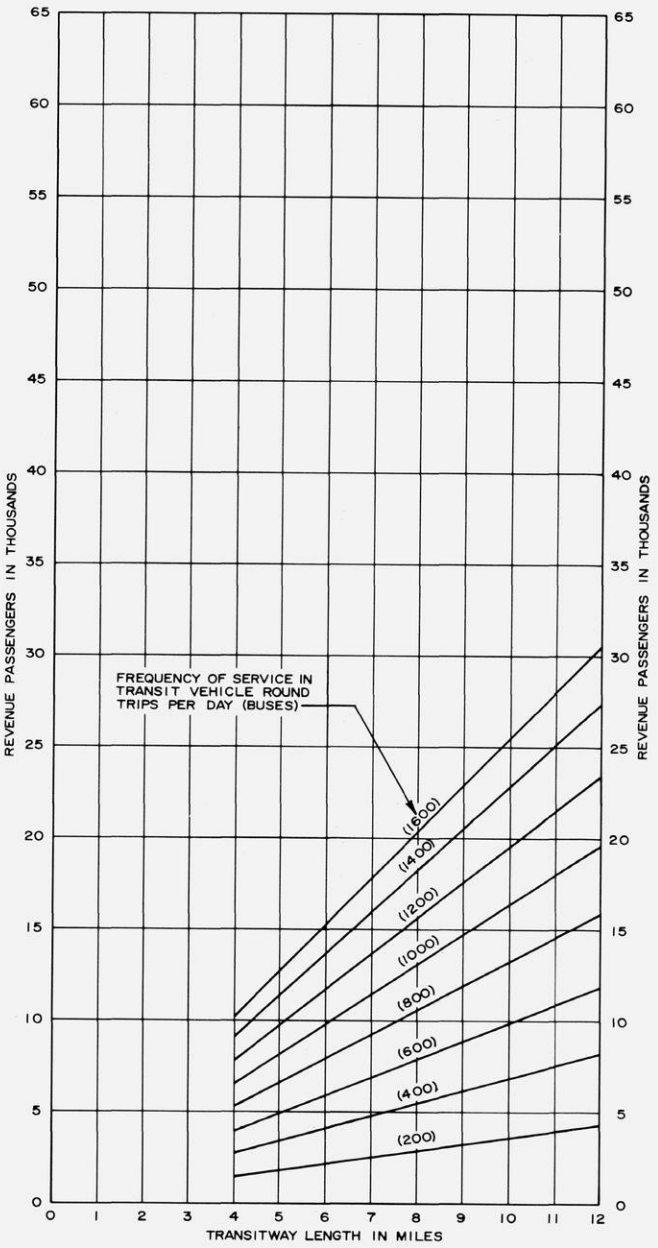
THRESHOLD SERVICE WARRANT CURVES
BUS RAPID TRANSIT WITH $0.25 FARE



Source: SEWRPC.

Figure 2

THRESHOLD SERVICE WARRANT CURVES
BUS RAPID TRANSIT WITH $0.50 FARE



Source: SEWRPC.

2f. Urban residential land shall be considered as served by intraregional transit when such land is within the distance of the various types of intraregional mass transit service, as set forth in the following:

Type of Intraregional Mass Transit Service	Maximum Distance	
	Walking	Driving
Primary	1/2 mile	1 1/2 miles
Secondary	1/2 mile	1 1/2 miles
Tertiary	1/4 mile	1 1/2 miles

2g. Mass transit routes should be direct, in alignment with a minimum number of turning movements, and arranged to minimize duplication of service and minimize transfers which would discourage transit use.

2h. Operating headways[h] for intraregional fixed route tertiary mass transit service within urban areas shall be designed to provide service at headways capable of accommodating passenger demand at the recommended load standards, but shall not exceed 30 minutes during weekday peak periods nor 60 minutes during weekday off-peak periods and weekend periods.

2i. Intraregional fixed route mass transit stops within urban areas should be located as follows:

Type of Intraregional Mass Transit Service	Location of Stops
Primary	At terminal areas and one mile or more on line haul sections.
Secondary	At terminal areas, intersections with other mass transit routes, and major traffic generators.
Tertiary	600 to 1,200 feet apart.

2j. Intraregional mass transit routes should be located sufficiently near concentrations of demand in the central business districts so that 90 percent of the mass transit users need walk no more than one block[i] or 600 feet.

2k. The proportion of mass transit ridership to the Milwaukee central business district should be increased to a level of at least 30 percent of total persons trips made to that district.

2l. Specialized transportation service should be available within the transit service areas to meet the transportation needs of those portions of the elderly and the handicapped population unable to avail themselves of regular transit service and within the rural portions of the Region to provide a level of transit service at least one day per week.

3. Parking

3a. Parking should be provided at park-and-ride mass transit stations to accommodate the total parking demand generated by trips which change from auto to mass transit modes at each station.

3b. On a gross area basis, parking in the major central business districts of the Region should be provided at the following levels:

Urbanized Area Population	Spaces Per 1,000 Auto CBD Destinations[j]
50,000	110
100,000	140
500,000	210
1,000,000	235
2,000,000	255

3c. In the central business districts of the Region, parking should be provided sufficiently near concentrations of demand so that 90 percent of the short-term parkers need walk no more than one block.[i]

4. System Adaptability

4a. The transportation system should be capable of being readily adaptable to changes in travel demand and in transportation technology, including travel modes and traffic management.

OBJECTIVE NO. 4

Minimization of disruption of existing neighborhood and community development, including adverse effects upon the property tax base and minimization of the deterioration and/or destruction of the natural resource base.

PRINCIPLE

The social and economic costs attendant to the disruption and dislocation of homes, businesses, industries, and communication and utility facilities as well as the adverse effects on the natural resource base can be minimized through the proper location and design of transportation facilities and terminals.

STANDARDS

1. The proper use of land for, and adjacent to, transportation facilities should be maximized and the disruption of future development minimized through advance reservation of rights-of-way for transportation facilities.

2. The penetration of neighborhood units and of neighborhood facility service areas by arterial streets and highways and primary rapid mass transit routes should be minimized.

3. The dislocation of households, businesses, industries, and public and institutional buildings as caused by the reconstruction of existing or the construction of new transportation facilities and terminals should be minimized.

4. The location of transportation facilities in or through primary environmental corridors should be minimized.

5. The total amount of land used for transportation and terminal facilities should be minimized.

6. The reduction of property tax base as caused by the reconstruction of existing or the construction of new transportation facilities and terminals should be minimized.

7. The transportation system should be located and designed so as to minimize the exposure of the Region's population to harmful, as well as annoying, noise levels.

8. The destruction of historic buildings and of historic, scenic, scientific, and cultural sites as caused by the reconstruction of existing or the construction of planned transportation facilities and terminals should be minimized.

OBJECTIVE NO. 5

The facilitation of traffic flow between component parts of the Region.

PRINCIPLE

To support the everyday activities of business, shopping, and social intercourse, a transportation system which provides for reasonably fast, convenient travel is essential. Furthermore, congestion increases the cost of transportation, including the cost of the journey to work, which is necessarily reflected in higher production costs and thereby adversely affects the relative market advantages of businesses and industries within the Region.

STANDARDS

1. The total passenger hours of travel within the Region should be minimized.

2. The total vehicle hours of travel within the Region should be minimized.

3. The total vehicle miles of travel within the Region should be minimized.

4. Highway transportation facilities should be located and designed so as to provide adequate capacity—that is, a volume-to-capacity ratio[k] equal to, or less than, 1.1 based on 24-hour average weekday traffic volumes—to meet the existing and potential travel demand.

5. Intraregional mass transit facilities should be located and designed so as to provide adequate transit vehicle capacity to meet the existing and potential travel demand. The average maximum load factor[l] shall not exceed 1.00 in primary, secondary, and tertiary mass transit service in off-peak periods or beyond the 10-minute point[m] in peak periods. The load factor should not exceed 1.00 in primary and secondary mass transit service provided by bus in peak periods or 1.25 in primary and secondary mass transit service provided by rail in peak periods. The load factor should not exceed 1.25 in tertiary mass transit service in peak periods.

6. Adequate capacity and a sufficiently high level of geometric design should be provided to achieve the following overall travel speeds based on average weekday conditions for the highway and the intraregional mass transit components of the transportation system:

Transportation System Component	Overall Travel Speed by Area[n] (miles per hour)		
	CBD	Urban	Rural
Arterial Street and Highway			
Freeway	35 - 55	40 - 55	50 - 55
Expressway	25 - 40	30 - 50	50 - 55
Standard Arterial			
Divided	15 - 25	25 - 45	45 - 55
Undivided	15 - 25	20 - 40	40 - 50
Intraregional Mass Transit			
Primary			
Rail	20 - 30	40 - 60	40 - 60
Bus	10 - 20	40 - 50	40 - 50
Secondary	10 - 20	20 - 35	40 - 50
Tertiary	5 - 15	10 - 20	40 - 50

OBJECTIVE NO. 6

The reduction of accident exposure and the provision of increased travel safety.

PRINCIPLE

Accidents take a heavy toll in life, property damage, and human suffering; contribute substantially to overall transportation costs; and increase public costs for police and welfare services; therefore, every attempt should be made to reduce both the incidence and severity of accidents.

STANDARDS

1. Travel on facilities which exhibit the lowest accident exposure should be maximized.[o]

2. Traffic congestion and vehicle conflicts should be reduced by maintaining a volume-to-capacity ratio equal to or less than 0.9, based on 24-hour average weekday traffic volumes.

3. Railroad grade separations should be provided at all crossings involving the provision of passenger train service. For all other crossings, the decision as to whether or not to grade separate should be made at the project planning stage.

OBJECTIVE NO. 7

A transportation system with a high aesthetic quality whose major facilities will possess the proper visual relation to the land- and cityscape.

PRINCIPLE

Beauty in the physical environment is conducive to the physical and mental health and well-being of people; and, as major features of the land- and cityscape, transportation facilities have a significant impact on the attractiveness of the total environment.

STANDARDS

1. Transportation facility construction plans should be developed using sound geometric, structural, and landscape design standards which consider the aesthetic quality of the transportation facilities and the areas through which they pass.

2. Transportation facilities should be located to avoid destruction of visually pleasing buildings, structures, and natural features and to avoid interference with vistas to such features.

[a] *Overall travel time is defined as the total door-to-door time of travel from origin to destination including the time required to arrive at the vehicle and leave the vehicle as well as over-the-road travel time.*

[b] *Low- and non-capital intensive alternatives for the reduction of traffic congestion may include but are not limited to:*

1. *Staggering of work hours.*

2. *Appropriate pricing of vehicular facilities in order to regulate automobile usage and encourage transit use.*

3. *Regulating the cost and supply of off-street parking.*

4. *Increasing central business district (CBD) daytime parking rates during work days.*

5. *Banning private automobiles from sections of the CBD during work days.*

6. *Liberal licensing of taxicabs.*

7. *Carpooling.*

8. *Preferential access by high occupancy vehicles.*

[c] *The term travel corridor is defined as a relatively long and narrow geographic area centered on an existing or proposed arterial highway or primary rapid transit facility, along which a substantial volume of persons or goods are or are expected to be transported.*

[d] *The provision of intraregional mass transit facilities shall be considered if such service can meet at least 50 percent of its associated costs of operation—the remaining operating costs to be accounted for through public subsidy—or if the provision of such service can be identified as contributing significantly to the revenue of other routes or to the total system.*

[e] *Intraregional mass transit facilities shall be considered to connect noncontiguous urban development with the urban center of an urbanized area when the transit vehicle provides immediate access to the urban center and to a mass transit system serving the urbanized area.*

[f] *The term urban center is defined as the largest concentrated complex of commercial activities within a single urbanized area.*

[g] *Intraregional mass transit facilities shall be considered to serve urban residential land uses when a transit route is within a distance as identified in Standard 2f, Objective 3.*

[h] *The term operating headway is defined as the time between vehicles operating over fixed routes and schedules.*

[i] *The percent of short-term parkers and intraregional mass transit users walking no more than one block within the central business districts in the Region in 1972 is as follows:*

CBD	Percent of Short-Term Parkers Walking Less Than One Block	Percent of Transit Users Walking Less Than One Block
Kenosha	96	89
Milwaukee	90	81
Racine.	97	100

[j] *The number of parking spaces per 1,000 auto destinations within the central business districts in the Region in 1972 is as follows:*

CBD	Population of Urbanized Area	Existing Spaces Per 1,000 Auto Destinations
Kenosha	84,000	290
Milwaukee	1,252,000	410
Racine.	117,000	310

[k] *The relationship existing between the average weekday traffic volume using a particular section of the arterial system and the design capacity of the section, expressed as a ratio of volume-to-capacity with volume and capacity expressed in terms of numbers of vehicles per 24 hours. Facilities operating at design capacity, level of service C, as described in the Highway Research Board Special Report 87, Highway Capacity Movement 1965, are considered to have volume-to-capacity ratios in the range of 0.91 to 1.10 and are considered to provide adequate service with stable flow conditions under relatively high volumes of traffic, with restrictions on the ability of individual motorists to change speed and lanes, and with restricted traffic flow at times. For regional planning purposes, the capacity of all arterial street and highway facilities was calculated assuming that parking would be prohibited during peak hour traffic conditions (see Appendix D).*

[l] *The average maximum load factor is defined as the ratio of the number of passengers carried on mass transit vehicles past the maximum load point of any route to the seating capacity of vehicles past that point in the peak flow direction during the operating period.*

[m] *The 10-minute point is a point located 10 minutes travel time from the maximum load point on any transit route. Application of this standard would provide that no passenger would have to stand on board the mass transit vehicle for longer than 10 minutes.*

[n] *Overall travel speed is defined as the over-the-road travel distance divided by the overall travel time.*

[o] *See Appendix E for the accident rates and costs based upon experience within the Region which were used to quantitatively compare the alternative transportation plans with respect to this standard.*

Source: SEWRPC.

Table 3

COMPARISON OF LAND USE DEVELOPMENT STANDARDS
INITIAL (1990) AND REVISED (2000) REGIONAL LAND USE PLANS

Objective and Standard Numbers[a]		Standard			
Initial 1990	Revised 2000	Name	Initial 1990	Revised 2000	Rationale for Change
(1) 1	(1) 1c	Low Density Residential Land Allocation			
		Net (Acres/100 Dwelling Units) . .	83	83	Plan data refinement.
		Gross (Acres/100 Dwelling Units) .	103	109	
--	(1) 1d	Suburban Density Residential Land Allocation			
		Net (Acres/100 Dwelling Units) . .	--	167	New plan categories.
		Gross (Acres/100 Dwelling Units) .	--	204	
--	(1) 1e	Rural Density Residential Land Allocation			
		Net (Acres/100 Dwelling Units) . .	--	500	New plan categories.
		Gross (Acres/100 Dwelling Units) .	--	588	
(1) 1	(1) 2a	Major Park and Recreation Land Allocation			
		Net (Acres/1,000 Persons)	--	4	Plan data refinement
		Gross (Acres/1,000 Persons).	4	5	based on preparation
(1) 1	(1) 2b	Other Park and Recreation Land Allocation			of regional park and open space plan.
		Net (Acres/1,000 Persons)	--	8	
		Gross (Acres/1,000 Persons).	10	9	
(1) 2	(1) 3a	Industrial Land Allocation			
		Net (Acres/100 Employees)	--	7	Plan data refinement.
		Gross (Acres/100 Employees). . . .	7	9	

Table 3 (continued)

Objective and Standard Numbers[a]		Standard			Rationale for Change
Initial 1990	Revised 2000	Name	Initial 1990	Revised 2000	
(1) 2	(1) 4a	Major Commercial Land Allocation			
		Net (Acres/100 Employees)	--	1	
		Gross (Acres/100 Employees). . . .	5	3	
(1) 2	(1) 4b	Other Commercial Land Allocation			Plan data refinement.
		Net (Acres/100 Employees)	--	2	
		Gross (Acres/100 Employees). . . .	5	6	
(1) 1	(1) 5a	Governmental and Institutional Land Allocation			
		Net (Acres/1,000 Persons)	--	9	Plan data refinement.
		Gross (Acres/1,000 Persons).	9	12	
(2) 1	(2) 1	Residential Uses in Neighborhood Planning Units	Applied to all residential uses.	Applies only to urban high-, medium-, and low-density residential uses.	Clarifies intent not to provide for the placement of suburban and rural density residential uses in planned neighborhood units.
--	(2) 2	Rural and Suburban Density Residential Units	--	Provides for access of residents in these areas to supporting land uses in urban communities.	New plan categories.
(3) 1	(3) 1a	Soils—Placement of Sewered Residential Development	Low density—maximum of 2.5 percent of area in poor soils. Medium density—maximum of 3.5 percent of area in poor soils. High density—maximum of 5.0 percent of area in poor soils.	All sewered residential development to be located on good soils.	Clarifies intent to place all new sewered residential development on soils suitable for such use.
(4) 2	--	Location and Design of Transportation System	Avoid penetration of prime natural resource areas.	--	Deleted in its entirety but included under transportation development standards.
--	(4) 5	Relationship of Urban Land Location of Mass Transit Facilities	--	Locate urban medium- and high-density uses where serviceable by mass transit.	New standard added to stress importance of serving new urban medium- and high-density land uses with mass transit.
--	(5) 3	Location of Suburban and Rural Density Residential Development	--	Locate suburban and rural density residential development where septic tanks and private wells can be properly accommodated.	New plan categories.
(5) 3	--	Housing within Neighborhood Units.	Include wide range of housing types, designs, and costs in each neighborhood unit.	--	Deleted in its entirety; supplanted by entire set of housing standards in regional housing plan.

Table 3 (continued)

Objective and Standard Numbers[a]		Standard			Rationale for Change
Initial 1990	Revised 2000	Name	Initial 1990	Revised 2000	
(6) 1	(6) 1	Major Industrial Centers	No minimum site size or employment specified.	Minimum gross site area of 320 acres or minimum employment of 3,500 persons.	Plan data refinement.
(6) 3	(6) 2	Major Commercial Centers	No minimum number of department stores specified.	Minimum of two department stores.	Plan data refinement.
(7) 2	(7) 1	Major Park and Recreation Sites	Within one hour travel time of every dwelling unit.	Within a 10-mile radius of every dwelling unit.	Plan data refinement based on preparation of regional park and open space plan.
(7) 1	(7) 2	Local Park and Recreation Sites	Maximum service radius of 1/2 mile; maximum use intensity of 675 persons per acre.	Maximum service radius of 1/2 mile; minimum gross site area of 5 acres.	

NOTE: This table includes only new standards and those standards that have been substantively altered in the plan refinement process. The precise wording of the remaining standards has in some cases been changed to clarify intent.

[a] *The number in parentheses refers to the objective number.*

Source: SEWRPC.

Table 4

COMPARISON OF TRANSPORTATION SYSTEM DEVELOPMENT STANDARDS
INITIAL (1990) AND REVISED (2000) REGIONAL TRANSPORTATION PLANS

Objective and Standard Numbers[a]		Standard			Rationale for Change
Initial 1990	Revised 2000	Name	Initial 1990	Revised 2000	
--	(1) 1	Transportation service to specified urbanized area land uses within specified travel times	--	30 minutes to 40 percent of jobs; 35 minutes to three major retail and service centers; 40 minutes to medical center and 30 minutes to hospital or clinic; 40 minutes to major park and recreation area; 40 minutes to vocational school, college, or university; and 60 minutes to scheduled air transport airport	New standard to enable measurement of how well a given transportation system serves a given land use pattern; and residents of each subarea of the Region without regard to color, race, or national origin
--	(2) 2	Transportation system costs and benefits	--	Direct benefits derived from transportation system improvements should exceed the direct costs of such improvements	New standard to emphasize benefit-cost relationship
--	(2) 4	Transportation system energy use	--	The amount of energy used in operation of the transportation system should be minimized	New standard to emphasize need to minimize energy use, particularly the petroleum-based fuels

Table 4 (continued)

Objective and Standard Numbers[a]		Standard			
Initial 1990	Revised 2000	Name	Initial 1990	Revised 2000	Rationale for Change
(2) 10	(3) 1b	Urban freeway warrants	25,000 vehicles per day	30,000 vehicles per day	30,000 vehicles per day approximates maximum capacity of standard six-lane arterial facility; more conservative with respect to freeway development
(2) 1	(3) 2a	Overall mass transit facility warrants	Related to minimum potential average weekday revenue passengers by type of transit service	Related to farebox revenue; revenues must meet at least 50 percent of system operating cost	Reflects public ownership and operation of transit systems and current subsidy policies
--	(3) 2b	Transit subsidy	--	Subsidy required per transit ride should be minimized	New standard; reflects public ownership and operation of transit systems
(2) 1	(3) 2c	Primary rapid transit warrants	Warrant curves reflected recovery of capital and operation costs	Warrant curves reflect recovery of 50 percent of operating costs	Reflects public ownership and operation of transit systems and current subsidy policies
--	(3) 2e	Primary/Secondary transit collection-distribution service	--	Extend primary/secondary service to perform collection and distribution function	New standard to reflect need to provide single vehicle service on primary and secondary transit routes
(2) 3	(3) 2h	Transit operating headways	One hour maximum in daylight hours	30 minutes maximum during peak hours; one hour maximum at all other times	Provides for a higher level of transit service to encourage transit use
(2) 4	(3) 2i	Transit stop spacing	Primary rapid—average 2 miles; primary modified rapid—none between terminals; tertiary—average 660 feet.	Primary—one mile minimum; secondary—major traffic generators and transit route intersections; tertiary—600-1,200 feet	Add criteria for new level of secondary service; clarify remaining criteria
--	(3) 2j	Transit user walking distance in CBD	--	Locate routes so that 90 percent of transit users walk no more than one block	New standard to provide for better route alignment in CBDs so as to encourage transit use
(2) 7	(3) 2k	Proportion of transit ridership to Milwaukee CBD	Maintain at least at present level	Increase to 30 percent	Greater specificity so as to favor transit trip-making to CBD
--	(3) 2l	Specialized transit service to elderly and handicapped	--	Provide specified levels of service to elderly and handicapped.	New standard to recognize special needs of elderly and handicapped
(2) 12	(3) 3c	CBD walking distance for short-term parkers	80 percent walk no more than one block	90 percent walk no more than one block	Provides a higher level of service in CBD
--	(3) 4a	Transportation system adaptability	--	System should be capable of being readily adaptable to changes in travel demand and transportation technology, including travel modes and traffic management	New standard to recognize importance of maintaining flexibility in system development

Table 4 (continued)

Objective and Standard Numbers[a]		Standard			
Initial 1990	Revised 2000	Name	Initial 1990	Revised 2000	Rationale for Change
--	(4) 6	Property tax base reduction	--	Minimize impact of new transportation facilities on local property tax base	New standard to reflect concern over impact of new transportation facilities on property tax base
--	(4) 7	Transportation system noise exposure	--	Locate and design transportation system to minimize exposure of population to harmful and annoying noise levels	New standard to reflect concern over harmful and annoying noise levels
--	(5) 1	Passenger hours of travel	--	Minimize total passenger hours of travel	New standard to reflect desirability of minimizing total passenger hours of travel without regard to travel mode
(1) 2	(5) 4	Design of highway facilities to provide adequate capacity	Adequate capacity defined as volume-to-capacity ratio of 1.0	Adequate capacity defined as volume-to-capacity ratio of 1.1	Provides for a more conservative approach to highway improvement
(2) 5	(5) 5	Transit loading factors	1.40 where operating headways are less than 5 minutes	1.25 regardless of headway; 1.00 during off-peak period	Revision to more rigid loading factors to tolerate less standing on transit vehicles in order to encourage transit use
(3) 2	(5) 6	Overall travel speeds	Speeds reflect operating conditions prior to 1972; no transit vehicle speeds included	Speeds reflect operating conditions after 1972; transit vehicle speeds added	Revision reflects need to conserve energy and need to include transit vehicle speeds
--	(6) 3	Railroad grade crossings	--	Warrant for warning devices and grade separations	New standard to reflect concern over railroad crossing accidents

NOTE: This table includes only new standards and those standards that have been substantively altered in the plan refinement process. The precise wording of the remaining standards has in some cases been changed to clarify intent.

[a] *The number in parentheses refers to the objective number.*

Source: SEWRPC.

OVERRIDING CONSIDERATIONS

In application of the planning standards and in preparation of the regional land use-transportation plans, several overriding considerations must be recognized. First, it must be recognized that each proposed transportation plan must constitute an integrated system. It is not possible from an application of the standards alone, however, to assure such a system since they cannot be used to determine the effect of individual facilities on each other or on the system as a whole. This requires the application of traffic simulation models to quantitatively test the proposed system, thereby permitting adjustment of the spatial distribution and capacities of the system to the existing and future travel demand as derived from the land use plan. Second, it must be recognized that an overall evaluation of each transportation plan must be made on the basis of cost. Such an analysis may show that the attainment of one or more of the standards is

beyond the economic capability of the Region and, therefore, that the standards cannot be met practically and must be either reduced or eliminated. Third, it must be recognized that an overall evaluation of each proposed land use-transportation plan must be made with regard to its probable effect on ambient air quality in southeastern Wisconsin. This evaluation must be made to assure compliance with the general development objectives of providing a healthful environment and protecting the natural resource base, as well as to assure the satisfaction of national and state air quality requirements. Fourth, it must be recognized that it is unlikely that any one plan proposal will meet all of the standards completely; and the extent to which each standard is met, exceeded, or violated must serve as a measure of the ability of each alternative plan proposal to achieve the specific objectives which the given standard complements. Fifth, it must be recognized that certain objectives and standards may be in conflict, requiring resolution through compromise, and that meaningful plan evaluation can only take place through a comprehensive assessment of each of the alternative plans against all of the standards. Finally, it must be recognized that the standards must be very judiciously applied to areas or facilities which are already partially or fully developed since such application may require extensive renewal or reconstruction programs. Particularly in this respect it should be noted that the land use and transportation standards which are concerned with natural resource protection, use, or development or with neighborhood and community development relate primarily to those areas of the Region where the resource base has not as yet been significantly deteriorated, depleted, or destroyed and where neighborhood and community development has not yet been significantly disrupted. In areas where such disruption, deterioration, depletion, or destruction has already occurred, application of the standards may make it necessary to inaugurate programs which would restore neighborhoods and the resource base to a higher level of quality as well as quantity.[1]

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[1] *Such programs are specifically recommended for surface water resources in the adopted comprehensive watershed plans and in the adopted regional sanitary sewerage system plan; for air resources in the regional air quality maintenance plan under preparation; and for certain recreational resources in the park and open space plan under preparation.*

Chapter III

ANTICIPATED REGIONAL GROWTH AND CHANGE

INTRODUCTION

Change is one of the basic characteristics of the modern world, and urban growth, decay, and renewal are among the most important aspects of this change. No nation, state, or region which participates in modern life can escape the effects of urban change; and no part of daily life can avoid being influenced in some way by forces rooted in this complex process. Since change is inevitable, the question facing public officials and citizen leaders of a region, such as southeastern Wisconsin, is not whether urban growth, decay, and renewal will occur, but how much will occur, when, and how well it will be shaped and guided in the public interest. Changes in population size, composition, and distribution; in employment levels, personal income, and public financial resources; in automobile and truck availability; and in land use are all inevitable. The previous volume of this report presented data which describe the changes in these factors that have occurred over the recent past within southeastern Wisconsin. This chapter presents the results of attempts to forecast the magnitude and direction of anticipated changes in these factors and thereby provides the basis for the development of new land use and transportation plans to guide urban change within the Region.

The methodologies and assumptions used in the preparation of these forecasts are also presented in summary form. In any consideration of forecasts, it is important to understand the basic concepts underlying forecasting methodology in general, the methods used in particular to prepare the forecasts under consideration, and the consequent limitations of those forecasts.

Many methods have been developed for forecasting change in a region, such as southeastern Wisconsin. Some of these methods are quite simple; some are highly complex; but all are ultimately based upon historical experience and, in general, rely on a combination of mathematical formulation and professional judgment to analyze this experience and project it into the future. The principal difference between or among any of the forecasting methods is generally reflected in the differing emphasis upon these two basic elements. At one extreme a method may involve little or no mathematical formulation and may depend almost entirely upon the exercise of professional judgment by a person or by a group of persons. Because the variables entering into these forecasts are most often not clearly defined, even in the minds of their authors, such forecasts are generally not capable of reduction to a precise procedure which can be expressed mathematically. At the other extreme, a method may depend almost entirely upon mathematical formulation and require little or no exercise of professional judgment. Such forecasts, founded as they are in a precise procedure, may be readily replicated once the rules of the procedure are established. These procedural rules may be called forecasting models; and if expressed in mathematical terms, may be designated as mathematical forecasting models.

It is important to understand that the forecasts based upon mathematical forecasting models are not necessarily more accurate than forecasts based largely upon experienced professional judgment. Forecasts based upon models, however, have two great advantages: they require that the underlying assumptions be explicitly stated; and they permit the effects of differing underlying assumptions to be quantitatively determined.

To date, no single mathematical or judgmental method of forecasting any of the basic components of regional change has proven to be more accurate than any other. For this reason, it is generally unwise to rely on the results of a single method of forecasting, but to utilize, if possible, a number of methods; compare the results; and then, after careful consideration of any differences, select the "best" estimate utilizing the best professional judgment available. When and as estimates or measurements of the magnitude of change become available in the future, forecasting methods can be evaluated by comparing the deviation of the observed magnitude of change from the original "best" estimate of that change with the deviations from estimates obtained by alternative methods. This evaluation procedure permits assessment of the correctness of the assumptions incorporated into the different forecasting methods and results in refinement of these methods. This procedure has generally been followed in the preparation of forecasts for the regional land use and transportation plan reevaluation.

Finally, it must be recognized that no one can "predict" the future, and that all forecasts, however made, involve uncertainty and, therefore, must always be used with great caution. Forecasts cannot take into account events which are unpredictable, but which may have a major effect upon future conditions. Such events include wars; epidemics; major social, political, and economic upheavals; and radical institutional changes. Moreover, both public and private decisions of a less radical nature than the foregoing can be made which may significantly affect the ultimate accuracy of any forecast. The very act of preparing forecasts which present a distasteful situation to society may lead to actions which will negate those forecasts. For these reasons, forecasting like planning must be a continuing process. As otherwise unforeseeable events unfold, forecast results must be revised; and, in turn, plans which are based on such forecasts must be reviewed and revised accordingly.

As an example of how unforeseen events may influence forecasts, it may be noted that the regional forecasts presented in this chapter are based on information collected prior to 1973 when the future availability and cost of energy became widespread public issues. If energy availability and cost remains a critical issue over the next two decades, it could significantly influence changes in employment levels, personal income, public financial resources, automobile and truck availability, and population size, composition, and distribution. A sufficient number of years has not elapsed since the onset of the energy question to allow accumulation of the necessary historical data which would permit the Commission staff to evaluate its effect upon development within the Region. For this reason, valid estimates cannot be generated for either the degree or direction of the impact on growth and change in the Region which might be occasioned by the future availability and cost of energy. In addition, it should be noted that the impact of energy availability on anticipated regional growth and change may assume quite different forms depending upon whether any long-term scarcities in supply are reflected solely through higher prices or if such scarcities are reflected in governmental action to ration or allocate fuel. Although any changes produced by the energy issue which are documented in the monitoring and surveillance processes of the continuing land use-transportation study will provide valuable information for future forecasting efforts, the unknown aspects of the energy problem—including any governmental policy actions related to motor fuel availability—make it inappropriate to include assumptions based on this issue in the revised forecasts at this time. Clearly, this is an area which will require careful consideration and review under the monitoring, surveillance, and plan reappraisal functions of the continuing regional land use-transportation planning effort.

FORECAST TARGET DATE

An important consideration involved in the preparation of forecasts for planning purposes is the forecast target date. Both the land use pattern and the supporting transportation and utility systems must be planned for anticipated demand at some future point in time. This "design year" is usually established by the expected life of the first facilities to be constructed in the implementation of the plan. It may indeed be argued that because of the basic irreversibility to many land development decisions, the design year for a land use plan should be extended beyond the life of the supporting transportation and utility system plans; nevertheless, practical considerations dictate that the land use plan design year be scaled to these design year requirements. Consequently, a forecast period of 20 to 25 years is normally required for comprehensive planning purposes. Accordingly, a forecast year of 2000 was established as the forecast, or design year, for the revised regional land use and transportation system plans.

NEED FOR REVISED AND UPDATED FORECASTS

Although the preparation of forecasts is not planning, the preparation of all plans must begin with some kinds of forecasts. In any planning effort, forecasts are required of all future events and conditions which are outside the scope of the plan, but which will affect plan design or implementation. In the land use and transportation planning process forecasts of population, economic activity, and automobile and truck availability are necessary to provide a basis for plan preparation. The adopted regional land use and transportation plans and the forecasts and assumptions on which these plans are based have been monitored annually to determine the conformance or departure of the forecasts from estimated actual levels. The following discussion presents, in summary form, the basis of the need to revise and update the forecasts prepared under the initial land use-transportation study.

Population

The forecasts of the probable future population size within the Region prepared by the Commission in 1963 under the initial regional land use-transportation study indicated that by 1990 the regional population could be expected to approximate 2.68 million persons. The continued validity of this regional forecast was monitored annually under the Commission's continuing planning program. Population information collected in 1972 indicated that the population of the Region stood at approximately 1,810,700 persons, an increase of 135,700 persons, or 8 percent, over the 1963 regional population level. The forecast used in the preparation of the adopted plans placed the 1972 population of the Region at approximately 1,940,900 persons, 130,200 persons, or 7 percent, above the estimated actual level (see Table 5 and Figure 3). This departure of the estimated from the forecast population levels as shown in Table 5 may be attributed principally to two factors:

1. A sharp decline in birth rates within the Region since the late 1960's. The population forecasts used in the preparation of the original plans envisioned a slight decrease in the crude birth rate within the Region from the 1963 rate of 23 births per 1,000 persons. Birth rates actually had declined to 14 births per 1,000 persons by 1972.

2. The reversal of the observed migration patterns of the 1950's, from a substantial net in-migration to a net out-migration during the late 1960's and early 1970's.

Table 5

COMPARISON OF ESTIMATED AND FORECAST LEVELS OF POPULATION IN THE REGION: 1972

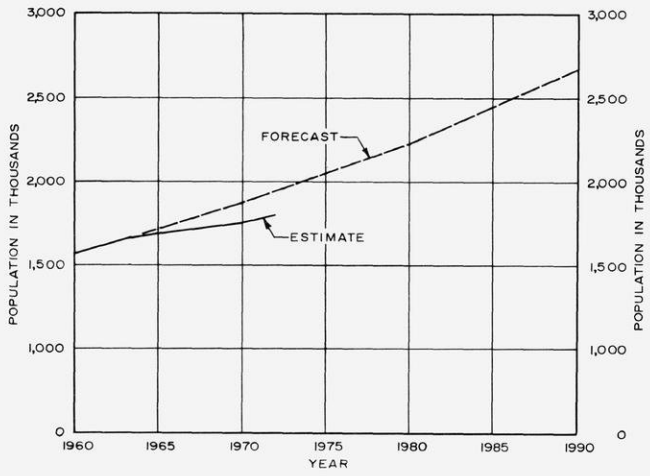
Geographic Area	1972 Population Level		Difference Forecast Minus Estimated	
	Estimated[a]	Forecast	Number	Percent
Southeastern Wisconsin Region	1,810,700	1,940,900	130,200	7.2

[a] *1972 SEWRPC Origin-Destination Travel Survey Estimate.*

Source: SEWRPC.

Figure 3

COMPARISON OF THE FORECAST AND ESTIMATED POPULATION LEVELS IN THE REGION: 1960-1990



Source: SEWRPC.

Of equal importance to these regional trends in total population size are the differential trends in population characteristics within subareas of the Region and subgroups of the resident population of the Region. As an example, the nonwhite population has increased from 2.1 percent of the regional population in 1950 to 4.7 percent in 1960 and 7.4 percent in 1970. Milwaukee County and Racine County continue to have the largest concentrations of nonwhite populations. For 1970 these figures were 10.8 percent and 6.6 percent, respectively. Trends in racial composition are summarized in Table 6.

Differential trends in the age and sex distribution of the Region's white and nonwhite population components are likewise of importance. Since Kenosha County has less than 2 percent nonwhite population, and the Counties of Ozaukee, Walworth, Washington, and Waukesha each have a nonwhite population of less than 1 percent, the age and sex data in Table 7 are limited to Milwaukee and Racine Counties. The 1960 figures are by "white" and "nonwhite," while 1970 figures are by "white" and "black." The racial classification is different, but the figures are roughly comparable in that the "other nonwhite" component of the resident population of the Region is small, representing 7 percent of the total nonwhite population in Milwaukee County in 1970 and 6.7 percent of the total nonwhite population in Racine County in that same year. Although the median age has declined for both groups, nonwhite and black median ages were about 10 years under the white median age in both 1960 and 1970. This difference is due to larger nonwhite populations under 18 years of age in 1960 and 1970 resulting from higher nonwhite birth rates as seen in Table 8.

In light of the data collected and analyzed up to and including 1972, a major reevaluation of the assumptions underlying the initial regional 1990 population forecasts was indicated.

Employment

The 1990 employment forecast used in the preparation of the adopted regional land use and transportation plans indicated that by 1990 employment within the Region could be expected to approximate 984,000 jobs, an increase of 339,100 jobs, or 53 percent, over the 1963 employment level of 634,900 jobs. In 1972 regional employment totaled 748,800, while the forecast prepared under the initial regional land use-transportation planning study placed the 1972 employment level at 728,600. Thus, actual employment in 1972 was about 3 percent above the forecast level (see Table 9 and Figure 4) even though the estimated 1972 population was 7 percent below the 1972 forecast population. A partial explanation for this lies in changes that have occurred in the labor force participation rate. According to the forecasts prepared in 1963, about 55 percent of the regional population over the age of 15 would be employed in 1970, assuming an unemployment rate of 4 percent. The actual 1970 labor force participation rate was 63 percent, or almost 8 percent above the forecast level. In 1970 the unemployment rate was 4 percent. Although actual employment closely approximated the forecast level, significant deviations from the forecast relationships between employment and population emphasized the need for analysis of changes in the regional economic base and structure since 1963 to provide a basis for a new correlation of employment and population levels and a current base upon which to update the Commission's regional employment forecasts to the year 2000.

Automobile and Truck Availability

The forecasts of motor vehicle availability prepared in 1963 under the initial regional land use-transportation study indicated that about 672,500 automobiles could be expected to be available for use by residents of the Region by 1972. As shown in Table 10 and Figure 5 in 1972 about 695,800 automobiles were in use within the Region, about 3 percent more than the forecast level. Forecasts prepared under the initial planning study further indicate that about 70,600 motor trucks could be expected to be available for use within the Region by 1972. As shown in Table 11 and Figure 6, in 1972, approximately 79,700 motor trucks were actually in use within the Region, or 11 percent more than the forecast level. Although both the number of automobiles and motor trucks, like employment, closely approximated the forecast levels, revised forecasts of automobile and truck availability were prepared to the year 2000.

GENERAL FORECASTING METHODOLOGY

The initial regional population and employment forecasts used in the preparation of the regional land use and transportation plans were made interdependently; that is, employment forecasts were not derived solely from population forecasts prepared by purely demographic analyses nor were the population forecasts derived

Table 6

RACIAL COMPOSITION OF THE POPULATION IN THE REGION BY COUNTY: SELECTED YEARS 1950-1970

County	1950 Population							
	White		Black		Other		Total	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Region Total
Kenosha	74,954	99.63	253	0.33	31	0.04	75,238	6.0
Milwaukee	847,806	97.33	22,129	2.54	1,112	0.13	871,047	70.2
Ozaukee	23,352	99.96	7	0.03	2	0.01	23,361	1.9
Racine	107,705	98.29	1,844	1.68	36	0.03	109,585	8.8
Walworth	41,451	99.68	112	0.27	21	0.05	41,584	3.3
Washington	33,883	99.95	4	0.01	15	0.04	33,902	2.7
Waukesha	85,612	99.66	129	0.15	160	0.19	85,901	7.1
Region	1,214,763	97.92	24,478	1.97	1,377	0.11	1,240,618	100.0

County	1960 Population							
	White		Black		Other		Total	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Region Total
Kenosha	99,525	98.92	957	0.95	133	0.13	100,615	6.4
Milwaukee	969,264	93.56	63,024	6.08	3,753	0.36	1,036,041	65.8
Ozaukee	38,395	99.89	9	0.02	37	0.09	38,441	2.5
Racine	136,322	96.15	5,289	3.73	170	0.12	141,781	9.0
Walworth	52,138	96.84	158	3.02	72	0.14	52,368	3.3
Washington	46,060	99.77	8	0.12	51	0.11	46,119	2.9
Waukesha	157,958	99.82	146	0.09	145	0.09	158,249	10.1
Region	1,499,662	95.31	69,591	4.42	4,361	0.27	1,573,614	100.0

County	1970 Population							
	White		Black		Other		Total	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Region Total
Kenosha	115,623	98.06	1,930	1.63	364	0.31	117,917	6.7
Milwaukee	939,989	89.18	106,033	10.06	8,041	0.76	1,054,063	60.0
Ozaukee	54,197	99.59	92	0.17	132	0.24	54,421	3.1
Racine	159,511	93.37	10,572	6.19	755	0.44	170,838	9.7
Walworth	62,879	99.11	287	0.45	278	0.44	63,444	3.6
Washington	63,652	99.71	45	0.07	142	0.22	63,839	3.7
Waukesha	230,205	99.50	362	0.16	798	0.34	231,365	13.2
Region	1,626,056	92.60	119,321	6.80	10,510	0.60	1,755,887	100.0

County	Population Change in Percent											
	1950-1960				1960-1970				1950-1970			
	White	Black	Other	Total	White	Black	Other	Total	White	Black	Other	Total
Kenosha	31.4	278.3	329.0	33.7	16.7	101.7	173.7	17.2	54.2	662.8	1,074.2	56.7
Milwaukee	14.3	184.8	237.5	18.9	- 3.0	68.2	114.3	1.7	10.9	379.1	623.1	21.0
Ozaukee	64.4	28.6	1,750.0	64.6	41.2	922.2	256.8	41.6	132.1	1,214.3	6,500.0	133.0
Racine	26.6	186.8	372.2	29.4	17.1	99.9	344.1	20.5	48.1	473.3	1,997.2	55.9
Walworth	25.8	41.1	242.9	25.9	20.6	81.6	286.1	21.2	51.7	156.2	1,223.8	52.6
Washington	35.9	100.0	240.0	36.0	38.2	462.5	178.4	38.4	87.8	1,025.0	846.7	88.3
Waukesha	84.5	13.2	9.4	84.2	45.7	148.0	450.3	46.2	168.9	180.6	398.8	169.3
Region	23.5	184.3	216.7	26.8	8.4	71.5	141.0	11.6	33.8	387.5	663.2	41.5

Source: U. S. Bureau of the Census and SEWRPC.

Table 7

AGE AND SEX DISTRIBUTION BY RACE IN MILWAUKEE AND RACINE COUNTIES: 1960 and 1970

Milwaukee County

Age Characteristic	1960				1970			
	White		Nonwhite		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female
Total Population	473,820	495,444	32,921	33,856	450,620	489,369	50,582	55,451
Under 18 Years.	162,724	157,992	15,602	15,703	150,983	146,668	25,697	25,944
Percent of Total. . .	34.3	31.9	47.4	46.4	33.5	30.0	50.8	46.8
18-64 Years	269,875	285,973	16,402	17,280	256,027	278,874	23,274	27,702
Percent of Total. . .	57.0	57.7	49.8	51.0	56.8	57.0	46.0	50.0
65 Years and Over . . .	41,221	51,479	917	873	43,610	63,827	1,611	1,805
Percent of Total. . .	8.7	10.4	2.8	2.6	9.7	13.0	3.2	3.3
Median Age	30.7	31.9	20.5	20.6	28.9	31.6	17.9	19.7

Racine County

Age Characteristic	1960				1970			
	White		Nonwhite		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female
Total Population	67,296	69,026	2,735	2,724	77,954	81,557	5,186	5,386
Under 18 Years.	26,015	25,231	1,318	1,326	30,690	29,581	2,749	2,672
Percent of Total. . .	38.7	36.6	48.2	48.7	39.4	36.3	53.0	49.6
18-64 Years	35,351	36,870	1,356	1,343	40,847	43,260	2,334	2,569
Percent of Total. . .	52.5	53.4	49.6	49.3	52.4	53.0	45.0	47.7
65 Years and Over . . .	5,930	6,925	61	55	6,417	8,716	103	145
Percent of Total. . .	8.8	10.0	2.2	2.0	8.2	10.7	2.0	2.7
Median Age	28.5	29.4	19.2	18.8	25.9	27.5	16.9	18.4

Source: U. S. Bureau of the Census and SEWRPC.

Table 8

CRUDE BIRTH RATES IN MILWAUKEE AND RACINE COUNTIES BY RACE: 1960 and 1970

County	Births Per 1,000 Persons			
	1960		1970	
	White	Nonwhite	White	Nonwhite
Milwaukee . .	24.7	42.7	16.4	33.6
Racine.	26.4	47.6	16.9	29.7

Source: U. S. Bureau of the Census, Wisconsin Department of Health and Social Services, and SEWRPC.

Table 9

COMPARISON OF ESTIMATED AND FORECAST LEVELS OF EMPLOYMENT FOR THE REGION: 1972

Geographic Area	1972 Population Level		Difference Forecast Minus Estimated	
	Estimated[a]	Forecast	Number	Percent
Southeastern Wisconsin Region	748,800	728,600	- 20,200	- 2.7

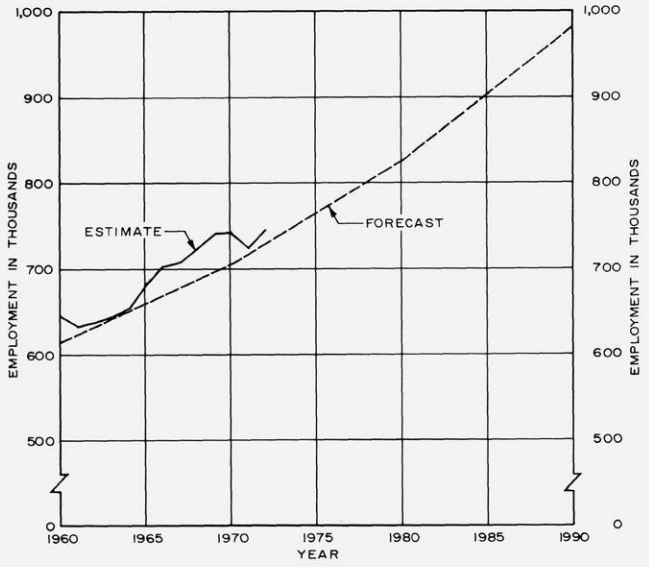
[a] *Place of work estimate.*

Source: Wisconsin Department of Industry, Labor, and Human Relations and SEWRPC.

solely from employment forecasts prepared by purely economic analyses. Rather, both demographic and economic analyses were independently made, the resulting sets of population and employment projections compared, and the comparison used as an aid in the selection of the "best" set of projections as the forecasts. In revising the initial regional population and employment forecasts, essentially the same procedure was followed. The following paragraphs briefly explain the methodology employed in making not only the new population and employment forecasts, but also the related personal income, financial resources, and automobile and truck availability forecasts, while a succeeding section presents the results of the new forecasts.

Figure 4

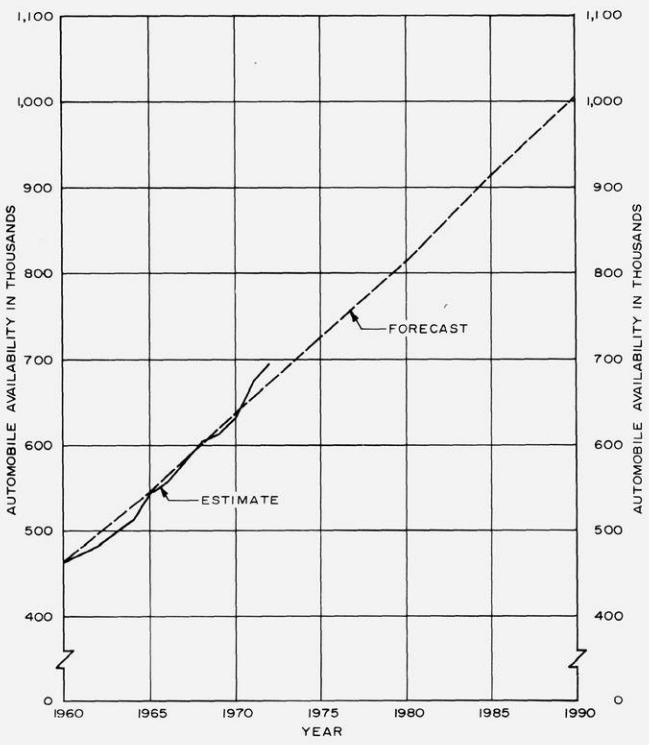
COMPARISON OF THE FORECAST AND ESTIMATED EMPLOYMENT LEVELS IN THE REGION: 1960-1990



Source: Wisconsin Department of Industry, Labor, and Human Relations and SEWRPC.

Figure 5

COMPARISON OF THE FORECAST AND ESTIMATED AUTOMOBILE AVAILABILITY LEVELS IN THE REGION: 1960-1990



Source: SEWRPC.

Table 10

COMPARISON OF ESTIMATED AND FORECAST LEVELS OF AUTOMOBILE AVAILABILITY IN THE REGION: 1972

Geographic Area	1972 Automobiles Available		Difference Forecast Minus Estimate	
	Estimated[a]	Forecast	Number	Percent
Southeastern Wisconsin Region	695,774	672,540	-23,234	-3.3

[a] *Based upon Wisconsin Department of Transportation motor vehicle registration data for the fiscal year ending June 30, 1972. Automobile availability estimates are based on the assumption that 10 percent of the registered automobiles are not in use either because the vehicles have been removed from the State or because they are in salvage yards, used car lots, or in similar storage.*

Source: SEWRPC.

Population

The basic procedure followed in the preparation of the revised population forecast can be summarized in the following steps:

1. Independent projections[1] were made of the regional population to the year 2000 by four different demographic techniques. These included a regression technique, which converted independently prepared national population projections to regional projections; a technique of projecting population developed by C. Horace Hamilton and Josef Perry;[2] a basic cohort survival technique;

[1] *In planning practice it is conventional to distinguish between "projections" and "forecasts." The former term refers to the result of the application of techniques in which facts about population, employment, or other factors are used to make conditional statements about that factor at later points in time. These projections imply continuation of a stated set of trends. An unconditional assertion about a future condition is formally termed a forecast. Completely unconditional assertions are, however, seldom if ever made for planning purposes. Hence, the term "forecast" as used herein refers to population and employment projections used as inputs to non-demographic and noneconomic aspects of plan preparation. While the future population, employment, personal income, and public financial resource data presented in this chapter are forecasts—in that they are inputs into the plan preparation—it will be seen that the automobile and truck availability and land use demand data presented are, in fact, projections. Moreover, the future levels of this availability and demand are seen to be modified by alternative plan designs as presented later in this report.*

[2] *The Hamilton-Perry projection technique has only one broad assumption; that is, that the age-specific rates of fertility, mortality, and migration which operated during the base period of the projection will continue unchanged during the projection period.*

Table 11

COMPARISON OF ESTIMATED AND FORECAST LEVELS OF MOTOR TRUCK AVAILABILITY IN THE REGION: 1972

Geographic Area	1972 Trucks Available		Difference Forecast Minus Estimate	
	Estimate[a]	Forecast	Number	Percent
Southeastern Wisconsin Region	79,712	70,560	-9,152	-11.5

[a] *Based upon Wisconsin Department of Transportation motor vehicle registration data. These truck availability estimates are based on the assumption that 6 percent of the registered trucks are not in use either because the trucks are now registered in another state, or because they are in salvage yards, used car lots, or in similar storage.*

Source: SEWRPC.

and a modified cohort survival technique.[3] Utilizing the basic cohort survival technique alone, 15 population projections were prepared, each based upon different assumptions concerning trends in fertility and migration rates.

2. The separate population forecasts were converted to employment forecasts, and the independently prepared employment forecasts were converted to population forecasts based on an analysis of the relationship between total regional population and employment.

3. A single "best" set of population estimates was then selected from the complete array of projections. This selection was made on the basis of an analysis of the distribution of the array of projections supplemented by the judgment of the Commission staff and Commission advisory committees.

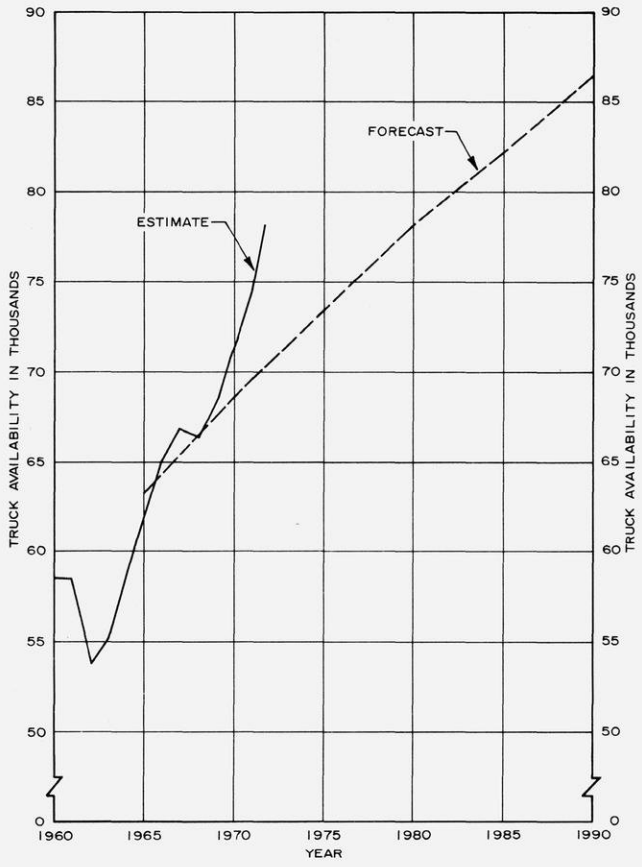
The above procedure produced a forecast of total resident population for the Region to the year 2000. Estimates of the future age and sex characteristics of the regional population were then derived from these projections by applying assumed fertility, mortality, and migration rates to the population estimates. Estimates of the future number of households and average household size of the regional population were developed on the basis of historic trend information.

As part of the population forecasting process, the feasibility of developing a forecast for the resident black population of the Region was explored. As shown in Table 6, only Milwaukee and Racine Counties had significant numbers of black residents in 1970. If all other inputs to the forecasting process are held constant, the reliability of a particular forecast is generally a function of the size of the base population upon which the forecast is made—the smaller the base population, the less

[3] *For details of this method, see SEWRPC Technical Report No. 19, A Regional Population Projection Model.*

Figure 6

COMPARISON OF THE FORECAST AND ESTIMATED MOTOR TRUCK AVAILABILITY LEVELS IN THE REGION: 1960-1990



Source: SEWRPC.

reliable the forecast. Additionally, recent literature[4] suggests that the characteristics of black migration may be undergoing significant changes. Since the migration patterns represent a significant input to population forecasting, any modification of historical migration trends may adversely affect the reliability of the forecasts. Finally, a review of literature on forecasting black population movements within small geographic areas indicated that the available techniques were developed for short range forecasting and would not be suitable for developing a 30-year forecast. In view of these findings, the Commission staff determined that while a realistic forecast of total resident black population at the regional level could be prepared, individual county forecasts or forecasts of specific characteristics of blacks—such as age and sex—would be unrealistic.

[4] *For example, see the U. S. Bureau of the Census publications The Social and Economic Status of the Black Population in the U. S. 1974: Current Population Reports, Special Studies, Series P-23, No. 54, July 1975; and, Mobility of the Population of the U. S. March 1970 to March 1975: Current Population Reports, Population Characteristics, Series P-20, No. 285, October 1975.*

Employment

The employment forecasting approach selected for use in the reevaluation of the adopted regional land use and transportation plans is essentially the same approach used by the Commission in its initial work program. That is, employment projections were made for each of the dominant and subdominant industry groups within the Region. These dominant and subdominant employment projections were summed, together with the projections of the remaining employment, to arrive at a total employment projection for the Region in the year 2000.

For each dominant and subdominant industry group, a range of employment was projected for the year 2000 from a series of inputs which included:

1. An analysis of historic trends of selected characteristics for each industry group including employment, value added by manufacture, average hourly earnings, and indices of industrial production.

2. An extrapolation of the employment trends in each industry group in the Region from 1950 to 1970.

3. A multiple regression analysis of national, east northcentral states, Wisconsin, and regional employment in each industry group from 1950 to 1970.

4. A questionnaire survey of 165 manufacturing firms in the Region.

5. Industry outlooks to 1980 as published by the U. S. Department of Commerce.

6. Unpublished forecasts to the year 2000 of national and east northcentral states employment by industry group prepared by the National Planning Association.[5]

7. Recent studies of regional business attitudes published by the Bureau of Business Research of the University of Wisconsin.

8. Work force industry projections to the year 1980 published cooperatively by the state government.

From the range of projections, a final regional employment forecast was selected by the Commission staff and Commission advisory committees for use in the reevaluation of the adopted plans.

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[5] *The National Planning Association is a private, nonprofit, research organization made up of various standing committees composed of leaders from different specialties and fields. The Association issues policy statements on matters of public concern and disseminates a variety of data, including demographic and economic forecasts on both a national and regional basis.*

It should be emphasized that the forecast employment levels presented herein are intended to reflect long-term trends and do not presume to account for variations caused by short-term changes in the business cycle.

Personal Income

Per capita, total personal, and per household incomes within the Region were also forecast to the year 2000. The primary income forecast made was that of per capita income. Per capita income was forecast to the year 2000 on the basis of a multiple regression analysis using the Commission's revised regional population and employment forecasts and U. S. Department of Commerce population and income projections for the nation and for the Southeastern Wisconsin Region as the independent variables. The total personal income forecast for the Region in the year 2000 was obtained by multiplying the forecast per capita figure by the year 2000 regional population forecasts. Income per household was similarly derived by relating the forecast population data to the total forecast personal income data. All income figures generated from the above methodology were converted to constant 1967 dollars on the basis of projected increases in the consumer price index. Thus, all income figures presented in this chapter are stated in terms of constant 1967 dollars so as to avoid distortion of the results of the forecasts by price inflation.

Land Use

The projection of land use demand as set forth herein by the Commission is concerned with total regional land needs irrespective of spatial distribution. The regional projections of land use demand serve to illustrate a historic or existing trend of land use development extended to a future target year. This trend projection will be used in the land use plan preparation process for comparison with each alternative land use plan prepared.

The projections of total land use demand to the year 2000 were accomplished by determining the change in land use in each of the eight major land use categories shown in Table 26 during the period 1963 to 1970. The average annual change in each land use category from 1963 to 1970 was calculated and projected over the next 30-year period from 1970 to the year 2000. The projected land use demand for the 1970 to 2000 period was added to or subtracted from the 1970 existing land use to obtain the regional total land use demand for the year 2000.

Public Financial Resources

The methodology used in forecasting the probable future level of public financial resources available for plan implementation was based upon an extrapolation of historic trends. The forecasts, therefore, do not take into account the effect of any potential changes in the manner in which the revenues are collected and allocated. As desirable as it might be to anticipate significant future realignments in the amounts and sources of the revenues and incorporate the anticipated effects of such realignments into the forecasts, it is not possible to do so in the absence of knowledge about the exact change introduced into the system and the time at which such a change is implemented.

Two basic forecasts of public revenues were prepared for use in reevaluation of the regional land use and transportation plans. A forecast was made of the total local government revenues which may be reasonably expected to be generated within the Region over the planning period; and a forecast was made of total highway revenues which may be reasonably expected to become available for use within the Region over the planning period. With respect to the federal and state levels of government, the forecasts were of those revenues directly available for expenditure within the Region by the Wisconsin Department of Transportation and not channeled through local units of government.

Total local government revenues were forecast as follows: historic revenues from all sources were first reduced to constant 1967 dollars. These constant dollar amounts were then extrapolated to the year 2000 on the basis of the observed trends in these constant dollar revenue amounts from 1960 to 1972 for eight revenue categories: general property taxes, state collected taxes shared with local governments, debt receipts, public industries, state and federal aids, special assessments, fees and fines, and miscellaneous general revenue. The revenue forecasts for these eight categories were then summed to obtain total local government revenues in the year 2000.

Total highway revenues were forecast to the year 2000 using a methodology similar to that used for forecasting total local government revenues. Federal, state, and local expenditures for highway purposes from 1960 to 1972 were first converted to constant 1967 dollar amounts, and then the observed trends in these historic expenditures from federal, state, county, city, village, and town sources were summed to obtain the total highway revenues available in the year 2000. For comparative purposes, total government revenues and total highway revenues were projected based on observed historic per capita revenue trends. Total revenues in constant dollars were converted to per capita revenues and then extrapolated to the year 2000 on the basis of observed trends. These per capita revenues were then multiplied by the forecast regional population to obtain total forecast revenues.

Automobile Availability

Projections of the number of automobiles available[6] to residents of the Region, that is, the number of automobiles either owned by residents of the Region or garaged at residences within the Region, were made to the year 2000 for the Region as a whole and for each county within the Region for use in plan reevaluation. These projections were derived from regional and county population forecasts by dividing the future population levels by projected changes in the ratio of persons per available automobile. Projection of the ratio of population to available automobiles was based upon observed trends over the period 1950 to 1974 for the Region and for each county. Implicit in these projections is the assumption that, as progressively higher automobile availability levels are attained, the rate of increase in automobile availability will decline. Projections based on linear extrapolation of present trends in automobile availability, that is, on a constant rate of increase, would lead to totally unrealistic ratios of population to automobiles. Consequently, the automobile availability projections prepared for use in the plan reevaluation process recognize the existence of a saturation level of auto ownership although assuming that those factors which have affected auto ownership in the past—such as personal income, family size, land development patterns, and mass transit availability—will continue to change as they have in the past and will continue to influence auto availability in the same manner. In addition, automobile availability projections prepared for the nation and areas similar to the Region were reviewed and considered in the regional projections.

This methodology is essentially identical to those methods used to forecast automobile availability for the initial land use-transportation planning effort. However, unlike the planning effort of 1963, the effect that alternative land use-transportation plans may have on the projected automobile availability will be analyzed as a part of the alternative plan evaluation process through application of quantitative relationships observed to exist in 1972 between automobile availability and average household income, family size, residential density, and level of mass transit service characteristic in subareas of the Region. The development and application of these methods is discussed in Chapters IV and VI of this volume.

Truck Availability

Projections of the number of trucks available[7] to truck operators within the Region were made to the year 2000 for use in plan reevaluation. The projections were based upon an analysis and projection of observed trends in the registrations of each truck type, that is, light (trucks under 8000 pounds net weight), medium (trucks over 8000 pounds net weight), and heavy trucks (tractor-trailer combinations), farm trucks, and municipal trucks over

[6] *The number of automobiles available within the Region at any time within a given calendar quarter is estimated to be approximately 90 percent of the total automobiles reported to be registered in the Region for that calendar quarter of the fiscal year by the Wisconsin Division of Motor Vehicles. The 10 percent reduction accounts for automobiles scrapped, moved out of the Region, or standing on used car lots and for those owned and kept in fleets by government and industry and not garaged at residences. The latter are considered to represent only a fraction of 1 percent of total automobiles in use within the Region.*

[7] *The number of trucks available to truck operators within the Region at any time in a given calendar quarter is estimated to be approximately 94 percent of the total trucks reported to be registered in the Region for that calendar quarter of the fiscal year by the Wisconsin Division of Motor Vehicles. The 6 percent reduction accounts for trucks scrapped, moved out of the Region, or those on used car lots.*

the period 1950 to 1974. Also considered in the preparation of the projections were changes in population levels and in commercial and industrial development anticipated by 2000 and national truck registration forecasts made by governmental and private agencies.

The methods used in preparation of this projection are identical to those employed in the initial land use-transportation planning effort. However, unlike the initial planning effort, the influence that alternative land use-transportation systems may have on the projected motor truck availability will be analyzed as a part of the alternative plan evaluation process through application of the quantitative relationships observed to exist in 1972 between truck availability and land use in subareas of the Region. The development and application of these techniques is discussed in Chapter IV of this report.

POPULATION FORECASTS

Background

In the 120 year period from 1850 to 1970, the regional population increased more than fourteen fold. This represents an average annual growth rate of 2.6 percent, slightly greater than that of the State of Wisconsin and nearly double the growth rate of the United States over the same period. The regional population growth rate, however, has decreased in recent years. From 1960 to 1970, the total population of the Region increased by only 1.2 percent annually, the second lowest population growth rate in the Region since 1850. Only the decade from 1930 to 1940 showed a slower annual rate of population growth—0.6 percent—reflecting the effects of the major national economic depression of that decade.

Regional population increases since 1940 have been principally due to natural increase, one of the two major components of population change. Natural increase accounted for 67 percent of the total population increase within the Region from 1950 to 1960 and all of the population increase from 1960 to 1970. Migration accounted for 33 percent of the growth from 1950 to 1960. From 1960 to 1970, however, this migration pattern reversed itself and a net population out-migration from the Region occurred.

During the first three decades of the 1900's the highest rates of population growth occurred in the now urban counties of Kenosha, Milwaukee, and Racine. Since 1930, however, the highest rates of population increase have occurred principally in the suburban and rural areas in Ozaukee, Washington, and Waukesha Counties. The trend of population decentralization from the urban centers to the suburban and rural areas of the Region has important implications for both land use and transportation planning since the changing demands for additional public facilities and services, such as transit and sewerage, that result from this population shift will affect both the older urban centers and the suburban and rural-urban fringe areas of the Region.

Regional population increases over the last two decades have been accompanied by significant changes in the age structure of the population. From 1950 to 1960 rapidly rising birth rates and declining death rates resulted in increases in the proportion of the regional population made up of persons under 20 years of age and 65 years of age and over, while the "labor force" segment of the population, from 20 to 64 years of age, actually declined by more than 8 percent. From 1960 to 1970, however, declining birth rates resulted in a decrease in the proportion of the total regional population made up of persons under 10 years of age and an increase in the proportion of the population made up of persons 20 to 64 years of age. The proportion of the population 65 years of age and over increased by 1 percent from 9 percent of the total population in 1960 to 10 percent in 1970.

One characteristic of the population of particular importance to land use and transportation planning is the number and size of households. From 1950 to 1970 the total number of households in the Region increased faster than the total population residing in households, resulting in a decline in average household size from 3.4 persons per households in 1950, to 3.3 in 1960, to 3.2 in 1970. This decline in the average number of persons per household is due in part to the dramatic increases in the number of one person households, and to the rapidly declining birth rates since the mid-1960's.

Future Population

The various population projections prepared by application of the techniques described earlier in this chapter ranged from a high of 3.8 million persons to a low of 1.9 million persons for the Region in the year 2000 (see Table 12). Based upon an analysis of these projections, and of the independently prepared employment forecasts, the probable range of the future regional population level was established at between 1.9 and 2.4 million persons by the year 2000. Within this range a forecast level of 2.2 million persons was finally selected by the Commission staff and Advisory Committees as the basis for plan reevaluation. This forecast population level is based on an assumed reduction in the age-specific fertility rates to below replacement level by 1985 and then a gradual increase to replacement level from 1985 to the year 2000, and on an assumed halt of regional out-migration by 1985, with no substantial net in- or out-migration occurring thereafter.

The assumptions contained in this forecast would appear to be reasonable in light of recent national declines in birth rates and fertility expectations and the anticipation that even if recent changes in the tax laws do not encourage industrial development, and thus population growth, in the Region, out-migration will soon reach its limit due to fundamental changes in migration components. In the recent past, migration was largely characterized by rural people moving into urban areas of the east, northcentral, and midwest. This rural pool of potential migration has effectively disappeared, however, and migration is presently characterized by a shift of population from the mature industralized areas of the east, northcentral, and midwest states to the south and west in response to the newly developing industrial economies there, with the attendant economic and job opportunities. In time, that shift will diminish as per unit labor costs in the south

Table 12

PROJECTED REGIONAL POPULATION IN THE YEAR 2000 USING VARIOUS COMBINATIONS OF FERTILITY AND MIGRATION ASSUMPTIONS

Projection Number	Fertility and Migration Assumptions	2000 Population
1	Continuation of current[a] fertility and mortality rates to 2000; migration rates at 1950-60 level.	3,756,400
2	Reduction in fertility to replacement level from 1975 to 2000; migration rates at 1950-60 level; current mortality.	3,532,000
3	Continuation of current fertility and mortality rates to 2000; migration rates at 1950-70 level.	3,167,700
4	Reduction in fertility to replacement level from 1975 to 2000; migration rates at 1950-70 level; current mortality.	2,968,400
5	Continuation of current fertility and migration rates through 1980, then replacement level fertility to 2000; migration rates between the current and the 1950-70 levels to 2000; current mortality.	2,701,700
6	Continuation of current fertility, mortality, and migration rates to 2000.	2,684,100
7	Continuation of current fertility rates to 1985 then replacement level fertility to 2000; continuation of current mortality and migration rates to 2000.	2,590,100
8	Continuation of current fertility rates to 1980, then replacement level fertility to 2000; continuation of current mortality and migration rates to 2000.	2,560,300
9	Reduction in fertility rates to replacement level from 1975 to 2000; continuation of current mortality and migration rates.	2,506,800
10	Reduction in fertility rates to below replacement level from 1975 to 1985, then replacement level fertility to 2000; reversal of net out-migration of the 1960's to net in-migration from 1970 to 2000; current mortality.	2,427,000[b]
11	Continuation of current fertility and migration rates to 1985, then replacement level fertility and no migration to 2000; current mortality.	2,380,800
12	Continuation of current fertility and mortality rates to 2000; no migration.	2,338,300
13	Reduction in fertility to below replacement level from 1975 to 1985, then replacement level fertility to 2000; slowdown in the out-migration of the 1960's to a slight net in-migration by 2000; current mortality.	2,219,300[c]
14	Reduction in fertility rates to replacement level from 1975 to 2000; continuation of current mortality rates; no migration.	2,175,200
15	Reduction in fertility to below replacement level from 1975 to 1985, then replacement fertility to 2000; continuation of current out-migration and current mortality.	1,971,800[d]

[a] *Current refers to 1970 fertility and mortality rates and to 1960-70 migration rates.*

[b] *Selected by Commission staff and Advisory Committees as the probable upper limit of regional population in 2000.*

[c] *Selected by Commission staff and Advisory Committees as the best forecast of regional population in 2000.*

[d] *Selected by Commission staff and Advisory Committees as the probable lower limit of regional population in 2000.*

Source: SEWRPC.

and west approach those existing in the east, northcentral, and midwest states. This should eventually stabilize much of the out-migration presently occurring from those states.

Using the overall regional population forecast as a control total, individual population forecasts were developed for each of the seven counties comprising the Region. Specific assumptions about migration, fertility, and mortality were developed for each individual county based upon historical trends in that county and assumptions about future trends. For this reason, the assumptions vary between and among the individual counties. The assumptions of the forecasting model were then iteratively refined until the county forecasts summed to the regional forecast. This procedure is advantageous in that it permits the regional forecast to be used as a control on the county forecasts. Theoretically, the potential relative error of a regional population forecast should be less than the potential relative error of a county population forecast since the assumptions about future migration, fertility, and mortality can be less specific at the regional level and since the Region affords a larger base population upon which to make a forecast. The net effect of developing the county forecasts within the constraints of the regional forecast is to reduce the potential relative error of the individual county population forecasts.

As shown in Table 13, the Region's forecast population for the year 2000 represents an increase of about 463,000 persons, approximately 26 percent, over the 1970 enumerated regional population of 1,756,000 persons. Generally, the revised county population forecasts indicate continued rapid population growth in Ozaukee, Washington, and Waukesha Counties, with slower rates of population growth in Kenosha, Racine, and Walworth Counties. Milwaukee County, currently experiencing a population decline, would continue to lose population until about 1980 when its population would be expected to begin increasing. The population increase forecast between 1980 and 2000 will not offset the decrease forecast for 1970 to 1980, however, resulting in a small absolute decline of 4,700 persons between 1970 and 2000. Washington and Ozaukee Counties are expected to show the largest relative population gain, increasing by 124 percent and 109 percent, respectively, from 1970 to 2000.

Table 14 presents comparisons between the initial 1990[8] and the revised 2000[9] population forecasts for the Region. At the regional level the revised 1990 forecast is about

[8] *As used hereinafter in this chapter, the term "initial 1990" when used with reference to a particular forecast number or group of numbers should be interpreted to mean the initial year 1990 regional population forecast prepared in 1963.*

[9] *As used hereinafter in this chapter, the term "revised 2000" when used with references to a particular forecast number or group of numbers should be interpreted to mean the revised year 2000 regional population forecast prepared in 1974.*

Table 13

REGIONAL POPULATION FORECAST BY COUNTY: 1970-2000

County	Population					
	Estimated 1970[a]	Forecast			Change: 1970-2000	
		1980	1990	2000	Number	Percent
Kenosha	117,917	139,200	159,900	174,800	56,883	48.2
Milwaukee	1,054,249	1,014,500	1,022,200	1,049,600	- 4,649	- 0.4
Ozaukee	54,461	76,200	97,400	114,000	59,539	109.3
Racine	170,838	185,600	203,600	217,700	46,862	27.4
Walworth	63,444	74,700	86,600	99,600	36,156	57.0
Washington	63,839	90,900	117,600	143,000	79,161	124.0
Waukesha	231,338	292,300	356,600	420,600	189,262	81.8
Region	1,756,086	1,873,400	2,043,900	2,219,300	463,214	26.4

[a] *These figures represent final 1970 Census of Population and Housing county totals after all adjustments and reallocations have been made by the Census Bureau. As such, these totals may not agree with county population totals shown in other tables in this publication. Adjusted population totals give no information about the social and economic characteristics of the reallocated population, making it impossible to recompile tables of population characteristics to reflect adjusted totals. However, in no county in the Southeastern Wisconsin Region does the final county population total differ from the preliminary county population total by more than 0.1 percent. This is not sufficient to affect the reliability of any table containing the preliminary population totals.*

Source: U. S. Bureau of the Census and SEWRPC.

Table 14

COMPARISON OF INITIAL 1990 AND REVISED 1990 AND 2000 REGIONAL POPULATION FORECASTS BY COUNTY

County	Initial 1990 Population Forecast	Revised 1990 Population Forecast	Difference Between Initial and Revised 1990 Forecasts		Revised 2000 Population Forecast	Difference Between Initial 1990 and Revised 2000 Forecasts	
			Number	Percent		Number	Percent
Kenosha	202,000	159,900	- 42,100	- 20.8	174,800	- 27,200	- 13.5
Milwaukee	1,446,000	1,022,200	- 423,800	- 29.3	1,049,600	- 396,400	- 27.4
Ozaukee	106,000	97,400	- 8,600	- 8.1	114,000	8,000	7.5
Racine	283,000	203,600	- 79,400	- 28.1	217,700	- 65,300	- 23.1
Walworth	87,000	86,600	- 400	- 0.5	99,600	12,600	14.5
Washington	96,000	117,600	21,600	22.5	143,000	47,000	49.0
Waukesha	458,000	356,600	- 101,400	- 22.1	420,600	- 37,400	- 8.2
Region	2,678,000	2,043,900	- 634,100	- 23.7	2,219,300	- 458,700	- 17.1

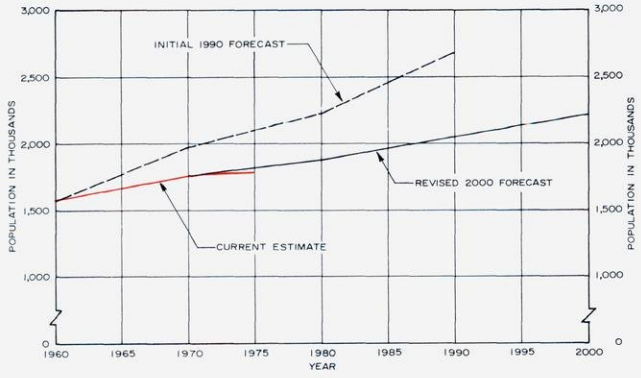
Source: SEWRPC.

634,000 persons, or almost 24 percent, below the initial 1990 forecast of 2.7 million persons. Even the revised 2000 forecast of 2.2 million persons represents a decrease of almost 460,000 persons, or approximately 17 percent below the initial 1990 forecast (see Figure 7). As already noted, this difference is mainly the result of the sharp reductions in fertility rates and the change in regional migration characteristics which have occurred within the Region since the mid-1960's.

With the exception of Washington County, the revised 1990 forecasts range from less than 1 percent to slightly more than 29 percent below the initial 1990 forecasts. Washington County, however, shows an increase of approximately 22 percent between the two forecast figures. The greatest deviations—28 to 30 percent—between the initial 1990 and the revised 1990 forecasts occur in Milwaukee and Racine Counties, the least deviation—less than 1 percent—in Walworth County. A comparison of the revised 2000 county forecasts with the initial 1990 county forecasts reveals that while the revised 2000 regional forecast is 17 percent less than the initial 1990 regional forecast and while four of the seven counties within the Region have revised 2000 forecasts that range from 8 to 27 percent less than the initial 1990 forecasts, three counties—Ozaukee, Walworth, and

Figure 7

COMPARISON OF INITIAL 1990 AND REVISED 2000 REGIONAL POPULATION FORECASTS



Source: SEWRPC.

Washington—have revised 2000 forecasts that are greater than their initial 1990 forecasts. In the case of Washington County, the difference is substantial—49 percent. These differences are attributable to the trend toward population decentralization that has occurred between 1963 and 1974, the years in which the forecasts were made.

The black population in the Region is expected to increase by 130 percent during the forecast period, almost doubling from 6.8 percent of the total population in 1970 to 12.4 percent in 2000 as shown in Table 15. As noted earlier in this chapter, the preparation of individual county forecasts of future black population was deemed to be unrealistic in light of what may be significantly changing characteristics of black migration. It is likely, however, that significant numbers of blacks will continue to reside in Milwaukee, Racine, and Kenosha Counties.

The revised population forecast envisions a significant decline in the overall rate of population growth within the Region over the next two to three decades. Additionally, the age and sex composition of the regional population is expected to change in accordance with anticipated declines in birth rates and changes in migration patterns. The number of males in the population is expected to increase at a slightly slower rate—26 percent—than the number of females—29 percent—with the resulting expectation that the ratio of males to females will decline from 0.943 in 1970 to 0.922 by 2000. Expected changes in the age composition of the population of the Region are presented in Figure 8 and can be summarized as follows:

1. The age group from 0-4 years of age, representing the pre-school population, is expected to increase only slightly from about 152,000 persons in 1970 to nearly 161,000 persons in the year 2000, an increase of 9,000 persons, or 6 percent over the forecast period.

Table 15

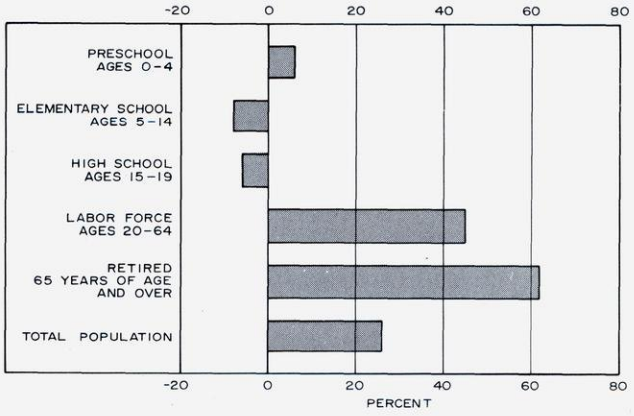
ESTIMATED AND FORECAST BLACK POPULATION IN THE REGION: 1970-2000

Year	Total Population	Black Population	
		Number	Percent of Total
1970	1,756,100	119,300	6.79
1980	1,873,400	172,000	9.18
1990	2,043,900	225,700	11.04
2000	2,219,300	275,000	12.39

Source: U. S. Bureau of the Census and SEWRPC.

Figure 8

PERCENT CHANGE IN POPULATION OF THE REGION BY SELECTED AGE GROUP: 1970-2000



Source: U. S. Bureau of the Census and SEWRPC.

2. The age group from 5-14 years of age, representing the elementary school age population, is expected to decrease in size by about 30,600 persons, or by 8 percent, from about 367,900 persons in 1970 to about 337,300 persons by the year 2000.

3. The age group from 15-19 years of age, representing the high school age population is expected to decline by about 10,500 persons, or 6 percent, from about 162,200 persons in 1970 to about 151,700 persons by the year 2000.

4. The age group from 20-64 years of age, representing the working age population of the Region, is expected to increase by about 401,800 persons, or by 45 percent, from about 894,600 persons in 1970 to about 1,296,400 persons by the year 2000.

5. The age group 64 years of age and over, representing the elderly population of the Region, is expected to increase by about 104,200 persons, or by 62 percent, from about 168,700 persons in 1970 to about 272,900 persons by the year 2000.

These forecast changes in the age and sex composition of the population have important implications for long-range land use and transportation planning. Initially these expected changes in population characteristics indicate a reduced need for new school facilities at all levels of education, the reduced need reflecting the expected decline in fertility rates from 1970 to 1985 and the maintenance of replacement fertility rates[10] thereafter. Forecast age changes indicate that the labor force may be expected to increase substantially, and will contain a larger percentage of persons between the ages of 30 and 54 years of age. Accordingly, the number of persons who will be seeking work within the Region may be expected to increase substantially as will the need to provide jobs for these persons. Finally, these changes indicate that the segment of population over 64 years of age, both in the next 30 years and later as the large working population grows older, may be expected to show the largest relative increase of all age groups, indicating a general aging of the population which will bear upon the demand for housing and special transportation services over at least the next 25 years.

Along with the forecast increases in population will come increases in the number of households in the Region. Forecasts of increases in the number of households have particularly important implications for long-range land use and transportation planning since it is the household population which creates nearly all the demand for land use and transportation facilities. As shown in Table 16, the number of households in the Region is expected to increase from about 536,500 in 1970 to about 747,700 by 2000, an increase of about 39 percent. Implicit in the forecast are the assumptions that the same proportion of the total population will reside in households in 2000 as did in 1970 and that average household size will continue to decline from its 1970 level. These assumptions are based on past trends in these population characteristics. The decrease forecast in average household size reflects the fact that forecasts of total population for the Region assume that crude birth rates in the forecast period will remain substantially below the pre-1970 rates. This forecast increase in the number of households within the Region by 2000 will manifest itself as an increase in the amount of land devoted to residential use, particularly in view of the fact that a continuing decrease in the persons per household rate means that the number of households will increase at a rate greater than that of the total population.

As shown in Table 17 and Figure 9, the regional population is expected to increase by about 27 percent over the forecast period, from 1.76 million persons in 1970 to 2.22 million persons by the year 2000. The regional population growth rate will thus be somewhat higher than that expected for the nation—24 percent—and somewhat lower than that expected for the state—32 percent—over the same period. The slower rate of population growth expected in the Region compared to that of the state, which represents a departure from previous trends, is indicative of the faster rates of population growth expected in other parts of the state, particularly in the northern and western counties.

Table 18 shows a comparison of the revised 1990 and revised 2000 Commission population forecasts with population projections for the Region prepared by other agencies. Overall, the revised 2000 population projections prepared by other agencies ranged from a high of 2,693,600 persons under the projections prepared by the University of Wisconsin-Madison Department of Rural Sociology using Hamilton-Perry ratio correlation technique to a low of 2,195,265 persons under the Series V projections prepared by the U. S. Bureau of the Census. The largest deviation from the revised SEWRPC population forecast—21 percent—occurred under the projections prepared by the University of Wisconsin using the Hamilton-Perry technique. The smallest deviation from the SEWRPC forecast—1 percent—occurred under Series V projections of the U. S. Bureau of the Census population projections. All other population projections for the Region presented in Table 12 show variances of between 2 and 14 percent from the Commission forecast.

Within the Region, the county population projections varied substantially with the type of methodology and assumptions employed in the preparation of each projection. Generally, the projections prepared by the U. S. Bureau of the Census and by the Wisconsin Department of Natural Resources show greater expected population increases in Milwaukee County than in the Commission population forecast which indicates virtual stability in the population of Milwaukee County over the forecast period. The Wisconsin Department of Administration projections generally show a decentralization of population by the year 2000 from Milwaukee County to the Counties of Ozaukee, Washington, and Waukesha, and in this respect are consistent with the county population distribution under the Commission year 2000 population forecasts.

All of the projections presented in Table 18 serve to illustrate the possible variations in demographic forecasts prepared under different methods. Since population forecasting is a difficult task at best, such differences are to be expected, particularly for areas smaller than the Region.

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[10] *Replacement fertility may be defined as the total fertility rate at which parents are replacing themselves but are not contributing to population growth. Allowing for differential male and female birth ratios and for differential death rates, each female of childbearing age in the United States would presently have to produce 2.1 children over her reproductive years to achieve replacement fertility. The total fertility rate in the United States at present is 1.9.*

Table 16

ESTIMATED AND FORECAST HOUSEHOLDS IN THE REGION BY COUNTY: 1970-2000

County	1970			1980			1990			2000		
	Number of Households	Household Population	Persons Per Household	Number of Households	Household Population	Persons Per Household	Number of Households	Household Population	Persons Per Household	Number of Households	Household Population	Persons Per Household
Kenosha	35,468	115,712	3.26	42,800	136,574	3.19	50,400	156,860	3.11	56,800	171,466	3.02
Milwaukee . . .	338,605	1,029,375	3.04	358,900	990,344	2.76	376,600	997,671	2.65	400,300	1,024,335	2.56
Ozaukee	14,753	53,999	3.66	21,200	75,546	3.56	27,500	96,558	3.51	32,500	113,012	3.48
Racine.	49,796	167,016	3.35	55,100	181,406	3.29	61,800	198,963	3.22	67,800	212,727	3.14
Walworth. . . .	18,544	58,553	3.16	22,000	68,890	3.13	25,800	79,811	3.09	30,200	91,768	3.04
Washington . .	17,385	63,167	3.63	25,300	89,937	3.55	33,800	116,344	3.44	42,300	141,468	3.34
Waukesha. . . .	61,935	226,776	3.66	80,200	286,491	3.57	98,700	349,457	3.54	117,800	412,149	3.50
Region	536,486	1,714,598	3.20	605,500	1,829,188	3.02	674,600	1,995,664	2.95	747,700	2,166,925	2.90

Source: U. S. Bureau of the Census and SEWRPC.

Table 17

POPULATION PROJECTIONS AND FORECASTS FOR THE REGION, WISCONSIN, AND THE UNITED STATES: 1970-2000

Year	Population (in Thousands)		
	Region[a]	Wisconsin[b]	United States[c]
1970	1,756	4,418	204,800
1980	1,873	4,820	220,664
1990	2,044	5,384	237,678
2000	2,219	5,841	254,502
Percent Change 1970-2000	26.4	32.2	24.3

[a] *SEWRPC projections.*

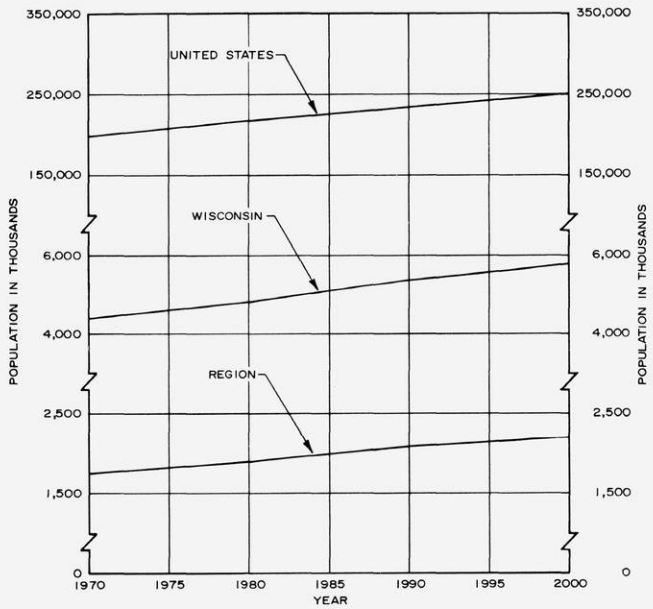
[b] *Wisconsin Department of Administration, Wisconsin Population Projections, Third Edition, June 1975.*

[c] *Figures include armed forces abroad and are Series V projections with immigration, published by the U. S. Bureau of the Census in Current Population Report Series P-25, No. 480, April 1972.*

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

Figure 9

COMPARISON OF POPULATION PROJECTIONS AND FORECASTS FOR THE REGION, WISCONSIN, AND THE UNITED STATES: 1970-2000



Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

EMPLOYMENT FORECASTS

Background

Population and employment levels in the Region have historically followed quite similar patterns because population migrations between geographic areas are largely dependent upon the availability of jobs in these areas. The rapid historic growth of population in the Region, therefore, may be attributed in part to the increasing economic activity in the Region since the early 1900's. During the last two decades, significant changes in the distribution of economic activity in the Region have occurred as economic activity has decentralized from the long established urban areas of the Region to new suburban and rural locations. This trend is consistent with population movements over these past two decades and characterizes the highly diffused nature of recent urban development within the Region.

Table 18

COMPARISON OF REVISED 1990 AND 2000 SEWRPC POPULATION FORECASTS BY COUNTY AND STANDARD METROPOLITAN STATISTICAL AREA (SMSA) WITH POPULATION PROJECTIONS PREPARED BY OTHER AGENCIES

County and SMSA	1990				2000			
	SEWRPC[a]		Wisconsin Department of Natural Resources[b]		SEWRPC[a]		Wisconsin Department of Administration[c]	
	Number	Percent of Region	Number	Percent of Region	Number	Percent of Region	Number	Percent of Region
Kenosha County and SMSA	159,900	7.8	150,068	6.5	174,800	7.9	183,600	8.1
Milwaukee County. . .	1,022,200	50.0	1,180,213	50.7	1,049,600	47.3	932,860	41.0
Ozaukee County	97,400	4.8	104,301	4.5	114,000	5.1	156,840	6.9
Washington County . .	117,600	5.8	136,603	5.9	143,000	6.4	190,060	8.4
Waukesha County . . .	356,600	17.4	419,182	18.0	420,600	19.0	486,480	21.4
Milwaukee SMSA . . .	1,593,800	78.0	1,840,299	79.1	1,727,200	77.8	1,766,240	77.6
Racine County and SMSA	203,600	10.0	222,770	9.6	217,700	9.8	226,740	10.0
Walworth County . . .	86,600	4.2	112,594	4.8	99,600	4.5	97,660	4.3
Region Total	2,043,900	100.0	2,325,731	100.0	2,219,300	100.0	2,274,300	100.0
Variance from SEWRPC Regional Forecast . . .	--		13.8 percent higher		--		2.5 percent higher	

County and SMSA	2000							
	Hamilton-Perry Ratio Correlation Technique[d]		U. S. Bureau of the Census Series - E[e]		U. S. Bureau of the Census Series - V[f]		Bureau of Economic Analysis[g]	
	Number	Percent of Region	Number	Percent of Region	Number	Percent of Region	Number	Percent of Region
Kenosha County and SMSA	181,863	6.7	157,028	6.7	147,423	6.7	140,500	--
Milwaukee County. . .	1,049,523	39.0	1,403,677	60.0	1,317,825	60.0	--	--
Ozaukee County	156,322	5.8	72,470	3.1	68,038	3.1	--	--
Washington County . .	179,781	6.7	85,013	3.7	79,813	3.7	--	--
Waukesha County . . .	720,014	26.7	308,104	13.2	289,260	13.2	--	--
Milwaukee SMSA . . .	2,105,640	78.2	1,869,264	80.0	1,754,936	80.0	1,581,100	--
Racine County and SMSA	295,715	11.0	227,501	9.7	213,587	9.7	195,000	--
Walworth County . . .	110,427	4.1	84,487	3.6	79,319	3.6	--	--
Region Total	2,693,645	100.0	2,338,280	100.0	2,195,265	100.0	--	--
Variance from SEWRPC Regional Forecast . . .	21.4 percent higher		5.4 percent higher		1.1 percent lower		N/A	

Table 18 (continued)

[a] *SEWRPC population figures are projected using a cohort survival model with assumptions of a reduction in fertility to below replacement level from 1975 to 1990 and then replacement fertility to the year 2000, a slowing down of out-migration to a slight regional net in-migration by 2000, and current mortality rates.*

[b] *The Department of Natural Resources projected population using multiple regression equations which included community size, location, and past growth variables; the projections are presented in DNR Technical Bulletin No. 59, 1972.*

[c] *The 1975 Department of Administration population projections are derived from a cohort survival method assuming a continuation of 1960 to 1970 migration patterns, a continuation of current fertility rates in Walworth and Waukesha Counties, and a reduction in fertility to replacement levels by 2005 in the other counties. These are the recommended figures in a series of forecasts found in the Third Edition of "Wisconsin Population Projections."*

[d] *The Hamilton-Perry ratio correlation technique projects the population in age-sex groups by reference to past age-sex cohort sizes and expected numbers of births and assumes the continuation of 1970 trends in fertility, mortality, and migration. The figures presented have been extended from Department of Rural Sociology, UW-Madison 1990 projections.*

[e] *Based on population projections for the U. S. published by the U. S. Department of Commerce in P-25, No. 470; Series E projections, which assume a reduction of fertility to replacement levels and a continuation of 1960 to 1970 migration trends. Projections assume that the proportion of the Region's population residing in each county will remain unchanged over the period 1970-2000.*

[f] *Based on population projections for the U. S. published by the U. S. Department of Commerce in Series V projections with immigration, which assume below replacement fertility by 1980 and replacement level fertility thereafter. Projections assume that the proportion of the Region's population residing in each county will remain unchanged over the period 1970-2000.*

[g] *Bureau of Economic Analysis population projections for SMSA's and based on the U. S. Bureau of the Census Series E projections and BEA employment projections and are presented in Volume 5 of the OBERS Projections, 1974.*

Source: Wisconsin Department of Natural Resources; Wisconsin Department of Administration; University of Wisconsin, Department of Rural Sociology; U. S. Bureau of the Census; U. S. Bureau of Economic Analysis; and SEWRPC.

The labor force of the Region increased from 540,100 persons in 1950 to 638,700 persons in 1960, an increase of 18 percent. This growth rate was greater than that for both the state and the nation during this period. From 1960 to 1970, the regional labor force grew by another 17 percent to 744,500 persons; a growth rate slower than that for both the state and nation during this period. In 1963 the labor force totaled 634,100, and by 1972 totaled 746,300. The number of jobs in the Region increased from 552,700 in 1950 to 647,900 in 1960, 741,600 in 1970 and to 748,800 in 1972. The largest increase in the number of jobs within the Region occurred from 1963 to 1972 when the total number of jobs increased from 630,900 to 748,800 jobs, or by 19 percent.

Economic activity within the Region is heavily concentrated in capital goods manufacturing. In 1972, 34 percent of the total jobs in the Region were in the manufacturing sector of the economy. This represents, however, a decline from 1963 job levels when manufacturing jobs represented 43 percent of the total. The manufacturing industry groups showing the largest decline over this period were the food and related products industry which declined from 9 percent of total manufacturing jobs in 1963 to under 8 percent in 1972; electrical equipment manufacturing which declined from 15 percent of total manufacturing jobs in 1963 to 14 percent in 1972; and transportation equipment manufacturing which declined from 14 percent of total manufacturing jobs in 1963 to about 10 percent in 1972. While manufacturing employment showed declines in relation to total regional employment, the public and private services industry groups showed substantial increases. Private service jobs increased from 12 percent of total regional jobs in 1963 to over 16 percent in 1972, and the government and education services industry group increased its proportion of regional jobs from 9 percent of total regional jobs in 1963 to over 13 percent in 1972. This trend of declines in regional manufacturing jobs and increases in jobs in the public and private services reflects a national trend of increased demand for consumer goods and services and the decentralization of manufacturing activity away from the older manufacturing belt in the northeast and northcentral parts of the nation to the now developing industrial economies in the southeastern and western parts of the nation.

Future Employment

Under the conditions and assumptions discussed in SEWRPC Technical Report No. 10, The Economy of Southeastern Wisconsin, published in 1972, employment in the Region by the year 2000 was projected to range from 994,500 to 1,101,400 jobs. From this range a forecast regional employment level of 1,048,000 jobs was selected. This forecast employment total was then allocated to the seven counties of the Region based upon an extrapolation of employment trends in each county over the period 1950 through 1970. Monitoring of employment levels from 1971 to 1974 and comparison of those levels against the forecast, particularly at the county level, led to a reevaluation of the employment

forecast with respect to both changing trends in the individual county employment patterns and the forecast changing population characteristics noted in the preceding section of the chapter on future population.

In light of the most recent population forecasts, which pointed to a reduction from previously forecast levels in the number of school age children, it was determined that forecast employment in the educational services category was unrealistically high. Accordingly, forecast employment in this category was subsequently reduced by 32,000 jobs. Employment forecasts for all other categories were deemed to still be reasonable and were not changed. This revision resulted in a regional employment forecast of 1,016,000 jobs for the year 2000—32,000 jobs less than originally forecast for that year. These 1,016,000 jobs were then allocated to each of the seven counties comprising the Region on the basis of county employment trends over the period 1955 through 1974. A comparison of the alternative year 2000 employment forecasts with 1974 estimated employment is shown in Table 19.

The distribution and staging of the regional employment forecast for each of the seven counties for the years 1980, 1990, and 2000 are shown in Table 20 and Figure 10. Regional employment is expected to increase to 833,000 jobs by 1980; to 924,500 jobs by 1990; and to the forecast level of 1,016,000 jobs by 2000. The revised 2000 regional employment forecast indicates an expected increase of 274,400 jobs, or 37 percent, over the 1970 level. This represents an average annual increase of 9,150 jobs, or 1.2 percent, over the next 30 years compared to an average annual increase of 12,300 jobs, or 2 percent, under the initial 1990 regional employment forecast. Assuming an unemployment rate of 5 percent, the initial 1990 employment forecast would imply a regional labor force participation rate of 57 percent in 1990, while the revised year 2000 employment forecast developed in 1976 indicates a regional labor force participation rate of 62 percent in 2000, a rate more consistent with the observed 1970 regional labor force participation rate of 63 percent.

Table 19

COMPARISON OF ESTIMATED 1974 EMPLOYMENT AND ALTERNATIVE 2000 EMPLOYMENT FORECASTS FOR THE REGION

County	Estimated 1974 Employment	Forecast 2000 Employment (1972)[a]	Forecast 2000 Employment (1976)[b]
Kenosha	47,000	45,100	54,300
Milwaukee	531,400	614,100	593,600
Ozaukee	20,700	39,800	38,000
Racine	69,100	99,600	95,500
Walworth	25,400	46,100	41,200
Washington	23,100	37,700	36,000
Waukesha	80,800	165,600	157,400
Region	797,500	1,048,000	1,016,000

[a] *Based upon county employment trends 1950-1970.*

[b] *Based upon county employment trends 1955-1974.*

Source: Wisconsin Department of Industry, Labor, and Human Relations and SEWRPC.

Milwaukee and Waukesha Counties are expected to have the largest absolute increases in employment—82,700 and 90,200 jobs, respectively—while Kenosha and Washington Counties are expected to have the smallest absolute increases--15,100 and 15,700 jobs respectively. The largest relative rates of employment growth are expected in Ozaukee and Waukesha Counties—112 percent and 134 percent, respectively—while the smallest relative rate of employment growth, 16 percent, is expected in Milwaukee County. Employment in Milwaukee County is expected to decline in relation to the regional total, reflecting a continued decentralization of economic activity from the highly urbanized areas of the Region. While Milwaukee County's employment is expected to increase from 510,900 jobs in 1970 to 593,600 jobs by 2000, the county's share of total regional jobs is expected to decline from 69 percent to 58 percent. Waukesha County is expected to increase its share of regional jobs from 67,200 jobs, representing 9 percent of total regional employment, in 1970 to 157,400 jobs, representing 16 percent of the total regional employment, by 2000. The Counties of Ozaukee, Racine, Walworth, and Washington are all expected to increase their share of regional employment by between slightly less than 1 percent to slightly more than 1 percent between 1970 and 2000, while Kenosha County is expected to maintain its share of regional employment at about 5 percent over the forecast period.

These expected trends in forecast county employment are generally consistent with expected population increases from 1970 to 2000 which reflect an overall decentralization of population and economic activity from the established urban areas of the Region to suburban and rural locations. This phenomenon is not unique to the Southeastern Wisconsin Region, but is now characteristic of many of the older established urbanized areas of the nation. It should be emphasized that the forecasts reflect the use of certain documented data and certain stated assumptions and judgments concerning trends in economic activity within the Region. As new data reveal new trends, revisions will undoubtedly have to be made to the forecasts in order to maintain their usefulness. Further, the forecasts presented do not take into account variations caused by short-term business cycles or any unpredictable economic dislocation.

A comparison of the initial 1990 and the revised year 2000 regional employment forecasts is presented in Table 21 and Figure 11. The revised year 2000 employment forecast is 32,000 jobs, or about 3 percent, higher than the initial 1990 forecast employment of 984,000 jobs used in the preparation of the adopted regional land use and transportation plans for 1990. The revised 1990

Table 20

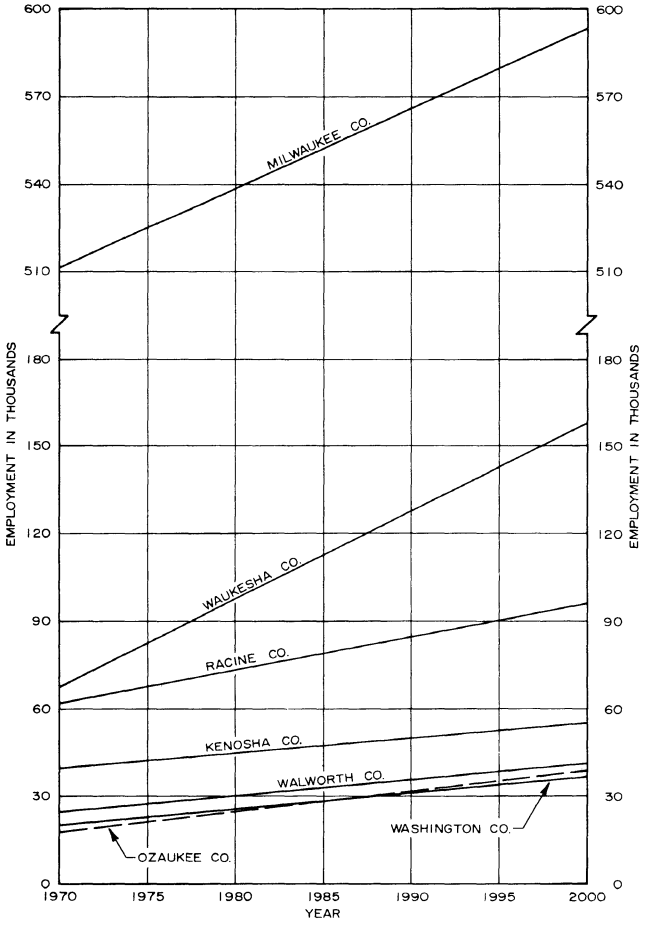
ESTIMATED EMPLOYMENT AND REVISED REGIONAL EMPLOYMENT FORECAST BY COUNTY: 1970, 1980, 1990, and 2000

County	Employment					
	Estimated	Revised Forecast			Change: 1970-2000	
	1970	1980	1990	2000	Number	Percent
Kenosha	39,200	44,200	49,300	54,300	15,100	38.5
Milwaukee	510,900	538,400	566,000	593,600	82,700	16.2
Ozaukee	17,900	24,600	31,300	38,000	20,100	112.3
Racine.	61,900	73,100	84,300	95,500	33,600	54.3
Walworth.	24,200	29,900	35,500	41,200	17,000	70.2
Washington . . .	20,300	25,500	30,800	36,000	15,700	77.3
Waukesha.	67,200	97,300	127,300	157,400	90,200	134.2
Region	741,600	833,000	924,500	1,016,000	274,400	37.0

Source: SEWRPC.

Figure 10

FORECAST EMPLOYMENT LEVELS IN THE REGION BY COUNTY: 1970-2000



Source: SEWRPC.

forecast of 924,500 jobs is 59,500, or 6 percent, lower than the initial 1990 employment forecast reflecting an anticipated slowdown in the amount and rate of regional economic growth over the next 30 years.

Under the revised year 2000 employment forecast, employment in Kenosha, Milwaukee, and Racine Counties is expected to be less in relation to the total regional employment than under the initial 1990 employment forecast, reflecting a continued decentralization of economic activity from the highly urbanized areas of the Region. By the year 1990, these three counties were initially forecast to have 8.1 percent, 63.8 percent, and 9.9 percent respectively, of the jobs in the Region. Based on the revised forecast, these figures will be 4.6 percent, 61.4 percent, and 9.2 percent, respectively, in 1990 and 5.3 percent, 58.4 percent and 9.4 percent in 2000. The remaining counties—Ozaukee, Walworth, Washington, and Waukesha—are expected to account for a larger proportion of the total regional jobs under the revised 2000 employment forecast than under the initial 1990 employment forecast.

Major industry group employment forecasts to the year 2000 are shown in Table 22 and Figure 12. Between 1970 and 2000 employment in the trade, government and education services, and private services groups can be expected to show relative increases greater than the regional employment increase of 37 percent. Employment in manufacturing, while increasing at a rate approximately 10 percent below the regional employment rate increase, will continue to be the largest employment group with 320,300 jobs by 2000. Private services will constitute the second largest employment group with 276,800 jobs in that year. One industry group—agriculture—is expected to decline in employment from 1970 to 2000. As shown in Table 22, agricultural employment in the Region is expected to decline by 3,100 jobs, or 29 percent, from 10,600 jobs in 1970 to 7,500 jobs in the year 2000. This expected decline in agricultural employment in the Region is a continuation of an established trend and is due, in part, to the mechanization of farming processes,

Table 21

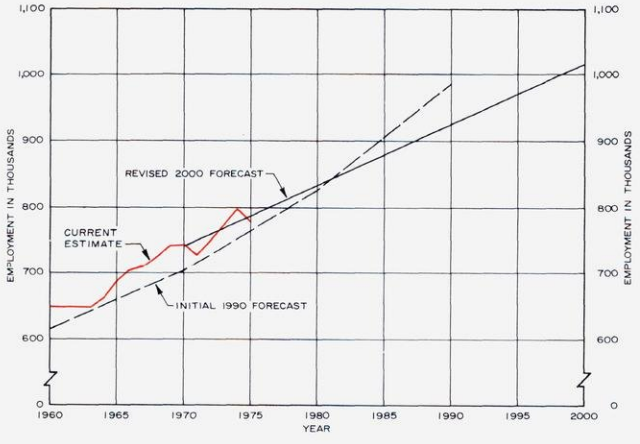
COMPARISON OF INITIAL 1990 AND REVISED 1990 AND 2000 REGIONAL EMPLOYMENT FORECASTS BY COUNTY

County	Initial 1990 Employment Forecast	Revised 1990 Employment Forecast	Difference Between Initial and Revised 1990 Employment Forecasts		Revised 2000 Employment Forecast	Difference Between Initial 1990 and Revised 2000 Employment Forecasts	
			Number	Percent		Number	Percent
Kenosha	80,000	49,300	- 30,700	- 38.4	54,300	- 25,700	- 32.1
Milwaukee . . .	627,700	566,000	- 61,700	- 9.8	593,600	- 34,100	- 5.4
Ozaukee	26,500	31,300	4,800	18.1	38,000	11,500	43.4
Racine.	97,100	84,300	- 12,800	- 13.2	95,500	- 1,600	- 1.6
Walworth. . . .	22,100	35,500	13,400	60.6	41,200	19,100	86.4
Washington . .	26,100	30,800	4,700	18.0	36,000	9,900	37.9
Waukesha. . . .	104,500	127,300	22,800	21.8	157,400	52,900	50.6
Region	984,000	924,500	- 59,500	- 6.0	1,016,000	32,000	3.2

Source: SEWRPC.

Figure 11

COMPARISON OF INITIAL 1990 AND REVISED 2000 REGIONAL EMPLOYMENT FORECASTS



Source: SEWRPC.

but more importantly to the loss of farmland in the Region through the conversion of land from agricultural to urban use.

Generally, the rapid increases in employment expected in the service and other consumer oriented industry groups and the corresponding slower rates of employment growth expected in the manufacturing industry groups by the year 2000 are continuations of already established trends. These represent a change in the orientation of the regional economy over the past 20 years and were probably brought about by the maturation of the Region's manufacturing base and subsequent increases in consumer spending for services and retail goods. It should be noted, however, that recently enacted business and industry tax changes in Wisconsin, which are intended to provide investment incentives especially to manufacturing industries, may encourage expansion of existing manufacturing industries as well as encouraging new manufacturing industries to locate in the Region.

Since the manufacturing industry group represents the largest single regional employer in 1970, a breakdown of the major manufacturing industry forecast employment level is shown in Table 23 and Figure 13. As shown, the largest relative increase in employment from 1970 to the year 2000 is expected in the fabricated metals industry. The forecast employment level in this industry shows an increase of 16,800 jobs, or 68 percent, from 24,600 jobs in 1970 to a forecast level of 41,400 jobs in the year 2000. The expected growth in employment in the fabricated metals industry is based on an increasing demand for such products as metal cans and containers used in food packaging. The revised forecast employment level for this industry is 15 percent greater than the original growth forecast made by the Commission in 1963.

The printing and publishing industry shows the next largest relative employment increase from 1970 to the year 2000. It is expected that employment in this industry will increase by 8,400, or 56 percent, from 14,900 jobs in 1970 to 23,300 jobs in the year 2000. The anticipated growth in this industry may be expected to be stimulated by increases in the number of households, rising educational attainment levels, and increased demands for paper products and publications from the business and government sectors. This revised forecast is consistent with the employment trend forecast made by the Commission in 1963.

The primary metals industry is expected to show employment increases of 9,900 jobs, or 44 percent, from 22,500 jobs in 1970 to 32,400 jobs in the year 2000. The expected increase in employment for this industry is

Table 22

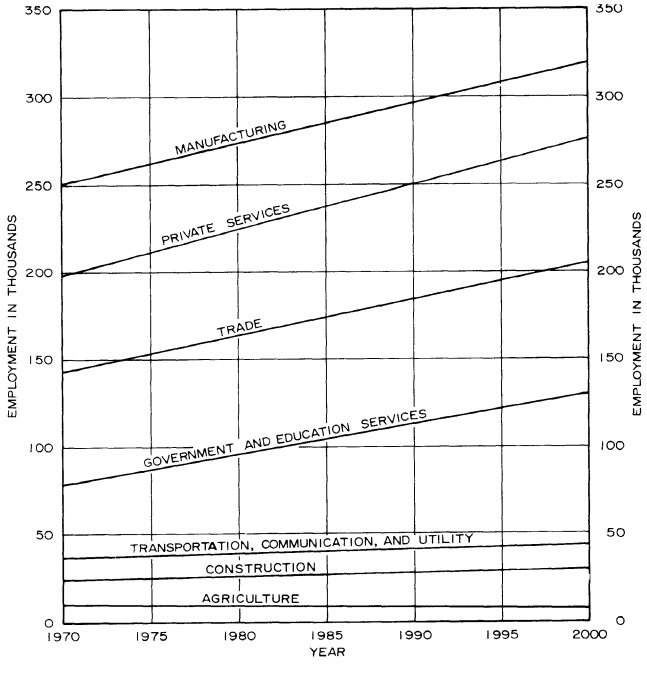
FORECAST EMPLOYMENT LEVELS IN THE REGION BY MAJOR INDUSTRY GROUP: 1970, 1980, 1990, and 2000

Major Industry Group	Employment (in Thousands)				Change 1970-2000	
	1970	1980	1990	2000	Number	Percent
Agriculture	10.6	9.5	8.3	7.5	- 3.1	- 29.2
Construction	24.0	26.0	28.0	30.1	6.1	25.4
Manufacturing	251.0	274.1	297.2	320.3	69.3	27.6
Trade	143.2	164.3	185.4	206.4	63.2	44.1
Transportation, Communication, and Utility	36.0	38.5	41.2	43.7	7.7	21.4
Private Services	198.1	224.4	250.7	276.8	78.7	39.7
Government and Education Services	78.7	96.2	113.7	131.2	52.5	66.7
Total	741.6	833.0	924.5	1,016.0	274.4	37.0

Source: SEWRPC.

Figure 12

FORECAST EMPLOYMENT LEVELS IN THE REGION BY MAJOR INDUSTRY GROUP: 1970-2000



Source: SEWRPC.

based upon a projected increase of demand for primary metal products, such as ferrous castings, which is expected to increase by 3 percent annually through the 1970's. The revised forecast of employment in this industry is approximately 15 percent greater than the overall growth forecast made by the Commission in 1963.

The Region's largest manufacturing employer—non-electrical machinery and equipment—is expected to show an increase of 23,800 jobs, or 35 percent, from a 1970 employment level of 68,100 to 91,900 jobs in the year 2000. Nationally, growth in the output of this industry is projected to range from 5 to 6 percent annually through the 1970's. In addition, national employment projections in this industry show an annual rate of growth of 1.5 percent to the year 2000. Within the Region, the non-electrical machinery industry has shown locational disadvantages, and the Region has not participated significantly in the rapidly growing computer industry. Thus, increases in regional employment in this industry are seen to be relatively modest. Nevertheless, new forecast employment levels in this industry are somewhat higher than the original growth forecasts made by the Commission in 1963.

One industry group—food and beverage products—is expected to decline in employment between 1970 and the year 2000. This industry is expected to show absolute declines in employment of 1,300 employees, or 7 percent, from 18,900 jobs in 1970 to 17,600 jobs in the year 2000. The forecast decline in this industry is based on employment trends in the Region which show slow but steady declines in employment over the past two decades. In addition, many of the processes involved in food processing such as in the brewing industry are becoming highly mechanized. This forecast level represents a virtual stabilization of employment in this industry over the next 25 years.

The electrical equipment and transportation equipment industries are expected to show modest increases in employment from 1970 to the year 2000. Employment in the electrical equipment industry is expected to increase by 25 percent over the same period. It should be noted that the nature of the transportation equipment industry in the Region, with only a few firms operating

Table 23

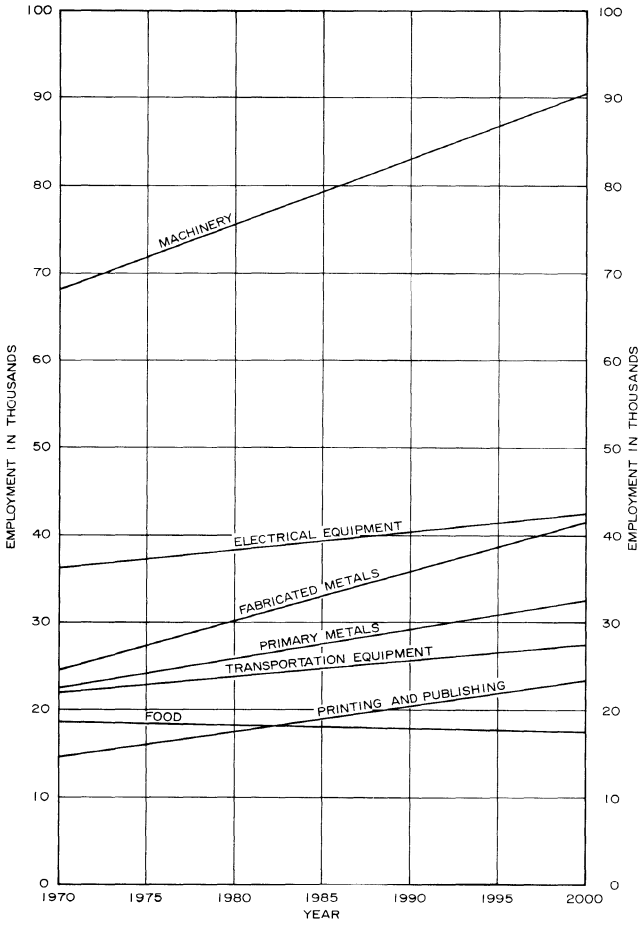
FORECAST MANUFACTURING EMPLOYMENT LEVELS IN THE REGION BY MANUFACTURING INDUSTRY GROUP: 1970, 1980, 1990, and 2000

Manufacturing Industry Group	Employment (in Thousands)				Change 1970-2000	
	1970	1980	1990	2000	Number	Percent
Food and Related Products	18.9	18.5	18.1	17.6	- 1.3	- 6.9
Printing and Publishing	14.9	17.7	20.5	23.3	8.4	56.4
Primary Metals	22.5	25.8	29.1	32.4	9.9	44.0
Fabricated Metals	24.6	30.2	35.8	41.4	16.8	68.3
Machinery	68.1	76.0	83.9	91.9	23.8	34.9
Electrical Equipment	36.5	38.5	40.5	42.6	6.1	16.7
Transportation Equipment	22.0	23.9	25.8	27.6	5.6	25.4
Miscellaneous Manufacturing	43.5	43.5	43.5	43.5	--	--
Total	251.0	274.1	297.2	320.3	69.3	27.6

Source: SEWRPC.

Figure 13

FORECAST MANUFACTURING EMPLOYMENT LEVELS IN THE REGION BY MANUFACTURING INDUSTRY GROUP: 1970-2000



Source: SEWRPC.

in a highly competitive market, makes long-term forecasts in this industry's employment subject to a wide range of error.

Four industries—printing and publishing, primary metals, fabricated metals, and nonelectrical machinery—are expected to show employment increases greater than the increases in total Regional manufacturing employment from 1970 to 2000. The remaining manufacturing industries—food and beverage products, electrical equipment, and transportation equipment—are expected to show employment increases at rates lower than the expected employment increases in total Regional manufacturing employment.

INCOME FORECASTS

Historical Background

Over the past 20 years from 1950 to 1970 incomes of the residents of the Region have risen quite rapidly. Per capita incomes increased at an annual rate of 3 percent per year, from $1,853 in 1950 to $2,954 in 1970, expressed in constant dollars using 1967 as the base year. Personal income during the same period increased by about 6 percent per year, from $2,299 million in 1950 to $5,189 million in 1970. Thus, regional personal income has more than doubled over this 20 year period, even when expressed in constant dollars. The regional population increase over the same 20 year period was only 41 percent, indicating that the residents of the Region have enjoyed a substantial increase in their standard of living over the past 20 years.

Future Income

Personal income within the Region is expected to continue to increase, but at a more modest rate. As indicated in Table 24, total personal income in the Region is forecast to reach $10 billion by the year 2000. This increase is based on the assumption that per capita incomes will increase by nearly 2 percent per year, from $2,954 in

1970 to $4,500 in the year 2000 measured in constant dollars. Overall, total personal income is expected to increase by nearly $5 billion, or 93 percent, from $5.2 billion in 1970 to $10 billion in the year 2000. Household incomes in the Region show increasing trends similar to those of per capita and total personal income levels, but at slightly lower rates. Household income in the Region is expected to increase by 39 percent from $9,700 in 1970 to $13,400 in the year 2000 measured in constant dollars.

As shown in Table 25, the income forecasts presented above are conservative when compared to forecasts prepared using the methodology of the Bureau of Economic Analysis (BEA) of the U. S. Department of Commerce. Under the more liberal assumptions about income growth rates contained in the BEA technique, both aggregate personal income and per capita income would more than double between 1970 and 2000. The important point in comparing the forecasts is that, while disagreeing on the magnitude of change, both forecasts indicate that income in constant dollars can be expected to increase. This forecast in income has certain important implications for land use and transportation planning, indicating that a large segment of the population can be expected to be able to continue to afford to pursue their personal preferences with respect to the purchase of housing and recreation. This pursuit may, however, be expected to be constrained by restrictive land use and transportation system development policies, continued price inflation, and uncertainties in the cost and supply of energy.

Table 24

FORECAST PERSONAL, PER CAPITA, AND HOUSEHOLD INCOME LEVELS IN THE REGION: 1970, 1980, 1990, and 2000

Year	Forecast Aggregate Personal Income (Millions of Dollars)	Forecast Per Capita Income	Forecast Average Household Income
1970	$ 5,189	$2,954	$ 9,671
1980	6,200	3,300	10,225
1990	7,800	3,800	11,600
2000	10,000	4,500	13,400
Percent Change 1970-2000	92.8	52.3	38.6

Source: SEWRPC.

Table 25

COMPARISON OF SEWRPC INCOME FORECASTS AND BUREAU OF ECONOMIC ANALYSIS INCOME PROJECTIONS FOR THE REGION: 1970, 1980, 1990, and 2000

Year	Forecast Aggregate Personal Income (Millions of Dollars)		Forecast Per Capita Income	
	SEWRPC Forecast	BEA[a] Projection	SEWRPC Forecast	BEA[a] Projection
1970	$ 5,189	$ 5,189	$2,954	$2,954
1980	6,200	8,200	3,300	4,100
1990	7,800	12,200	3,800	5,300
2000	10,000	18,700	4,500	7,100
Percent Change 1970-2000	92.8	260.52	52.3	140.4

[a] *Bureau of Economic Analysis income projections for the Region were prepared by applying projected percentage increases for the United States, obtained from BEA publication, Population and Economic Activity in the United States and Standard Metropolitan Statistical Areas-Historical and Projected, 1950-2020, July 1972 to 1970 SEWRPC income data.*

Source: U. S. Department of Commerce, Bureau of Economic Analysis; and SEWRPC.

It should be noted that within the Region the rate of increase of income has been greater for the total population than it has for minority groups. This is consistent with a national trend and has been attributed to a decline in the number of husband-wife families among blacks, an increase in the number of black families with female heads, fewer multiple wage earner families among blacks, and an increase in the number of working white wives.[11] Should these trends continue, the difference in white and nonwhite incomes may be expected to persist. The implication for land use and transportation planning is that minority groups will likely continue to be at an economic disadvantage to the total population in the purchase of goods and services, including housing and transportation, and equal opportunity efforts are not likely to erase this differential in the near future.

LAND USE DEMAND

Although the Region has continuously experienced major changes in land use since its settlement by Europeans in the middle 1800's, the period from 1950 to 1963 was marked by particularly drastic changes in land use development. While the population of the Region increased by about 433,700 persons, or by 35 percent, over this 13 year period, the amount of land devoted to urban use increased by 146 percent. Consequently the density of the developed urban area of the Region declined sharply from about 8,500 persons per square mile in 1950 to about 4,800 persons per square mile in 1963. This urban diffusion and decline in urban population density continued but at a more moderate rate from 1963 to 1970, over which period the density fell further to a level of about 4,350 persons per square mile.

About 129,000 acres, or about 202 square miles of land in the Region, were converted from rural to urban use from 1950 to 1963, or about 15.5 square miles per year. It was on this trend of land development within the Region that the land use demand projections were based under the initial regional land use-transportation planning program.

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[11] *The Social and Economic Status of the Black Population in the U. S. 1974: Current Population Reports, Special Studies, Series P-23, No. 54, July 1975.*

About half of the total of 202 square miles of land converted to urban use from 1950 to 1963, or over 100 square miles, was converted for residential use. In addition to this conversion for residential use, approximately 65,000 acres, or about an additional 100 square miles, of land were converted for other urban uses. Major changes in the concepts relating to the development of major activity centers, such as industrial parks, major shopping centers, and higher educational centers, substantially increased the land devoted to these major uses. The provision of large areas for off-street parking in conjunction with these various major land uses was a major, but not the only, contributing factor to this increase in land area devoted to these uses. The changes in land use that occurred within the Region from 1963 to 1970 are summarized in Table 26 and indicate that a total of 74 square miles of land were converted from rural to urban use during this seven year period, or an average of about 10.6 square miles per year converted during the 1963 to 1970 period. As in the 1950 to 1963 period, about half of the land converted during the period 1963 to 1970 was converted to accommodate residential use. During this period, however, the two major land uses experiencing the highest percentage increase were retail sales and service lands and lands devoted to recreational use. The land use showing the lowest percentage increase during this period was the transportation, communication, and utilities category. Agricultural and other open lands were reduced by the increases in urban land, the bulk of the loss occurring in agricultural lands.

Future Land Use Demand

As already noted, the 1990 projections of land use demand that were made in 1963 under the initial regional land use-transportation planning effort were based on trends in land use as evidenced by actual land use development over the 1950 to 1963 period. New projections of land use demand were prepared for use in the plan reevaluation, using trends established from the land use inventories conducted by the Commission in 1963 and 1970. As shown in Table 26, the new projection indicates that if existing trends in land use development continue within the Region, nearly 319 square miles of land may be expected to be converted from rural to urban use during the 30 year period from 1970 to the year 2000. This is an increase of about 62 percent over the 1970 urban land totals. The projection further indicates that the bulk of this conversion to urban use will occur within the agricultural areas, with approximately 293 square miles of agricultural land being converted during the 30 year period. This projected conversion of land from rural to urban use, would result in major changes in the regional land use pattern. For example, in 1970, urban land uses accounted for approximately 19 percent of the total area of the Region. Based upon the projections,

Table 26

PROJECTED LAND USE DEMAND IN THE REGION: 1970-2000

Land Use Category	Existing Land Use[a] 1963 Acres	1963 Square Miles	1970 Acres	1970 Square Miles	1970 Percent of Region	1963-1970 Change Acres	1963-1970 Change Square Miles	1963-1970 Change Percent	Average Annual Change 1963-1970 Acres	Average Annual Change 1963-1970 Square Miles	Average Annual Change 1963-1970 Percent	1970-2000 Projected Change[b] Acres	1970-2000 Projected Change[b] Square Miles	1970-2000 Projected Change[b] Percent	Total Projected Land Use 2000 Acres	Total Projected Land Use 2000 Square Miles	Total Projected Land Use 2000 Percent of Region
Residential	129,219	201.91	156,266	244.17	9.1	27,047	42.26	20.9	3,863	6.04	3.00	115,890	181.09	74.2	272,156	425.24	15.8
High Density	*21,471*	*33.55*	*25,401*	*39.69*	*1.5*	*3,930*	*6.14*	*18.3*	*561*	*0.88*	*2.61*	*16,830*	*26.30*	*66.3*	*42,231*	*65.99*	*2.5*
Medium Density	*31,596*	*49.37*	*43,230*	*67.55*	*2.5*	*11,634*	*18.18*	*36.8*	*1,662*	*2.60*	*5.26*	*49,860*	*77.91*	*115.3*	*93,090*	*145.45*	*5.4*
Suburban and Low Density	*76,152*	*118.99*	*87,635*	*136.93*	*5.1*	*11,483*	*17.94*	*15.1*	*1,640*	*2.56*	*2.16*	*49,200*	*76.88*	*56.1*	*136,835*	*213.80*	*7.9*
Retail Sales and Service[c]	6,759	10.56	9,464	14.79	0.6	2,705	4.23	40.0	387	0.61	5.71	11,610	18.14	128.0	21,074	32.93	1.2
Industrial[c]	9,668	15.11	11,383	17.79	0.7	1,715	2.68	17.7	245	0.38	2.53	7,350	11.48	64.5	18,733	29.27	1.1
Transportation, Communication, and Utilities[c]	96,121	150.19	103,350	161.48	6.0	7,229	11.29	7.5	1,033	1.61	1.07	30,990	48.42	30.0	134,340	209.91	7.8
Governmental and Institutional[c]	14,910	23.30	17,878	27.93	1.0	2,968	4.63	19.9	424	0.66	2.84	12,720	19.87	71.1	30,598	47.81	1.8
Recreational[d]	23,548	36.79	29,502	46.10	1.7	5,954	9.31	25.3	851	1.33	3.61	25,530	39.89	86.5	55,032	85.99	3.2
Total Urban	280,225	437.86	327,843	512.26	19.1	47,618	74.40	17.0	6,803	10.63	2.43	204,090	318.89	62.3	531,933	831.15	30.9
Agricultural	1,083,800	1,693.44	1,040,121	1,625.19	60.4	-43,679	-68.25	-4.0	-6,240	-9.75	-0.57	-187,200	-292.50	-18.0	852,921	1,332.69	49.6
Other Open Lands[f]	357,075[e]	557.93[e]	353,136	551.78	20.5	-3,939	-6.15	-1.1	-563	-3.00	-0.16	-16,890	-26.39	-4.8	336,246	525.39	19.5
Total Rural	1,440,875[e]	2,251.37[e]	1,393,257	2,176.97	8.09	-47,618	-74.40	-3.3	-6,803	-10.63	-0.47	-204,090	-318.89	-14.6	1,189,167	1,858.08	69.1
Region Total	1,721,030[e]	2,689.23[e]	1,721,100	2,689.23	100.0	--	--	--	--	--	--	--	--	--	1,721,100	2,689.23	100.0

[a] *Based on SEWRPC regional land use inventories conducted in April 1963 and April 1970.*

[b] *Based on a 30-year projection of the 1963-1970 average annual change.*

[c] *Includes related off street parking.*

[d] *Includes only "active" recreation areas within parks or parkways and related off street parking. All other uses within parks or parkways are tabulated in the appropriate land use category.*

[e] *Includes 85 acres added to make the 1963 and 1970 data directly comparable.*

[f] *Includes water, wetlands, woodlands, unused lands, and quarries.*

Source: SEWRPC.

nearly 31 percent of the Region would be devoted to urban use by the year 2000, a substantial increase. Similarly, rural land uses that accounted for nearly 81 percent of the land area of the Region in 1970 would be reduced to approximately 69 percent by the year 2000.

Urban population density within the Region is one of the important factors which must be considered in the preparation of the regional land use plan, and the trends in density must be evaluated along with the projected demand for land. Based on the 1970 regional population of 1,756,086, the forecast regional population for the year 2000 of 2,219,300, and the projected demand for land, major changes in urban densities in the Region may be expected to occur. In 1970, the gross population density of the developed urban land within the Region approximated 4,350 persons per square mile. If the projected land use demand is met entirely through the conversion of rural land to urban use, the overall density of the developed area of the Region can be expected to fall to about 3,000 persons per square mile, a decrease in gross density of approximately 30 percent.

It should be noted that these land use projections are not plans, nor should the numbers provided by such projections be construed as the numbers to which each plan prepared must adhere. In the preparation of alternative land use plans, recommendations may be made to change the projected course of events in terms of land conversion to bring about a more efficient, beautiful, and attractive regional settlement pattern. Similarly, plans that will be prepared using the projections are not to be construed as forecasts or projections, but as what they are—plans that are intended to be used as a guide in guiding and shaping regional development. Considerable confusion exists concerning the difference between a land use plan with accompanying population distribution, employment, motor vehicle availability, and land use data and the forecasts and projections used in the preparation of that plan. It is essential that the significant but subtle differences between forecasts, projections, and plans be understood. Forecasts and projections are intended to indicate what "might be" in the absence of plans. Plans recommend what "should be."

PUBLIC REVENUE FORECASTS

Historical Background

From 1960 to 1972 the property tax levy has annually provided over 40 percent of the total revenue of general purpose local units of government operating within the Region, and over 60 percent of the school district revenues. Per capita property taxes levied for the Region as a whole increased at an average annual rate of about 5 percent, from $160 per capita in 1960 to $262 per capita in 1972, expressed in constant 1967 dollars. The proportion of total regional revenues provided by the property tax, however, has diminished slightly over this 12 year period for all local units of government except school districts.

One of the most rapidly increasing revenue sources to local units of government in the Region is revenue derived from public industries which reflects the rapid growth in urbanization which occurred during the 1960's. Public industries' revenues have increased by 281 percent, from $48 million in 1960 to $183 million in 1972 measured in constant 1967 dollars, a more rapid increase than all other revenue sources. Public industries' revenues have also increased substantially in proportion to total revenue and are second only to property tax revenues as a source of revenue for the Region. All other major public revenue sources have also increased on a per capita basis. These general sources included: state collected taxes shared with local governments; state and federal aids; revenues from fines, fees, and related sources; special assessment revenues, and miscellaneous revenues.

The amount of money available for highway transportation in the Region, while increasing in absolute terms, has actually been declining as a proportion of total revenues. In 1960, $91 million was available for this purpose. This represents approximately 16 percent of the total revenues in 1960 and contrasts to $113 million available for highway uses in 1972, which represents less than 11 percent of the total 1972 revenues expressed in constant 1967 dollars. In 1960, federal and state monies expended for highway purposes within the Region amounted to $18 million, or 20 percent of all monies expended for highway purposes. By 1972, federal and state expenditures for highway purposes within the Region totaled $28 million and represented 25 percent of total expenditures for such purposes. Thus, during the 12 year period from 1960 to 1972, local revenues provided the major portion of expenditures for highway purposes in the Region.

In 1960 construction expenditures of $46 million comprised nearly half of the total expenditures for highway purposes. In 1972 construction expenditures totaled $57 million, also about half of total highway expenditures. Federal and state expenditures for highway construction in 1960 accounted for $16 million; or 35 percent of total highway construction expenditures. In 1972 federal and state expenditures for highway construction amounted to $24 million, or 42 percent of total construction expenditures. Thus, the local units of government provided the bulk of monies for highway construction as well as for operation and maintenance within the Region.

Future Revenues (Expressed in constant 1967 dollars) Local government revenues in the Region are forecast to increase by 110 percent from $1,069 million in 1972 to $2,245 million in the year 2000. This year 2000 revenue forecast of $2,245 million is 3 percent higher than the 1990 revenue forecast of $2,170 million prepared in 1963 under the initial land use and transportation study. Of this total expected revenue, over 42 percent may be expected to be provided by property taxes, which are anticipated to increase by $489 million, or 104 percent, from $470 million in 1972 to $959 million in the year 2000. The next largest revenue producing source is the public industries category which is anticipated to comprise 23 percent of total local government revenues in the year 2000. Revenues from public industries are expected to increase by $328 million, or 178 percent, from $183 million in 1972 to $511 million in the year 2000. Other important revenue producing sources will

be revenues from debt receipts, which are expected to comprise 12 percent of total local government revenues by the year 2000, and state collected taxes shared with local governments, which are expected to comprise 10 percent of total local government revenues (see Table 27).

A comparison was made between the forecast total revenues based on revenue trends and a total revenue forecast based on per capita trends. As shown in Appendix Figure F-1, the per capita forecast is slightly higher than the total revenue forecast.

Generally, the revised local government revenue forecast for the year 2000 differs only slightly from the initial 1990 revenue forecast total; however, there are significant differences between some revenue categories. The major differences occur in the categories of highway aids, other miscellaneous revenues, and public industry revenues. The sizable difference between the initial 1990 forecast for aids and the revised year 2000 forecast is definitional, with the 1990 forecast including all federal and state aids and grants to local governments and school districts whereas the year 2000 forecast includes only those aids pertaining to highways. Similarly, the revised year 2000 forecast for miscellaneous revenues includes many revenues previously grouped as "aids" in the initial 1990 forecast. The difference between the initial 1990 forecast for public industry revenues and the revised year 2000 forecast is the result of the rapid urbanization which occurred during the 1960's and was thus not entirely anticipated in the initial forecast.

The degree to which public revenue amounts will be available for highway purposes, does, of course, depend upon the amount and the manner of allocation of such revenue by federal, state, and local governments. The proposals embodied in the recently defeated Wisconsin State Assembly Bill 930, entitled "An Integrated Transportation Plan for the State of Wisconsin," indicate that future state highway revenue amounts may be allotted in a manner inconsistent with past expenditure patterns. The Federal Aid Highway Act of 1973 may have a similar effect upon future federal revenue amounts, particularly if subsequent legislation carries forward the changes in the allocation of federal highway monies embodied in that Act. The amounts of revenues which may be expected to become available for highway purposes in the Region in the year 2000, as shown in Table 28 and Figure 14, are projections based upon historical trends and should be viewed, therefore, as qualified estimates of the future public revenue support available for highway purposes. Any changes in the manner and amount in which expenditures for highway purposes are made may interrupt historical trends and necessitate the development of new forecasts.

In addition to the future uncertainty regarding the amount and manner of allocation of future highway transportation expenditures, the erratic nature of historic spending patterns adds an additional note of uncertainty to these forecasts. Appendix F contains a more detailed presentation of the problems encountered in analyzing the historic data and in preparing the forecast. To neutralize the effect of these fluctuations on the comparisons between the forecast amounts and the historic amounts, comparisons are made using the average of alternate year expenditures for the period 1960 to 1972 rather than a particular base year.

Total federal, state, and local expenditures for highway and related purposes are expected to increase by $17 million in constant dollars, or 15 percent, from $113 million in 1972 to $130 million in the year 2000. Federal and state revenues for highway purposes are expected to amount to $37 million, or 29 percent of total revenues for highway purposes in the year 2000. Thus, local revenues for highway purposes are expected to provide 71 percent of the total expenditures for highway transportation purposes in the Region. Recent trends in revenues available for highway purposes indicate that federal revenues expended for highway purposes are declining in proportion to total highway expenditures.

Table 27

DISTRIBUTION OF FORECAST PUBLIC REVENUES IN THE REGION BY SELECTED REVENUE CATEGORY: 1972, 1980, 1990, and 2000

Revenue Category	Revenues (in Millions of Dollars)				Change 1972-2000		Percent of Total Revenues				Point Change 1972-2000
	1972	1980	1990	2000	Absolute	Percent	1972	1980	1990	2000	
General Property Tax	470.4	598.6	778.6	958.6	488.2	103.8	44.0	43.0	42.8	42.7	- 1.3
State Collected Tax	115.6	155.3	198.8	242.3	126.7	109.6	10.8	11.2	10.9	10.8	0.0
Debt Receipts	159.4	186.5	231.4	276.3	116.9	73.3	14.9	13.4	12.1	12.3	- 2.6
Public Industries	183.2	272.5	392.0	511.5	328.3	179.2	17.1	19.6	21.6	22.8	5.7
Highway Aids	20.3	24.6	29.9	35.2	14.9	73.4	2.0	1.8	1.6	1.6	- 0.4
Special Assessments	20.0	30.6	39.6	48.6	28.6	143.0	1.9	2.2	2.2	2.2	0.3
Fees and Fines	18.4	25.2	33.1	41.0	22.6	122.8	1.7	1.8	1.8	1.8	0.1
Miscellaneous General Revenues	81.6	98.0	114.6	131.2	49.6	60.8	7.6	7.0	6.4	5.8	- 1.8
Total	1,068.9	1,391.3	1,818.0	2,244.7	1,175.8	110.0	100.0	100.0	100.0	100.0	0.0

Source: Wisconsin Department of Revenue, Bureau of Municipal Audit, and SEWRPC.

Table 28

FORECAST REVENUES AVAILABLE FOR HIGHWAY AND RELATED PURPOSES IN THE REGION BY GOVERNMENT TYPE: 1980, 1990, and 2000

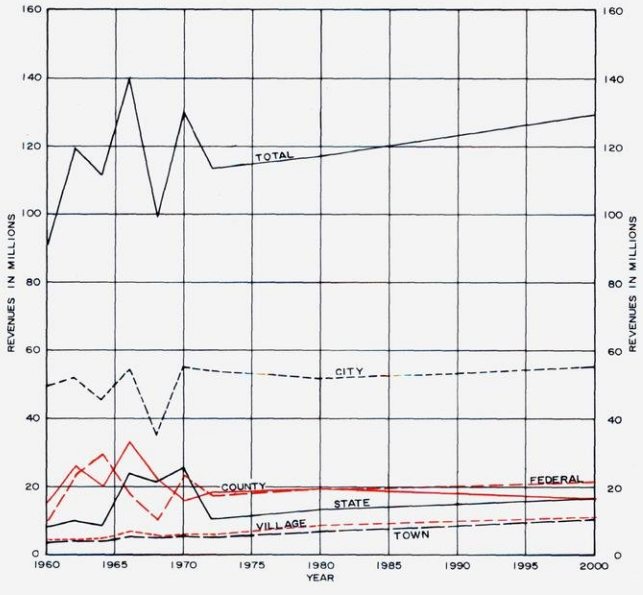
Government Type	Total Highway Revenues (in Millions of Dollars)				Change Historic-2000		Percent of Total Highway Revenues				Point Change Historic-2000
	Historic[a]	1980	1990	2000	Absolute	Percent	Historic	1980	1990	2000	
Federal	$ 18.8	$ 19.6	$ 20.1	$ 20.7	$ 1.9	10.1	16.4	16.7	16.3	15.9	- 0.5
State.	15.5	12.6	14.6	16.6	1.1	7.1	13.5	10.7	11.8	12.8	- 0.7
County	21.7	19.5	17.9	16.4	- 5.3	- 24.4	18.9	16.6	14.5	12.6	- 6.3
City	49.5	51.8	53.4	55.0	5.5	11.1	43.2	44.1	43.2	42.4	- 0.8
Village.	5.1	7.3	9.0	10.6	5.5	107.8	4.5	6.2	7.3	8.2	3.7
Town	4.1	6.7	8.6	10.5	6.5	162.5	3.5	5.7	6.9	8.1	4.6
Total	$114.7	$117.5	$123.6	$129.8	$15.2	13.3	100.0	100.0	100.0	100.0	--

[a] *Represents the average based on 1960-1972 revenues.*

Source: Wisconsin Department of Revenue, Bureau of Municipal Audit; Wisconsin Department of Transportation; and SEWRPC.

Figure 14

EXISTING AND FORECAST REVENUES AVAILABLE FOR HIGHWAY AND RELATED PURPOSES IN THE REGION: 1960-2000



Source: SEWRPC.

Forecast data for the Region indicate that this trend is expected to continue with federal highway revenues accounting for $19 million, or over 16 percent of the average 1960 through 1972 total highway revenues and $21 million or less than 16 percent in the year 2000. State highway revenues are also expected to show a slight decline in relation to the average total highway revenues, from a 1960 through 1972 average of over 13 percent to less than 13 percent in the year 2000. Of the local units of government, only counties show declining revenues for highway purposes in relation to the past average total highway revenues. In contrast, two other types of local units of government—villages and towns—show substantial increases in revenues in relation to past averages, while cities show a moderate increase. In the year 2000, village revenues available for highway purposes are forecast to provide $10.6 million, or 8.2 percent of the total highway revenues in the Region, while towns are forecast to provide $10.5 million, or 8.1 percent of the total. This is in contrast to previous average village and town revenues of $5.1 and $4.1 million, which comprise over 4 and 3 percent, respectively, of the total average revenues from 1960 through 1972 (see Table 28).

A comparison was made between the forecast of total highway revenues based on revenue trends and a total highway revenue forecast based on per capita trends. As shown in Appendix Figure F-2, the per capita forecast is slightly less than the total highway revenue forecast.

In 1972, revenues available for highway construction amounted to $57 million, representing nearly half of total highway revenues in that year. Forecast data indicate that revenues available for highway construction in the year 2000 are expected to decline by about 3.5 percent under the 1972 level to $55 million representing 42 percent of total year 2000 revenues for highway transportation purposes.

AUTOMOBILE AVAILABILITY PROJECTIONS

Historic Background

During the period from 1920 to 1974, the number of automobiles available to residents of the Region increased from 58,500 to 746,400. The period from 1920 to 1950 was characterized by short term, erratic trends as a result of the Great Depression and World War II. Since 1950, however, the number of automobiles available to residents

of the Region has increased every year—from 294,000 in 1950, to 462,000 in 1960, to 497,000 in 1963, to 634,000 in 1970, and to 746,400 in 1974. This increase is equivalent to a uniform growth rate of approximately 4 percent annually over this 24 year period. If the increase in the number of automobiles within the Region were to continue at this same rate, there would be 2,050,000 automobiles available to residents of the Region by 2000. Such a projection, based upon continuation of a uniform rate of increase, would, however, lead to an unrealistically low ratio of 1.08 persons per automobile by the year 2000.

Historically, the ratio of persons per automobile within the Region decreased from 4.23 in 1950, to 3.41 in 1960, to 3.36 in 1963, to 2.77 in 1970, to 2.41 in 1974. While it is likely that this ratio will continue to decline somewhat as more single person households and more multicar households are formed, as a practical matter an absolute lower limit to the ratio of persons per automobile available for every licensed driver residing within the Region exists. Based upon the age distribution of the forecast regional population and an estimate that nearly 88 percent of the population within the Region between the ages of 16 and 75 is licensed to drive, this absolute lower limit of automobile availability may be calculated at 1.62 persons per available automobile, representing a total of 1.4 million available automobiles in the Region by the year 2000. While such a ratio may be possible, it is highly unlikely ever to be attained, since not every licensed driver will be able to afford, or be inclined, to own an automobile.

Future Automobile Availability

Based on the assumption of a decreasing rate of growth in automobile availability within the Region and the existence of a saturation level of auto ownership, the number of automobiles available within the Region, as shown in Table 29, is projected to reach 1,168,000 by 2000. This represents an increase of approximately

Table 29

AUTOMOBILE AVAILABILITY AND NUMBER OF PERSONS PER AUTOMOBILE IN THE REGION BY COUNTY: SELECTED YEARS 1950-2000

Year	County							
	Kenosha		Milwaukee		Ozaukee		Racine	
	Autos Available	Persons Per Auto	Autos Available	Persons Per Auto	Autos Available	Persons Per Auto	Autos Available	Persons Per Auto
1950	18,400	4.11	197,600	4.41	6,500	3.60	26,900	4.07
1955	24,500	3.53	244,400	3.96	8,900	3.24	34,700	3.61
1960	32,500	3.10	288,800	3.58	12,600	3.05	43,200	3.28
1965	38,100	2.94	328,100	3.36	15,900	2.89	53,300	2.93
1970	43,900	2.69	367,700	2.87	21,000	2.59	62,400	2.74
1975	53,600	2.38	420,600	2.45	29,100	2.24	76,100	2.33
1980	65,600	2.12	448,200	2.26	37,000	2.06	86,300	2.15
1985	73,700	2.03	468,800	2.16	44,100	1.97	95,400	2.05
1990	81,900	1.95	493,600	2.07	52,000	1.87	104,200	1.95
1995	88,300	1.90	513,200	2.03	57,900	1.83	110,600	1.91
2000	94,300	1.85	529,900	1.98	64,100	1.78	116,800	1.86

Year	County						Region	
	Walworth		Washington		Waukesha			
	Autos Available	Persons Per Auto	Autos Available	Persons Per Auto	Autos Available	Persons Per Auto	Autos Available	Persons Per Auto
1950	12,100	3.44	9,400	3.61	22,700	3.78	293,600	4.23
1955	15,100	3.06	11,600	3.19	33,500	3.19	372,700	3.76
1960	18,000	2.91	14,300	3.22	51,800	3.06	461,200	3.41
1965	21,100	2.70	18,300	2.84	71,100	2.70	545,900	3.15
1970	24,700	2.57	23,500	2.71	90,800	2.55	634,000	2.77
1975	29,600	2.33	32,500	2.38	117,900	2.22	759,400	2.38
1980	34,100	2.19	41,700	2.18	138,600	2.11	851,500	2.20
1985	38,700	2.08	50,600	2.05	160,200	2.01	931,500	2.10
1990	44,100	1.96	61,100	1.93	185,300	1.92	1,022,000	2.00
1995	48,700	1.92	68,700	1.89	209,800	1.86	1,097,400	1.95
2000	52,700	1.89	77,500	1.85	232,800	1.81	1,168,100	1.90

Source: Wisconsin Department of Transportation and SEWRPC.

422,000 automobiles, or 57 percent, over the 1974 level. The corresponding ratio of persons per available automobile is projected to decline from 2.41 in 1974 to 1.90 by 2000. This assumes that the absolute lower limit, or saturation level, of automobile availability will not be reached in southeastern Wisconsin by the year 2000 (see Figure 15).

A comparison of the regional projection of the automobile availability ratio with similar projections of ratios for the nation and areas similar to the Region reveal that a similar leveling out in the curve of persons per available automobile is common to all projections (see Figure 16). The ratio of persons per automobile tends to stabilize as it approaches the saturation level.

Comparison of the persons per available automobile forecast used in the initial regional land use-transportation planning effort with the historic persons per available automobile ratio during the period from 1965 to 1974 and the projection developed for the plan reevaluation reveals that the original projection of persons per available auto was substantially higher than both the historic data and the revised projection (see Figure 17). However, as shown in Table 30 and Figure 18, the original projection of total automobiles available in the Region varies little from either the historical data from 1965 to 1974 or from the revised forecast.

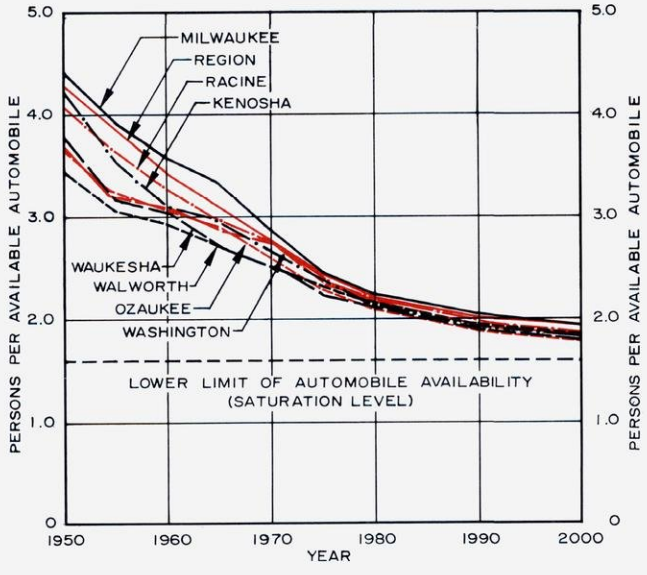
MOTOR TRUCK AVAILABILITY PROJECTIONS

Historical Background

The growth pattern of motor trucks available to truck operators within the Region during the period 1950 to 1974 has generally exhibited a rapidly increasing trend, particularly in the period between 1962 and 1974. From 1950 to 1974, the number of trucks available increased from 49,400 to 92,900, with the major portion of the increase—37,000 trucks or 25 percent—occurring in the last 12 years. This represents an increase in regional truck availability over the period from 1950 to 1974 of about 88 percent, as compared to an increase of 137 percent in automobiles available over the same period.

Figure 15

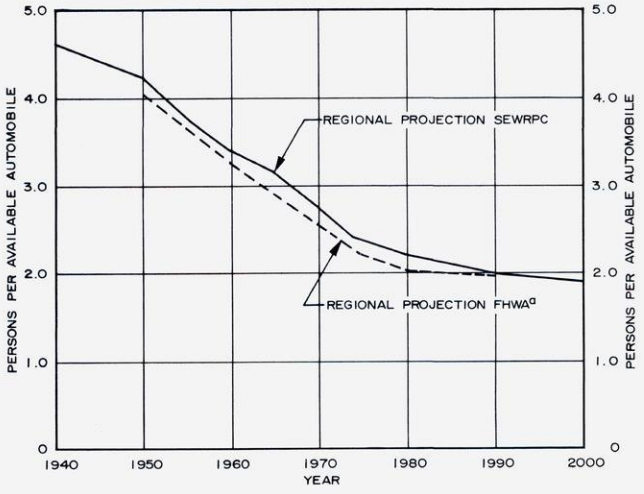
PERSONS PER AVAILABLE AUTOMOBILE IN THE REGION: 1950-2000



Source: SEWRPC.

Figure 16

COMPARISON OF SEWRPC AND U. S. DEPARTMENT OF TRANSPORTATION PROJECTION OF PERSONS PER AVAILABLE AUTOMOBILE IN THE REGION: 1940-2000

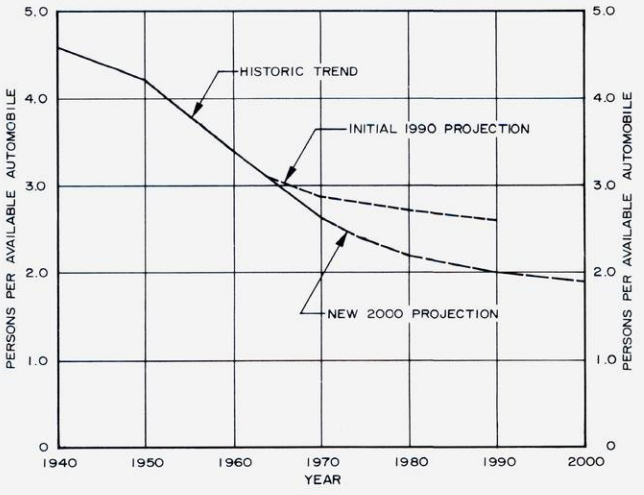


[a] THIS TREND AND PROJECTION FOR THE REGION WAS DETERMINED BY UTILIZING A NATIONAL TREND AND PROJECTION OF THE RATIO OF REGISTERED AUTOMOBILES TO POPULATION OF LICENSED DRIVING AGE, AS OBSERVED AND FORECASTED BY THE FEDERAL HIGHWAY ADMINISTRATION.

Source: SEWRPC.

Figure 17

COMPARISON OF INITIAL 1990 AND NEW 2000 PROJECTIONS OF PERSONS PER AVAILABLE AUTOMOBILE IN THE REGION



Source: SEWRPC.

The increase in the number of motor trucks within the Region during the period from 1950 to 1974 can be attributed primarily to large increases in motor truck availability in Waukesha and Milwaukee Counties, which exhibited increases of 12,700 and 10,700 trucks respectively. The greatest rates of increase in motor truck availability during the same 24 year period occurred in Waukesha, Kenosha, and Racine Counties, which experienced net increases of over 240, 136, and 130 percent respectively. Much of the increase in truck availability in recent years may be attributed to a growing preference for the utilization of light trucks and vans as passenger vehicles.

Table 30

COMPARISON OF INITIAL 1990 AND NEW 2000 PROJECTIONS OF AUTOMOBILES AVAILABLE IN THE REGION BY COUNTY: SELECTED YEARS 1975-2000

Year	Kenosha County			Milwaukee County		
	Original Projection	New Projection	Percent Difference	Original Projection	New Projection	Percent Difference
1975	51,300	53,600	4.3	409,100	420,600	2.7
1980	59,000	65,600	10.0	446,900	448,200	0.3
1985	68,400	73,700	7.2	484,100	468,800	-3.3
1990	78,300	81,900	4.4	521,700	493,600	-5.7
1995	--	88,300	--	--	513,200	--
2000	--	94,300	--	--	529,900	--

Year	Ozaukee County			Racine County		
	Original Projection	New Projection	Percent Difference	Original Projection	New Projection	Percent Difference
1975	24,400	29,100	16.1	73,900	76,100	2.9
1980	29,300	37,000	20.8	83,700	86,300	3.0
1985	35,300	44,100	19.9	96,300	95,400	-0.9
1990	42,500	52,000	18.3	111,200	104,200	-6.7
1995	--	57,900	--	--	110,600	--
2000	--	64,100	--	--	116,800	--

Year	Walworth County			Washington County		
	Original Projection	New Projection	Percent Difference	Original Projection	New Projection	Percent Difference
1975	26,800	29,600	3.4	25,800	32,500	20.6
1980	29,500	34,100	13.5	29,900	41,700	28.3
1985	32,600	38,700	15.8	34,400	50,600	32.0
1990	35,600	44,100	19.3	39,500	61,100	35.6
1995	--	48,700	--	--	68,700	--
2000	--	52,700	--	--	77,500	--

Year	Waukesha County			Region		
	Original Projection	New Projection	Percent Difference	Original Projection	New Projection	Percent Difference
1975	110,800	117,900	6.0	722,000	759,400	5.0
1980	133,800	138,600	3.5	812,100	851,500	4.6
1985	160,800	160,200	-0.4	911,900	931,500	2.1
1990	194,000	185,300	-4.7	1,022,800	1,022,000	-0.1
1995	--	209,800	--	--	1,097,400	--
2000	--	232,800	--	--	1,168,100	--

Source: SEWRPC.

Future Motor Truck Availability

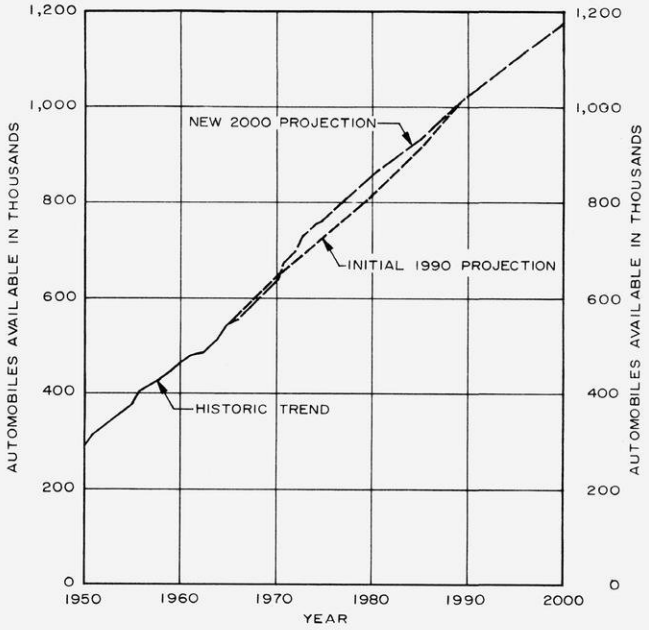
The number of available trucks within the Region is projected to increase from 92,900 in 1974 to 144,000 in 2000, an increase of 51,100, or approximately 55 percent (see Table 31 and Figure 19). An analysis of growth trends in each of the various truck classifications indicates that a large proportion of future truck growth in the period 1974 to 2000 will probably occur in the lightweight truck classification.

Comparison of the truck availability forecast used in the initial land use-transportation planning effort with the historic truck availability data from the period 1965 to 1974 and the projection developed for plan reevaluation, as shown in Table 32 and Figure 20, reveals that the original projection is significantly lower than both the historic data and the revised projection.

Within the past several years, there has been increased concern at the national, state, regional, and local levels over the future quality and quantity of rail freight service. This increased concern is attributable to the recent bankruptcies of several large northeastern rail carriers. Should this concern ultimately manifest itself in the form of expenditures of public money to maintain rail freight service, the historic trends in motor truck availability may be altered, which would, in turn, affect the reliability of the foregoing motor truck availability forecast. At the present time, the possible effect of such rail subsidies, should they occur, upon the forecast cannot be assessed.

Figure 18

COMPARISON OF INITIAL 1990 AND NEW 2000 PROJECTION OF AUTOMOBILES AVAILABLE IN THE REGION



Source: SEWRPC.

Table 31

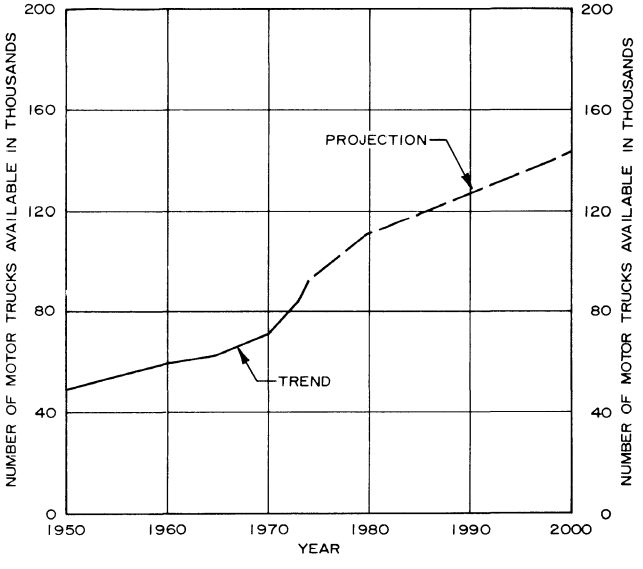
MOTOR TRUCK AVAILABILITY IN THE REGION
SELECTED YEARS 1950-2000

Year	Motor Trucks Available in Region
1950	49,400
1955	54,100
1960	59,500
1965	63,400
1970	71,700
1975	97,000
1980	112,000
1985	120,000
1990	128,000
1995	136,000
2000	144,000

Source: Wisconsin Department of Transportation and SEWRPC.

Figure 19

MOTOR TRUCK AVAILABILITY IN THE REGION: 1950-2000



Source: SEWRPC.

Table 32

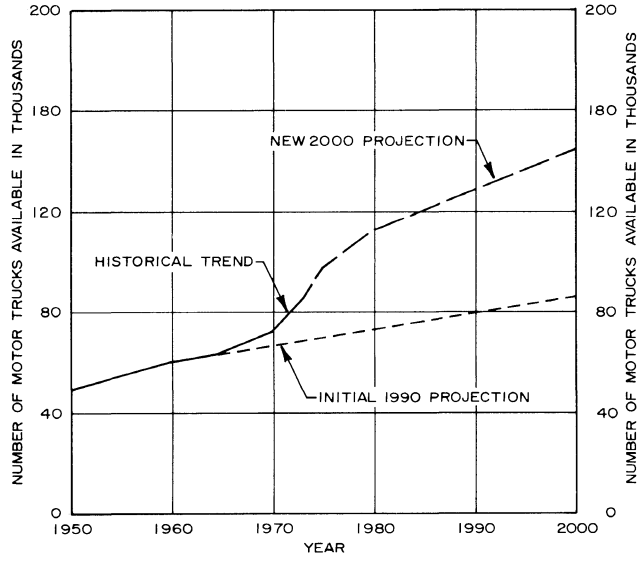
COMPARISON OF INITIAL 1990 AND NEW
2000 PROJECTIONS OF MOTOR TRUCKS AVAILABLE
IN THE REGION: SELECTED YEARS 1975-2000

Year	Motor Trucks Available in Region		
	Initial 1990 Projection	New 2000 Projection	Percent Difference
1975	73,500	97,000	24.2
1980	78,200	112,000	30.2
1985	82,100	120,000	31.6
1990	86,300	128,000	32.6
1995	--	136,000	--
2000	--	144,000	--

Source: SEWRPC.

Figure 20

COMPARISON OF INITIAL 1990 AND NEW
2000 PROJECTIONS OF MOTOR TRUCKS
AVAILABLE IN THE REGION



Source: SEWRPC.

SUMMARY

One of the very important steps necessary to the formulation of regional development plans is the preparation of forecasts. Forecasts are required of all future events and conditions which are outside the scope of the plan, but which will affect plan design or implementation. In the land use and transportation planning process forecasts of population, economic activity, the demand for automobiles and trucks, and the demand for land are necessary to provide a basis for plan reevaluation and for the subsequent preparation of new plans to the year 2000.

The adopted regional land use and transportation plans and the forecasts and assumptions on which these plans are based have been monitored annually to determine the conformance or departure of the forecasts from estimated actual levels. The conformance or departure

of the forecasts from actual levels provides the basis of the need to revise and update the forecasts prepared under the initial land use-transportation study. This chapter has presented revised forecasts of the direction and magnitude of change in the year 2000 for the Southeastern Wisconsin Region.

The following points summarize the expected changes in regional population, economic activity, income, automobile and truck availability, public financial resources, and land use demand by the year 2000.

1. The population of the Region is expected to increase by approximately 463,000 persons over the 1970 population level of 1.76 million persons. This represents about half of the population growth expected by 1990 under the initial regional population forecast prepared in 1963. Thus, the revised population forecast envisions a significant decline in the overall rate of population growth over the next two to three decades. The largest increase in regional population by the year 2000—62 percent—will be in the age group from 65 years of age and over. Two age groups—5-14 years of age and 15-19 years of age—are expected to decline by 8 percent and 6 percent, respectively, by the year 2000.

2. Employment in the Region is expected to reach 1,016,000 jobs in the year 2000, an increase of 274,400 jobs, or 37 percent, over the 1970 employment level of 741,600 jobs. Service and wholesale and retail trade jobs will increase at the greatest rates, ranging from 40 to 68 percent, and will provide a combined total of 614,400 jobs in the year 2000. Manufacturing employment, still the largest regional major industry employment group, will increase by 28 percent to about 320,300 jobs in the year 2000.

3. Personal income in the Region in constant dollars is expected to reach $10 billion by the year 2000, nearly double the 1970 level. Per capita incomes are expected to increase from $2,954 in 1970 to $4,500 in the year 2000. The average household in the Region is expected to earn $13,400 in constant 1967 dollars by the year 2000.

4. If recent development trends continue, approximately 319 square miles of land may be expected to be converted from rural to urban uses by the year 2000. Thus, 31 percent of the Region would be devoted to urban uses in the year 2000 compared to 19 percent in 1970. If this projected land use demand is met entirely through the conversion of rural to urban land use, the overall density of the developed area of the Region will decline by 30 percent from 4,350 persons per square mile in 1970 to 3,000 persons per square mile in the year 2000.

5. Local government revenues in the Region are expected to increase by 110 percent from $1,069 million in 1972 to $2,245 million in constant 1967 dollars in the year 2000. Over 42 percent of these revenues will be provided by property taxes and 23 percent will be provided by public industry revenues. Revenues for highway purposes are expected to reach $130 million in the year 2000, up from $113 million in 1972. Highway construction revenues are expected to comprise $55 million, or 42 percent of total highway revenues, while revenues for maintenance comprise 58 percent of these revenues.

6. The number of automobiles available to residents of the Region is projected to reach 1,168,000 in the year 2000; an increase of 57 percent over the 1974 level. The ratio of persons per automobile is expected to decline from 2.41 persons per auto in 1974 to 1.90 in the year 2000. The number of available trucks within the Region is expected to increase from 93,000 in 1974 to 144,000 in the year 2000, an increase of 51,000 trucks, or 55 percent, over this period. Much of this increase is expected in the light-weight truck classification.

It is evident from the forecasts summarized above that the Region in the year 2000 will be quite different from the Region as we know it today. Succeeding chapters in this report present alternative land use and transportation proposals designed to meet or alter these anticipated changes, and, at the same time, preserve and protect the limited and irreplaceable natural resources of the Region.

Chapter IV

DEVELOPMENT AND APPLICATION OF PLANNING MODELS

INTRODUCTION

One of the five basic principles upon which the regional land use-transportation plan reevaluation is based, as set forth in Chapter II, Volume One, of this report is:

> Transportation facilities must be planned as an integrated system. The capacities of each link in the system must be carefully fitted to traffic loads and the effects of each proposed facility on the remainder of the system quantitatively tested.

This principle is particularly important because, unless transportation system plans are subject to quantitative test and evaluation permitting preparation of forecasts of the amount of traffic the system must carry, the adequacy of the plans must remain in doubt from an engineering standpoint. Transportation system plans prepared without quantitative test and evaluation are little more than intuitively created street patterns rather than engineered transportation system designs. Such untested plans cannot provide a sound basis for project design or capital investment. Nor can the implementation of such plans be expected to provide the desired long-range solution to traffic and transportation problems. Indeed, such untested plans may create more problems than they purport to solve. The lack of quantitative system test and evaluation is one of the major factors which has in the past contributed to the ineffectiveness of many transportation planning programs carried on at the local level of government, since state and federal transportation agencies have, quite properly, refused to implement plans which were unsupported by carefully prepared traffic forecasts and assignments.

The Role of Quantitative Analysis

Quantitative traffic analysis is a fundamental requirement of any transportation planning effort but is a particularly important and complex requirement of the urban transportation planning process. Three basic questions must be confronted in the planning and design of a new transportation facility or of an improvement to an existing transportation facility:

1. How will the existing traffic patterns be distributed on the proposed facility? That is, how many persons and vehicles will use the proposed facility upon its completion?

2. How will future traffic patterns be distributed on the proposed facility? That is, how many persons and vehicles will use the proposed facility at the end of its physical and economic life?

3. How will the proposed facility affect traffic on the remainder of the transportation system? That is, how many persons and vehicles will be diverted by the proposed facility to or from other facilities comprising the total transportation system?

No transportation facility can be soundly planned, designed, or constructed without answers to these three basic transportation planning questions. It should be noted that these three questions not only recognize the need for an understanding of present travel and traffic patterns but also recognize that future traffic conditions may differ from present conditions. Existing traffic patterns change in form and intensity as new land use activities and transportation facilities are added to the regional complex and as established land use activities and transportation facilities are changed or relocated. Thus, sound transportation system planning must recognize the need to consider both existing and future travel and traffic patterns and must do so in an explicit, quantitative manner.

Originally, the only quantitative traffic information available for use in the transportation planning process consisted of traffic volume counts. Such counts can only indicate the distribution of traffic patterns on the existing transportation network. Alone, such counts are of little value for long-range transportation planning since they do not provide an answer to even the first of the three transportation planning questions. For many years, however, the application of growth factors to traffic volume counts was the only traffic forecasting technique available for planning purposes.

About 35 years ago, the origin and destination study was developed to collect factual information about existing travel habits and patterns. This survey provided the travel data necessary to answer the first of the three transportation planning questions on existing travel habits and patterns, not the data necessary to answer directly the second or third transportation planning questions which involve the characteristics of future travel behavior.

About 20 years ago, new transportation planning techniques were developed which for the first time provided quantitative answers to the second and third of the three basic transportation planning questions. These techniques made it possible to calculate future travel demand quantitatively as a function of regional development patterns instead of deriving such demand, as was necessary in the past, from simple expansions of existing traffic patterns. The techniques were based on the concept that those

aspects of regional development which affect the magnitude and pattern of regional travel demand could be identified, quantified, and correlated with such travel through the analysis of origin and destination and land use survey data. The concept, further, was that the relationships between land use and travel, so established, would remain reasonably stable over time, thus enabling the simulation of future travel patterns on the basis of projected or planned future land use patterns. By considering the future distribution of land use activity within an urban region as the major factor influencing future traffic patterns, integrated transportation system designs could be developed which would not only serve the existing traffic patterns within an urban region but which would also serve the entirely new patterns that will evolve with changing development.

The first time that these new transportation planning techniques were used on a regional scale in southeastern Wisconsin was during the initial land use-transportation study conducted by the Commission from 1963 to 1966. The adopted 1990 regional transportation plan is in large part based upon the quantitative analyses of the performance of alternative highway and transit systems permitted by the battery of traffic simulation models developed for this study.

As the need for quantitative analysis of the performance of alternative transportation systems has, if anything, increased over the last 10 years, it has been necessary to review and, as needed, refine the initial battery of traffic simulation models for use in the regional transportation plan reevaluation effort. The first step in this review process consisted of an analysis of the adequacy of each individual model used in the initial study. The effectiveness of this analysis was greatly enhanced by the fact that major travel inventories were available for two points in time—1963 and 1972—thus permitting examination of the temporal stability of the traffic simulation models. In this manner those initial traffic simulation procedures which were shown to be reliable could be retained for use in the plan reevaluation effort. Significant advances in the state of the art of traffic simulation have occurred since the conduct of the initial transportation study. Thus, despite the adequacy of initial study procedures, an investigation of newer modeling strategies was conducted and some of these strategies were incorporated into the simulation process for use in the plan reevaluation. A complete description of the initial study procedures can be found in SEWRPC Planning Report No. 7, Volume II, Forecasts and Alternative Plans—1990. This chapter documents the refinements to these procedures incorporated in the new battery of traffic simulation models used in the plan reevaluation.

Basic Modeling Concepts

The simulation of existing and future travel demand is a long, complex procedure requiring application of a variety of mathematical and statistical techniques. Although the basic formats of the traffic simulation process used in the major urban transportation studies today, are very similar, the specific needs and characteristics of each study area require a certain amount of individualization for the precise procedures used. As already noted, current traffic simulation modeling techniques are based on the premise that the magnitude and pattern of travel are a stable function of land uses. The initial input to the traffic simulation process is thus a detailed accounting of existing and probable future land uses. Existing land uses, as determined by the major land use inventories conducted periodically by the Commission, are compared with existing travel inventory data to derive the basic relationships between land use and travel. These relationships are then applied to the planned, or forecast, future land uses to determine probable future travel demand. It should be noted that, as used in this context, the term "land use" refers to a wide variety of population, economic, and social characteristics. A discussion of existing land uses and the methodology employed to forecast future land uses can be found in Chapter III of this Volume.

Given the necessary existing and forecast land use data, the complete sequence of traffic simulation occurs in four steps:

1. Trip generation, in which the total number of person trips generated in each subarea of the planning area is determined using relationships found to exist between land use and travel by analyses of the planning inventory data. The output from this step is the total number of person trip ends, that is, trips entering and leaving each subarea of the study area.

2. Trip distribution, in which the person trips generated in each subarea are linked with trip ends from other subareas, thereby defining the universe of person trips by point of origin and point of destination. The output from this step is the number of person trips made between each subarea pair.

3. Modal split, in which the number of person trips between each subarea pair is divided among the travel modes, primarily mass transit and automobile. The automobile person trips are further converted to vehicle trips based upon automobile occupancy. The output of this step is the number of person trips made between each subarea pair by mass transit and the number of vehicle trips made between each subarea pair by automobile.

4. Traffic assignment, in which the intersubarea transit trips are assigned to the existing or proposed transit system network, and the intersubarea vehicle trips are assigned to the existing or proposed highway facility network. The output of this step is the number of people utilizing each route of the existing or proposed mass transit system and the number of vehicles utilizing each segment of the existing or proposed arterial street and highway system.

The end result of the four step traffic simulation process is a complete description of the use of an existing or proposed transportation system, highway and transit. With

this information it is possible to identify deficiencies in the existing transportation system and to evaluate the performance of alternative future transportation systems and the consequences of alternative transportation facility development proposals. The evaluation of the traffic simulation modeling results, as applied to the alternative transportation systems considered in the plan reevaluation process, is documented in Chapters VI and VIII of this Volume.

The four step simulation process described above also may be conducted using a different sequence of stages: specifically, modal split can be simulated prior to trip distribution. In this case trip ends as determined by the trip generation step are then divided into automobile and transit trips. These trip ends are then distributed using separate trip distribution models for each mode. Termed a predistribution or trip end modal split approach, this alternative sequence was used in the initial transportation planning effort for the Southeastern Wisconsin Region.

Although the four steps described above provide a general indication of the traffic simulation modeling process, a number of variations are necessary depending on the type of trip to be simulated. Therefore, it is necessary to describe the method of trip classification used in the plan reevaluation effort. The classification of trips is an essential task in the urban transportation planning process because different types of trips exhibit different characteristics and thus require different simulation techniques. A summary of the complete classification of trips used in the plan reevaluation effort as well as the specific simulation techniques used for each classification is provided in Table 33. The first major division of trips involves the distinction between internal and external trips. Internal trips are defined as those trips which have both ends within the Southeastern Wisconsin Region. External trips are defined as those trips which have one or both ends outside of the Region. As intraregional travel by residents of the Region accounted for over 96 percent of the vehicle trips and 97 percent of the person trips observed on an average weekday in 1972, the primary emphasis in the modeling process is on internal trips. It must be noted, however, that external trips do have important effects on the use of facilities in certain travel corridors and near the boundaries of the Region.

Among internal trips a further classification is made based upon mode of travel. The major transportation modes in southeastern Wisconsin include automobile, public mass transit, school bus, heavy truck, light truck, and taxicab. The manner in which these modes are combined for simulation purposes depends not only on modal characteristics but also upon the type of travel inventory survey used for calibrating relationships. A complete description of the travel inventories conducted for the plan reevaluation effort can be found in Chapter IX of Volume One of this report.

The vast majority of trips belong to the category of internal bus and automobile trips. These trips are further classified by the living quarters of the persons making the trip. Essentially trips by group-quartered persons and nonresidents of the Region are separated for special consideration due to the limitations of the selected trip generation procedure and to the unique travel habits and patterns exhibited by these persons. Group-quartered persons are defined as those persons residing in dormitories, convents, homes for the aged, and similar group

Table 33

TRIP CLASSIFICATION AND TRAFFIC SIMULATION PROCEDURE

Trip Classification					Simulation Procedure				
					Trip Generation				
Internal or External	Mode[a] of Travel	Type of Quarters	Trip Purpose	Percent of Total Trips	Production	Attraction	Trip Distribution	Modal Split	Traffic Assignment
Internal	Automobile, Transit Bus, and School Bus	Nongroup Quartered Residents	Home-Based Work Home-Based Shopping Home-Based Other (excluding school)	21.0 13.4 30.5	Cross-Classification Analysis	Multiple Regression Analysis	Gravity Model	Logit Analysis	Highway Using the Federal Highway Administration's Urban Transportation Planning Computer Programs Transit Using the Urban Mass Transportation Administration's Urban Transportation Planning System
			Nonhome-Based (excluding school)	15.5	Multiple Regression Analysis				
			School	8.3	Average Factor		Existing Patterns	N/A	
		Group Quartered Residents	All	0.5					
		Nonresidents	All	0.6					
	Heavy Truck	All	All	3.7	Multiple Regression Analysis		Fratar Model		
	Light Truck and Taxi	All	All	4.0					
External	All	All	All	2.5					

N/A Not Applicable.

[a] *Not including the lesser modes of railroad, bicycle, motorcycle, air travel, water travel, and charter bus.*

Source: SEWRPC.

residences. Together, group-quartered trips and nonresident trips accounted for slightly more than 1 percent of the total person trips within the Region in 1972.

Because of the sheer volume of travel involved, the primary emphasis of the traffic simulation modeling process focuses on internal automobile and mass transit trips made by nongroup-quartered residents. These trips represent almost 80 percent of total trips made within the Region on an average weekday. This group of trips is further subdivided by trip purpose into: home-based work; home-based shopping; home-based other (excluding school); nonhome-based (excluding school); and all school trips. Home-based trips are defined as those trips having one end located at the residence of the tripmaker. The purpose of a home-based trip is thus determined by the nonhome end of the trip as either work, shopping, or other—the last representing an aggregation of personal business, medical-dental, social-eat meal, recreation, and serve passenger purposes. Nonhome-based trips are defined as those trips having neither end located at the place of residence of the tripmaker and can be made for any purpose except school. Separate consideration of home-based and nonhome-based school trips is necessary because of the arbitrary constraints imposed upon travel patterns by school service area boundaries, constraints which cannot be adequately represented in the normal travel simulation sequence in current trip distribution models. In addition, most schools serve local neighborhoods or communities so that tripmaking to or from such schools has a relatively small impact on arterial street and highway travel. Trips to and from all schools—elementary, junior and senior high, vocational and technical schools, and colleges and universities—represent approximately 8 percent of all person trips observed in the Region on an average weekday in 1972.

Based upon the classification of trips described above, Table 33 indicates the specific modeling techniques used for each type of trip in the plan reevaluation effort. Each of these techniques will be more fully described in the appropriate sections of this chapter.

A final matter concerning the traffic simulation modeling process that warrants discussion here involves the method of spatially aggregating trips. In the description of the four step simulation process, trips were described as being generated within, distributed between, and split by mode among subareas of the study area. The manner in which these subareas are determined is critical to the success of the total simulation process. The primary objective is to achieve maximum homogeneity of land use—broadly defined—within each subarea. Although not all models are calibrated on the basis of subarea characteristics, all models must eventually be applied by subarea. The greater the degree of homogeneity of the land uses in the subareas, the better able the models are to accurately simulate actual traffic conditions.

Essentially two related systems were used in the modeling effort to define spatially the internal areas of the Southeastern Wisconsin Region. The first is a system of 1,220 traffic analysis zones. The second is a system of 60 planning analysis areas (PAA's) representing aggregations of zones. In general, the traffic analysis zones were used in the calibration and application of internal traffic simulation models, while the planning analysis areas were used for less important trip categories and for the statistical testing of the models. A system of 20 external planning analysis areas was also defined for the simulation of external trips. A further description and map of the traffic analysis zones and planning analysis areas can be found in Appendix F, Volume One, of this planning report.

Format of Presentation

This chapter is intended to document the simulation models used in the regional transportation plan reevaluation effort to forecast future travel demand, and the manner in which that demand may be expected to impact alternative transportation systems. This chapter is intended also to document those closely related models and procedures for transportation system design and evaluation. The documentation includes not only a description of the specific model formats but also a description of the methods used to develop, apply, and test the models.

In the first section of this chapter it was noted that land use data comprise the initial input to the traffic simulation process. Although Chapter III of this Volume contains a description of most land use characteristics and the methodology used in the land use plan reevaluation to develop probable future land use patterns, there are certain critical land use variables which were specifically developed for the individual traffic simulation models. In this section these variables are identified and the procedures for their forecasting described. Subsequent sections of this chapter are then devoted to describing the development and application of each of the four steps in the traffic simulation process, namely: trip generation, trip distribution, modal split, and traffic assignment. For each step a more complete explanation of basic modeling concepts is presented followed by a description and assessment of the specific models developed and applied in the initial land use-transportation planning effort. Based upon this assessment, refinements made in the simulation modeling procedures for the plan reevaluation are described. Finally, the results of various statistical and mathematical testing procedures used to validate each individual model are presented. A test of the adequacy of the entire four step simulation process is also presented in the traffic assignment section. In this section the simulated traffic volumes derived from using the initial and revised simulation models are compared with actual observed vehicle ground counts.

The next section of the chapter is devoted to the procedures used in the system design phase of the transportation planning process. Using the results of the four step traffic simulation procedure, alternative highway and transit systems are synthesized in this phase based upon an identification of existing transportation system deficiencies and the satisfaction of the regional transportation system development objectives and standards. The results of the systems design phase, that is, the actual

alternative highway and transit sytems considered, are the subject of Chapters V and VIII of this Volume. Finally, the models used to quantify the effects of alternative transportation systems on ambient air quality and regional noise levels are described. The results of these two models are in turn presented in Chapters VI, VIII, and IX of this Volume which deals with evaluation of the alternative transportation systems considered.

TRANSPORTATION-SPECIFIC LAND USE FORECASTS

As noted earlier, current traffic simulation models are based upon relationships determined between land use and travel. As such, the development and application of traffic simulation models requires a detailed description of existing land uses to calibrate the models and a similar description of future land uses to apply the models. As noted earlier, the term "land use" as used in this context has a special meaning which includes demographic and economic variables.

Ideally, from a planning standpoint, it would be desirable to be able to express trip end generation rates in terms of the broad, generalized land use categories used in the existing land use inventories and in the preparation of land use plans. Each of these broad land use categories, however, represents a complex of related and unrelated human activities that comprise the reasons for which trips are actually made. Broad land use categories, therefore, usually are inadequate as a basis for analyzing and forecasting trip generation. Refinement of these broad land use categories is, therefore, required for trip generation analysis and forecast purposes; and this refinement is usually best expressed in terms of more detailed characteristics of the activities taking place on the land, such as resident population, population density, employment, income level, and automobile availability. These more detailed socioeconomic characteristics of land use, however, must be capable of derivation from a forecast of future land use, or from a land use plan. Since the ability to predict or control the future location and intensity of land use activity tends to diminish rapidly as the detail of classification increases, a balance must be struck between the transportation planning needs and the land use planning capabilities.

Chapter III of this Volume includes a description of the methodologies used to forecast future land use. For travel simulation purposes, however, it is necessary to devise a scheme to allocate land use activities to the pertinent traffic analysis zonal system. In addition, there are certain land use variables which are specifically required by and thus derived for the travel simulation process. The following sections describe the specific procedures used to forecast and allocate transportation-specific land use variables in the land use-transportation plan reevaluation effort.

Automobile Availability

The availability of an automobile is a very significant variable in the travel simulation modeling process, influencing not only the ability to make a trip—trip generation—but also the decision of which travel mode to use in making the trip—mode split. The existing and projected regional and county levels of automobile availability are derived from historic data on motor vehicle registrations as documented in Chapter III of this Volume. For traffic simulation purposes, however, it is necessary to allocate the regional, or county, totals to the traffic analysis zone level.

The procedure used to develop a relationship which could be used in such allocation was multiple regression analysis, in which the effects of a large variety of variables and variable combinations on automobile availability were examined. The selection of a model formulation was based upon consideration of the existence of a logical relationship between each independent variable and automobile availability, consistent with past experience; the statistical significance of the formulation in explaining zonal automobile availability; the ability of the formulation to replicate automobile availability on a regional and subregional level; and the degree to which the formulation reflected the underlying behavioral assumptions of the decision to own an automobile.

The model formulation selected for allocating existing and future levels of automobile availability was a linear equation including household income, household size, residential density, and transit accessibility[1] as independent variables. With regard to income and residential density, a logarithmic transformation was employed, reflecting the diminishing effects of these variables on automobile availability. Specifically:

> Number of automobiles available per household = 0.1106 (number of persons per household) + 0.4135 $\log_e$ (average household income) - 0.1210 $\log_e$ (number of households per developed gross residential acre) - 1.3×10^{-7} (transit accessibility) - 2.6425

The validity of this formulation in explaining the number of automobiles available per household was examined on a planning analysis area level. Using the regression equation above, all coefficients were determined to be significant at the 99 percent level of confidence with a coefficient of determination (R^2) of 0.89 and a percent standard error of the estimate of 5.6 percent. The equation was also examined for its ability to predict total

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[1] *Transit accessibility is a quantitative measure of the relative availability and quality of transit service. It is expressed in the form of an index which for any zone, i, within the Region is defined as the product of the person trip attractions in zone j times the friction factor for the transit travel time value of the interchange from zone i to zone j summed for all interchanges with zone i. The friction factor is an empirically derived relationship defined as the inverse of the door-to-door travel time raised to some power which varies with the travel time. Further clarification of the variables used in the accessibility measure is found in the trip distribution and modal split sections of this chapter.*

automobiles per traffic analysis zone. In this case a coefficient of determination of 0.94, and a percent standard error of the estimate of 16.4 percent were derived. Finally, the equation was applied at the zonal level and the zonal totals summed to give a regional estimate of available automobiles. The estimated total was found to be within 0.6 percent of the observed regional total. It was thus concluded that the derived relationship was reasonable and significant, and could be used with confidence for the future prediction and allocation of automobile availability.

Household Stratification and Zonal Allocation

As described in the following sections, a number of the models used in the transportation plan reevaluation effort were developed on a disaggregate basis; that is, basic tripmaking relationships were determined at the household level without regard to any zonal system. When a disaggregate model, using household characteristics as independent variables, is applied to a zonal system, it is necessary to have detailed information concerning the households within each zone. In the transportation plan reevaluation effort, households were classified by household size (either 1, 2, 3 and 4, or 5 or more persons) and by automobile availability (either 0, 1, or 2 or more automobiles). Thus, for every zone under consideration, it was necessary to determine the percentage of households belonging to each possible combination of the two household characteristics (12 combinations in all).

This allocation process was accomplished by first developing a stratification model for each characteristic individually. For household size, the population and number of households per zone were derived from other sources, thereby determining the average household size in every zone. The stratification process then identified a relationship, using home interview survey data, between the zonal average household size and the proportions of households in each of the four household size categories. Future proportions, needed to apply the disaggregate models to future conditions, could thus be obtained based on the predicted average household size for each zone. Similarly given the average number of automobiles per zone, a relationship was derived to determine for every zone the proportion of households within each of the three automobile availability categories.

In order to determine the number of households within each category, as classified by both household size and automobile availability, it was necessary to combine the results of the two individual stratification models. This was done by defining the proportions of households in each category as probabilities and then applying elementary probability theory,[2] to determine the joint probability of a household possessing a specific family size and a specific automobile availability. If the two characteristics were considered independent, then the joint probability of a particular household size category K (HHS_K), and a particular auto availability category j, (AA_j) for a zone i would merely be the product of the two probabilities or:

$$P(HHS_K \cap AA_j)i = P(HHS_K)i \times P(AA_j)i$$

Examination of the available data, however, indicates that there is a certain degree of dependence between the two characteristics. The joint probability thus must include a conditional probability, that is:

$$P(HHS_K \cap AA_j)i = P(HHS_K)i \times P(AA_j/HHS_K)i$$

The value of the conditional probability $P(AA_j / HHS_K)i$, representing the probability of auto availability category j given the household size category K, was determined by the calibration of the equation:

$$P(AA_j/HHS_K)i = C_1\,(PAA_j)i + C_2\,P(AA_j/HHS_K)_{region}$$

where C_1 and C_2 are the calibrated weights reflecting the amount of independence and dependence respectively of the two characteristics, and $C_1 + C_2 = 1$. $P(AA_j/HHS_K)_{region}$ is the observed conditional probability for the Region.

A number of combinations of C_1 and C_2 were examined to find that combination which best replicated the observed household classification. The final version of the household stratification model, using equal dependent and independent weights can be summarized as:

$$P(HHS_K \cap AA_j)i = P(HHS_K)i \times [0.5\,P(AA_j) + 0.5\,P(AA_j/HHS_K)_{region}]$$

The results of the application of this model on a regional level with 1972 data are shown in Table 34. It should be noted that while the estimated distribution does differ from the observed distribution significantly in some categories, such variation when weighted by the proportion of the total person trips generated by the respective household categories never exceeds 3 percent.

TRIP GENERATION

Basic Concepts

The first major step in the travel simulation process is trip generation in which the total number of trip ends generated within each zone of the study area is determined through the identification and quantification of relationships between travel and land use. As such, trip generation occupies a critical position between land use and transportation planning. The inputs to this step include a detailed accounting of relevant existing and forecast or planned future land use characteristics and the number of existing trip ends for each zone from travel inventory data. The output of the trip generation step is an estimate of the probable future number of trips, usually by trip purpose, entering or leaving each zone.

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[2] *In standard probability notation:*

P(A) = *the probability of event A happening;*
P(A∩B) = *the probability of both events A and B happening;*
P(A/B) = *the probability of event A happening given that event B has already happened.*

Table 34

REGIONWIDE RESULTS OF THE COMBINED HOUSEHOLD SIZE AND AUTO AVAILABILITY MODEL: 1972

Household Size (Persons Per Household)		Auto Availability (Autos Per Household) 0	1	2 or More	Total
1	a	46,714	45,777	1,272	93,763
	b	34,187	47,722	13,964	95,873
	c	0.4	0.2	1.7	0.1
2	a	21,130	99,776	38,651	159,557
	b	24,268	89,221	45,433	158,922
	c	0.2	2.8	1.9	0.1
3 or 4	a	12,730	81,987	83,453	178,170
	b	19,527	83,711	74,738	177,976
	c	0.5	0.3	2.3	0.0
5 or More	a	7,964	48,784	69,022	125,770
	b	11,966	52,605	59,833	124,404
	c	0.3	0.6	2.7	0.3
Total	a	88,538	276,324	192,398	557,260[a]
	b	89,948	273,259	193,968	557,175[b]
	c	0.1	0.5	0.4	0.1[c]

[a] *Households reported in the regional inventory of travel.*

[b] *Model results.*

[c] *Percent error as expressed in terms of the percent of the daily person trips generated by the household category.*

Source: SEWRPC.

Within trip generation, then, the travel data are expressed in terms of trip ends which may be conveniently represented as points in space with no regard to the direction, length, or duration of the trip. By convention, one end of each trip is termed the "production" end while the other end is termed the "attraction" end. For trips beginning or ending at home, termed "home-based trips," the production end is always considered as the home end of the trip while the attraction end is always considered as the nonhome end, irrespective of the actual direction of the trip. For trips having neither end at home, termed "nonhome-based trips," the production end is defined as the origin of the trip while the attraction end is defined as the destination.

Two sets of trip generation relationships are consequently developed. One set is developed for the "production" end of trips generated within the planning area and involves relating trip ends to primarily residential land uses. The other set is developed for the "attraction" end of trips generated within the planning area and involves relating trips ends to primarily nonresidential land uses.

There are currently four basic approaches to trip generation: factoring of existing trip patterns, land area trip analysis, regression analysis, and cross-classification analysis. The first and most basic approach to trip generation is the application of growth factors to existing travel patterns. Essentially the number of trips between two zones as observed in the base year inventory is multiplied by some factor to derive horizon year trips. The factor may either represent an annual increment, or may be determined by the corresponding change in a socioeconomic variable such as population. Since the factor is applied to observed trip interchanges, this approach actually represents a combination of the trip generation and trip distribution steps. Usually this approach is used either for relatively small trip categories such as external trips, or for trip purposes which are artificially constrained. An example of the latter would be school trips, the distribution of which is largely determined by school district boundaries. Since the majority of current trip generation and distribution models cannot incorporate the important effects of school service area boundaries, the extrapolation of existing school trip patterns is used in lieu of more sophisticated techniques.

The second of these procedures deals explicitly with the land areas and has, as its objective, the establishment of trip rates which reflect the character, location, and intensity of the land use. Trip rates, in terms of trips per acre, may be derived, for example, for different kinds of land uses such as residential, commercial, and industrial. To forecast future trip generation, these rates are simply applied to the projected land use distribution in each zone. The major weakness of this approach lies in the fact that a great deal of variation in trip rates exists within even quite specific land use categories.

The third approach involves the development of trip generation relationships using linear regression analysis. In this procedure the dependent variable—the number of trips generated per zone—is determined by a linear combination of independent variables representing the land use and socioeconomic characteristics of the zone. To account for any nonlinear effects that an independent variable may have on the dependent variable, a monotonic transform such as logarithmic or exponential—may be made on an independent variable. The major strength of this procedure is that regression analysis has a strong and well established theoretical basis allowing for the rigorous statistical testing of derived relationships. The major weaknesses are that nonlinear effects are often difficult to identify and that the regression procedure may obscure the causative relationships affecting trip generation.

The final procedure involves cross classification analysis, wherein "n" number of independent variables are stratified into two or more appropriate groups creating an n-dimensional matrix. For each cell of the matrix, representing a unique combination of independent variables, an average daily trip generation rate is calculated. In most cases the independent variables are individual household characteristics rendering this procedure most applicable to the production end of home-based trips. When the relationships are so determined on a household basis, with no regard to a zonal system, cross-classification is termed a disaggregate procedure as opposed to regression analysis where relationships are derived using aggregated

zonal data. The advantages of cross-classification are that it is easy to understand, develop and apply, it allows for the curvilinearity of independent variable effects, it makes efficient use of base data, and it provides a better understanding of the causative relationships of household tripmaking behavior. The basic disadvantage is that, since no assumptions of linearity or normality are made, the usual statistical tests of significance and explained variation do not apply. In addition, the fact that distributions are often highly skewed means that even with an extremely large sample there will be certain cells which contain an insufficient number of observations to be statistically valid.

The selection of procedures for trip generation is an extremely important function in the simulation process dependent upon the type of trip, the data available for calibration, and the particular needs and character of the study area. The following sections contain a description and evaluation of the procedures used in the initial study, a description of the refined procedures used in the transportation plan reevaluation effort, and the testing of the revised trip generation models.

Evaluation of the Initial Study

In the initial regional land use-transportation study, trip generation relationships were developed through the use of: multiple regression analysis for the four major internal trip purposes; extrapolation for home-based school trips; multiple regression analysis for truck and taxi trips; and extrapolation for external trips. The following sections describe the specific procedures utilized and evaluate the ability of the initial formulations to predict observed 1972 trip generation.

The vast majority of trips observed in the Region are internal automobile and transit trips, classified by purpose into home-based work, home-based shopping, home-based other, and nonhome-based. In the initial regional land use-transportation study, trip generation relationships for these major trip categories were developed using multiple linear regression analysis. A total of nine equations for forecasting internal person trip generation were developed including four for trip productions and five for trip attractions. Trip productions were classified by trip purpose including home-based work, home-based shopping, home-based other, and nonhome-based. Trip attractions were classified in the same manner with the exception of home-based work, which was further classified by area into either within the Milwaukee urbanizing area or within the rest of the Region. This further division was made as analysis indicated that zones located in the Milwaukee urban area exhibited slightly different home-based work trip attraction characteristics than did zones located in the remainder of the Region. The final regression equations for productions and attractions, as well as certain relevant statistical measures, are shown in Table 35.

The ability of the trip generation equations developed in the original land use-transportation planning program to simulate 1972 internal person tripmaking was investigated by comparing the results of the application of the initial trip generation equations using 1972 land use data to actual 1972 travel survey data. As shown in Table 36, the travel surveys conducted by the Commission indicated that trip generation within southeastern Wisconsin increased substantially from 1963 to 1972, in all trip purpose categories.[3] The ability of the trip generation equations developed and applied in 1963 to accurately predict these changes in regional trip generation is also demonstrated in Table 36. As can be seen, the equations were able to predict regional trip generation with a remarkable degree of accuracy considering the nature of the phenomena involved. In this respect, it must be recognized that the actual 1972 regional trip generation used as the basis for comparison, the 1963 trip generation data used to calibrate the original equations, and much of the data necessary to prepare predictions of 1972 trip generation—such as household socioeconomic characteristics—are in themselves estimates derived from travel surveys. Thus, considering the limitations inherent in the data being compared, the total trips generated within the Region in 1972 were predicted by the equations developed under the original planning effort with a high degree of accuracy although some divergence exists within specific trip purpose categories.

The ability of the original equations to estimate 1972 trip generation on a small geographic area—or traffic analysis zone—level is demonstrated by trip purpose in Figures 21 through 24 which display the correspondence between observed and estimated 1972 zonal trip productions. Although, as may be expected, considerable differences can be observed between actual and predicted trip generation by zone, no consistent bias of over- or underestimation is present. Moreover, much of the variance can be attributed to the random variation expected in any survey data and to zonal characteristics not treated in the trip generation equations—both of which may cause deviations between observed and estimated values from regression procedures in a base year—rather than to possible changes over the past decade in the relationship

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[3] *In 1963, all travel data obtained in the three major urbanized areas of the Region were increased through the application of a uniform adjustment factor, regardless of travel mode or trip purpose. In 1972, adjustment factors unique to each urbanized area were applied only to automobile travel for purposes other than home-based work or school and to truck travel for all purposes. In the remainder of the Region, no adjustment was made to the travel data in 1963 or 1972.*

For direct comparisons, therefore, the 1963 person trip data were refactored using differential adjustment factors. Use of these factors produced slightly different distributions of all personal travel characteristics. It is believed that the use of differentially adjusted travel data has produced a refinement in the 1963 data and provides a sound basis for direct comparisons with the 1972 travel data. Thus, the refactored 1963 survey data are utilized in the comparisons of 1963 and 1972 person travel throughout this text.

Table 35

TOTAL PERSON TRIP GENERATION EQUATIONS FOR THE REGION AS DEVELOPED AND USED IN THE INITIAL LAND USE-TRANSPORTATION STUDY

Equations	Coefficient of Determination (r^2)	Standard Error of Estimate (s)	Mean (y)	Standard Error as a Percent of the Mean
Total Person Trip Productions				
Home-Based Work				
Number of Trip Ends = - 11.0 + 0.47 (Total Population) + 0.62 (Number of Households)	0.939	43.7	170.8	25.6
Home-Based Shopping				
Number of Trip Ends = 6.5 + 1.54 (Number of Automobiles) - 1.36 (Net Area in Residential Use in Acres) - 0.34 (Number of Households)	0.834	40.3	91.5	44.1
Home-Based Other				
Number of Trip Ends = - 6.4 + 2.47 (Number of Automobiles) - 1.78 (Net Area in Residential Use in Acres)	0.872	71.2	194.6	36.6
All Nonhome-Based				
Number of Trip Ends = 5.6 + 0.28 (Total Employment) + 0.24 (Total Population) + 0.82 (Total Employment on Retail and Service Land)	0.649	84.1	106.3	79.1
Total Person Trip Attractions				
Home-Based Work (Zones in Urbanizing Areas)				
Number of Trip Ends = 2.6 + 1.73 (Total Employment)	0.996	21.6	252.8	8.5
Home-Based Work (All Other Zones in Region)				
Number of Trip Ends = 1.0 + 2.22 (Total Employment)	0.786	141.4	170.8	82.8
Home-Based Shopping				
Number of Trip Ends = - 0.5 + 7.14 (Retail Employment on Retail and Service Land)	0.497	178.0	138.8	128.3
Home-Based Other				
Number of Trip Ends = 2.9 + 1.43 (Number of Households) + 0.73 (Total Employment on Retail and Service Land) + 23.48 (Net Area in Retail and Service Use in Acres) + 0.27 (Total Employment)	0.658	115.6	185.7	62.3
All Nonhome-Based				
Number of Trip Ends = 3.9 + 0.91 (Number of Households) + 0.97 (Total Employment on Retail and Service Land)	0.585	88.7	106.0	83.7

Source: SEWRPC.

between trip generation and the variables used to explain tripmaking in the equations developed in the initial planning effort. Again considering the nature of the data used to develop the equations and to compare observed and estimated trip generation and the detailed level at which this analysis and comparison was conducted, it may be concluded that 1972 trip generation of internal trips was predicted with an adequate degree of accuracy on a zonal level. Despite this adequacy the procedures for trip generation were modified in the reevaluation effort primarily to take advantage of advances in the state of the art of trip generation modeling.

The generation of home-based school trips was accomplished in the initial study by uniform factoring of existing travel patterns. As noted earlier, this separate consideration of home-based school trips was necessitated by the limitations imposed by school service area boundaries, which cannot be adequately simulated by current trip generation and trip distribution models. Since trips to and from all schools—elementary, junior and senior high, vocational and technical schools, and colleges and universities—amounted to less than 8 percent of total person trips generated within the Region on an average weekday in 1963 and to less than 4 percent of

Table 36

COMPARISON OF OBSERVED AND ESTIMATED INTERNAL PERSON TRIP GENERATION WITHIN THE SOUTHEASTERN WISCONSIN REGION: 1963 AND 1972

Trip Purpose	1963 Observed[a]	1972 Observed[a]	Percent Change 1963-1972	1972 Estimated[b]	Percent Difference[c]
Home-Based Work	895,900	1,057,300	18.0	1,151,800	8.9
Home-Based Shopping . . .	546,800	677,200	23.8	770,600	13.6
Home-Based Other.	1,197,200	1,546,800	29.2	1,552,700	0.4
Nonhome-Based[d]	670,600	818,800	22.1	749,100	- 8.5
Total	3,310,500	4,100,100	23.9	4,224,200	3.0

[a] *Includes group-quartered trips.*

[b] *Estimated with 1963 models using 1972 land use inputs.*

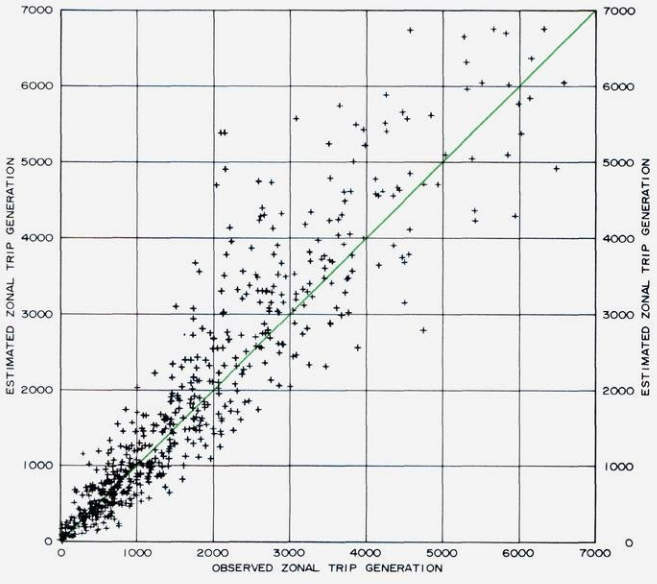
[c] *Percent Difference = (Estimated-Observed) x 100/Observed.*

[d] *Includes nonhome-based school trips.*

Source: SEWRPC.

Figure 21

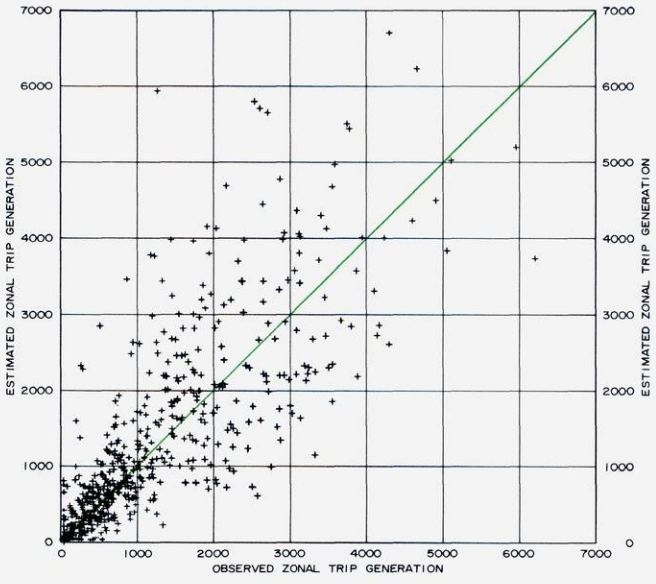
COMPARISON OF ESTIMATED AND OBSERVED TOTAL PERSON HOME-BASED WORK TRIP GENERATION BY ZONE: 1972



Source: SEWRPC.

Figure 22

COMPARISON OF ESTIMATED AND OBSERVED TOTAL PERSON HOME-BASED SHOPPING TRIP GENERATION BY ZONE: 1972



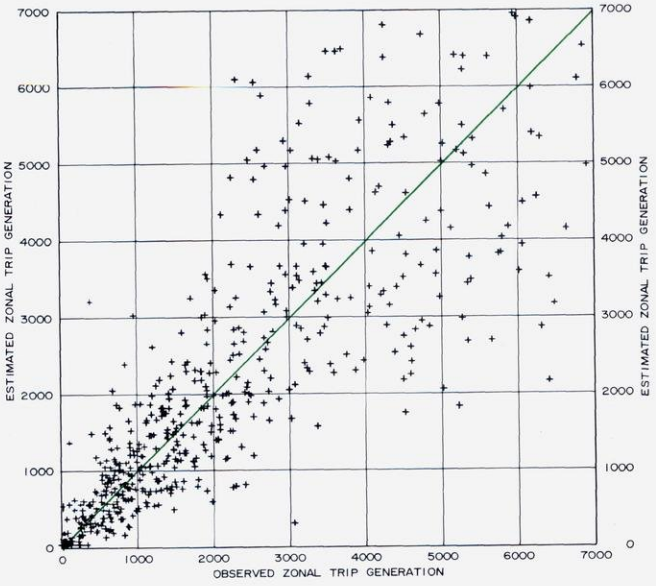
Source: SEWRPC.

total vehicle trips, and since most schools serve local neighborhoods or communities so that tripmaking to and from such schools has a very small impact on arterial street and highway travel, it was considered adequate for traffic planning purposes to let the 1963 pattern of vehicle trips for school purposes represent the probable future pattern of such trips. A factor based upon population growth was thus applied to the observed 1963 automobile school trip interchanges to derive the future year interchange volumes.

Transit trips to and from schools, however, comprised about 20 percent of total transit trips made within the Region on an average weekday in 1963. For traffic

Figure 23

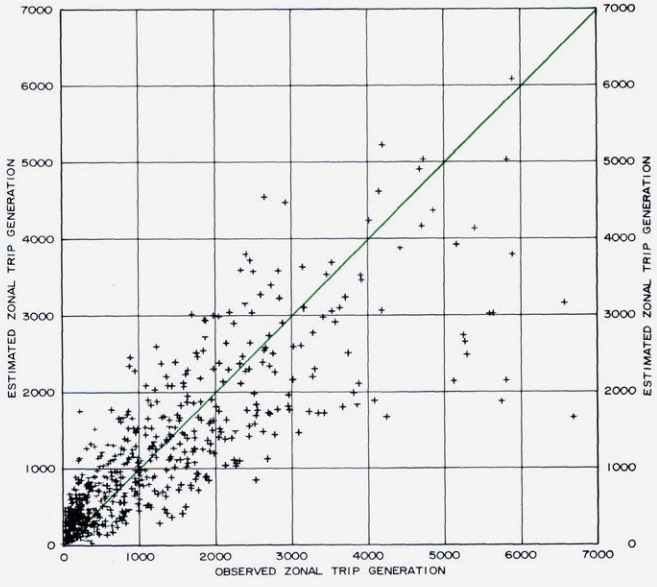
COMPARISON OF ESTIMATED AND OBSERVED TOTAL PERSON HOME-BASED OTHER TRIP GENERATION BY ZONE: 1972



Source: SEWRPC.

Figure 24

COMPARISON OF ESTIMATED AND OBSERVED TOTAL PERSON NONHOME-BASED TRIP GENERATION BY ZONE: 1972



Source: SEWRPC.

analysis purposes, therefore, it was considered necessary in the original land use-transportation planning effort to go into greater detail in the development of factors for future transit trips occurring between home and all schools. The forecasting procedure was based on the assumption that the 1963 pattern of transit school trips could be adjusted to represent the 1990 pattern of transit school trips. The pattern was adjusted through application of growth factors established for zones containing existing institutions which were expected to experience changes in school enrollment by 1990, and through the synthesis of school trip interchanges for those areas which were anticipated to become a part of a service area for new schools to be constructed by 1990, as identified in the land use plans.

The ability of the initial study procedures to predict the future generation of home-based school trips is discerned by a comparison of the estimated and observed trip generation for 1972. The travel inventories indicated that the number of observed home-based school trips in the Region increased 30 percent between 1963 and 1972, from 292,600 to 379,500, respectively. These totals represent all home-based school trips made on an average weekday by all modes of travel including the school bus. Using the initial study procedures, a 1972 estimate of 341,700 school trips was derived, a total approximately 10 percent lower than the observed figure. Considering the nature and significance of the home-based school trip, it may be concluded that the initial study procedure was adequate for traffic analysis purposes. Consequently, the same procedure was used in the reevaluation effort.

Truck trips within the Region, although constituting a relatively small proportion of total vehicle trips—approximately 12 percent of all such trips generated within the Region on an average weekday—nevertheless constitute an important element of regional travel which must be considered in arterial street and highway system planning and development. In the initial regional transportation planning effort, the generation of truck trips was accomplished by the use of multiple linear regression analysis. Taxi trips, comprising less than one-third of 1 percent of total trips within the Region on an average weekday, were included with truck trips as they displayed trip characteristics similar to those of truck trips. Analysis of the 1963 travel inventory data had indicated that both trucks and taxi trips were primarily of a nonhome-based nature with short average trip lengths, and trips made by both types of vehicles were made for essentially pickup and delivery functions. The regression equation, developed and applied on the traffic analysis zone level, was:

> Number of Truck and Taxi Trip Ends = 318 + 0.30 (Total Employment) + 0.14 (Total Population) + 7.90 (Net Acres of Retail and Service Land)

The ability of the truck and taxi trip generation technique utilized in the initial planning program to accurately predict 1972 truck and taxi travel was evaluated using inventory data from the 1972 origin and destination survey. These travel inventories indicated that truck and taxi travel within the Region has increased substantially over the past decade. The travel forecasting techniques, as developed in 1963, predicted this increase in regional

truck and taxi travel within 6 percent of the actual number of truck and taxi trips observed in the 1972 travel survey. In view of the demonstrated accuracy of the technique employed in the original planning effort, the technique was utilized with only slight modification in the plan reevaluation process for forecasting truck and taxi trips within the Region.

Although comprising less than 4 percent of total vehicular travel within the Region in 1963, the generation of external trips is significant for analyzing the traffic load and travel patterns to be served by certain arterial street and highway facilities of interregional importance and for coordinating highway system development across regional boundaries where interregional travel accounts for all vehicle movements on the highway system. In the initial land use-transportation planning effort, external travel was forecast through the extrapolation of the existing 1963 pattern of external tripmaking by applying growth factors to the trips observed at all major routes crossing the regional boundaries. In development of the growth factors, consideration was given to forecast annual increases of travel crossing the State boundaries prepared by the State Highway Commission; forecast changes in regional land use, population, and automobile availability; probable growth in recreational travel; and the probable effects of the improvement of highway facilities in adjacent regions.

The ability of the external travel forecasting technique to forecast external tripmaking within the Region in 1972 was tested using the travel inventory data collected by the Commission in 1972. Over the past decade external travel affecting the Region has increased by approximately 40 percent, from 91,000 vehicle trips per average weekday in 1963 to 127,500 such vehicle trips in 1972. Comparison of observed and forecast 1972 external travel indicated that the growth factors used in the initial study overestimated the increase in external travel, predicting an increase of approximately 87,000 trips over the 1963 to 1972 period, as compared with an observed increase of 36,500 trips. Although not necessarily significant in terms of total trips, this disparity in the estimation of external trips indicated the need for a revised procedure. As will be seen in later sections, the generation of external trips was modified for the plan reevaluation effort.

In general, it can be concluded that the initial study trip generation relationships exhibited a reasonable degree of accuracy in the estimation of 1972 trip generation particularly for major trip categories. Although the performance of the trip generation equations indicated that these equations could continue to be used in their original form, or in a refined form, through calibration with the more recent travel survey data, certain advances in the state of the art indicated that a shift in the type of trip generation submodel should be considered. Within the past few years an alternative approach to modeling trip production has been developed. This new modeling technique utilizes a "disaggregate" approach, as opposed to the more traditional zonal "aggregate" approach, as used in the original submodel. In this newer modeling approach, trip generation analysis is conducted at the household level using areawide data without reference to a zonal system, rather than at the zonal level, as in the original model. These disaggregate relationships are thought to be theoretically more valid as well as more stable over time, since they are developed for the basic personal travel decisionmaking unit—the household. More importantly, in a continuing land use-transportation study smaller sample surveys can be more readily used with the disaggregate approach to monitor and update the trip generation submodel. Primarily because of this latter advantage it was decided to utilize a disaggregate approach for the trip production model in the plan reevaluation process even though the aggregate models utilized in the initial study did estimate trip generation with a remarkable degree of accuracy.

REVISED TRIP GENERATION PROCEDURES

As can be seen in Table 33, trip generation relationships were developed for the plan reevaluation effort through the use of: cross-classification analysis for major internal home-based productions; multiple regression analysis for major internal home-based attractions and for nonhome-based productions and attractions; average factoring of existing travel patterns for school trips, group-quartered person trips, and nonresident internal trips; and multiple regression analysis for truck and taxi and external trips.

Internal home-based trips by nongroup-quartered residents constitute the vast majority of daily trips within the Region. The production of these home-based trips was analyzed and forecast through the use of cross-classification analysis. The use of cross-classification represents a change to a disaggregate approach to trip production as the models are calibrated using individual household trip records as observations. As in the initial study, trip generation analysis was conducted by trip purpose. Home-based trips were stratified in a manner identical to the classification employed in the initial planning effort, namely, home-based work, home-based shopping, and home-based other. The home-based trip purposes of personal business, medical-dental, social-eat meal, recreation, and serve passenger were again combined into a single category—home-based other—since the 1972 travel survey data reaffirmed the 1963 inventory findings that trips made with these purposes have reasonably similar characteristics of trip production, attraction, and length, and therefore can be combined for forecasting purposes.

In cross-classification, the trip production relationships are developed by establishing a multidimensional matrix. Each dimension of the matrix represents an independent or explanatory variable of tripmaking—such as household income, household size, or automobile availability—which is stratified into several classes. Values of the dependent variables—number of trips—are accumulated for each matrix cell from the household survey data and the mean trip generation rate for that cell determined. Thus, the value of each matrix cell represents the average trip production rate for households which possess the cell's unique independent variable characteristics. The model can then be applied to any geographic subarea of

the planning Region to obtain trip production estimates by linking the characteristics of the households within the subarea to the appropriate trip generation rate and summing the total number of trips made by all households residing in that area.

Within each trip purpose used in the modeling process, four category models were developed for forecasting future household trip production according to geographic location: for the Milwaukee urban area, the Racine urban area, the Kenosha urban area, and for all remaining areas within the Region (see Map 1). Separate models for each trip purpose were developed for these four areas because initial analysis based upon average values of household production as surveyed in 1963 and 1972 indicated substantial differences in tripmaking frequency between highly urbanized and remaining areas of the Region, and between urban areas of different size within the Region. Although statistically significant differences were in fact observed between the urban and the nonurban trip production rates, upon further analysis based upon the full range of household trip production, statistically significant differences were not found to exist between trip production rates for the larger urban areas as opposed to those for the smaller urban areas. However, since the separate modeling of trip frequency in the Milwaukee, Racine, and Kenosha urban areas permitted consideration of the variance in observed tripmaking within the Region, allowed a more accurate replication of base year trip production, and did not eliminate the possibility of combining trip rate data for those areas for possible future updating; it was decided to calibrate category models of trip production for each trip purpose separately for the Milwaukee urban area, the Racine urban area, the Kenosha urban area, and the remaining areas of the Region.

An important consideration in the development of the trip production category models was the selection of the variables used to explain household trip frequency. To identify those variables which affect tripmaking, a detailed analysis of 1963 and 1972 travel inventory data was undertaken. Among the variables investigated were automobile availability, household size, household income, structure type, neighborhood density, and stage in family life cycle. Household automobile availability and household size were selected as the independent variables to explain tripmaking in the trip generation model, since these variables exhibited a high correlation with tripmaking frequency, explained most of the variation in household tripmaking as observed in the 1963 and 1972 surveys, and, unlike a number of other variables considered, could be relatively readily forecast.

The category models calibrated for the Milwaukee, Racine, and Kenosha urban areas, and the remaining area of the Region are presented by trip purpose in Figures 25 through 28. As shown in these graphic displays, the trip generation rates vary by area with the urban areas exhibiting generally higher trip making frequencies than the rest of the Region, as may be expected, particularly for the nonwork trip purposes. Figures 25 through 28 also show the generally direct relationships between the rate of household tripmaking and household automobile availability and household size.

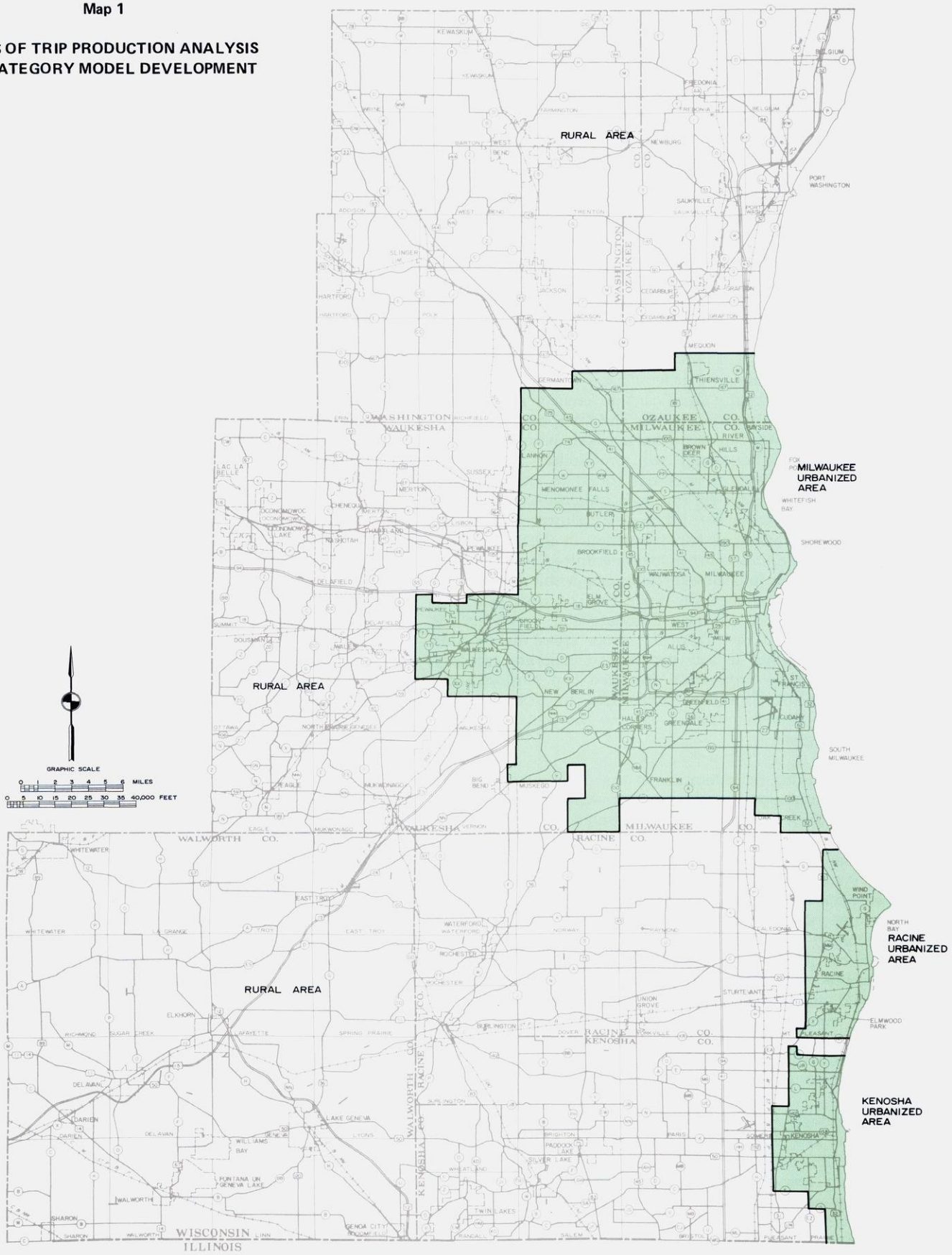
The other set of trip end relationships developed in the trip generation process are for trip attractions, which are primarily a function of the nonresidential land use activity within the subareas of the Region. Person trip attractions relationships were developed through the calibration of four linear equations representing the trip purposes of home-based work, home-based shopping, home-based other, and nonhome-based. Relating home-based person trip attractions to employment, population, and land use, the equations were developed on a zonal basis using multiple regression analysis, the same technique used in the initial study. This same procedure was employed in plan reevaluation because comparison of the zonal estimates of 1972 trip attraction, derived from the 1963 trip attraction equations, with observed 1972 zonal trip attractions indicated that the equations estimated the trip attractions of subareas within the Region with an adequate degree of accuracy.

The calibrated trip attraction equations are presented in Table 37, along with their statistical measures of adequacy. The equations differ from those developed in the initial study in two ways: the variables used in the equations and the means used to define employment. Minor changes in the variables utilized to explain home-based trip attractions were made primarily as a result of the availability of zonal data for various types of employment. The other major change made in the development of the equations was the means used to define employment. In the initial study, zonal employment was defined as the number of first work trip attractions in a zone as observed in the 1963 origin and destination survey. Forecasts of first work trip attractions for input to the future application of the equations were obtained by factoring forecast future levels of "actual" zonal employment by the ratio of regional first work trips to "actual" regional employment as observed by employment category in the base year. For plan reevaluation, observed levels of "actual" zonal employment were used for equation development rather than first work trip data. This modification was introduced because the continued validity of using first work trip data as a measure of employment can only be reviewed periodically with full scale origin and destination surveys, while employment, population, and land use data are available from other sources. Thus, periodic estimates of regional trip attraction would be more readily available for the monitoring function necessary under a continuing study, as a result of the change in forecasting procedure.

The forecast of nonhome-based trip production was accomplished through the use of multiple regression analysis as in the initial study. The production of nonhome-based trips could not be adequately simulated by the cross-classification procedure since neither end represents the place of residence of the traveler. Thus, while cross-classification could provide an estimate

Map 1

AREAS OF TRIP PRODUCTION ANALYSIS FOR CATEGORY MODEL DEVELOPMENT

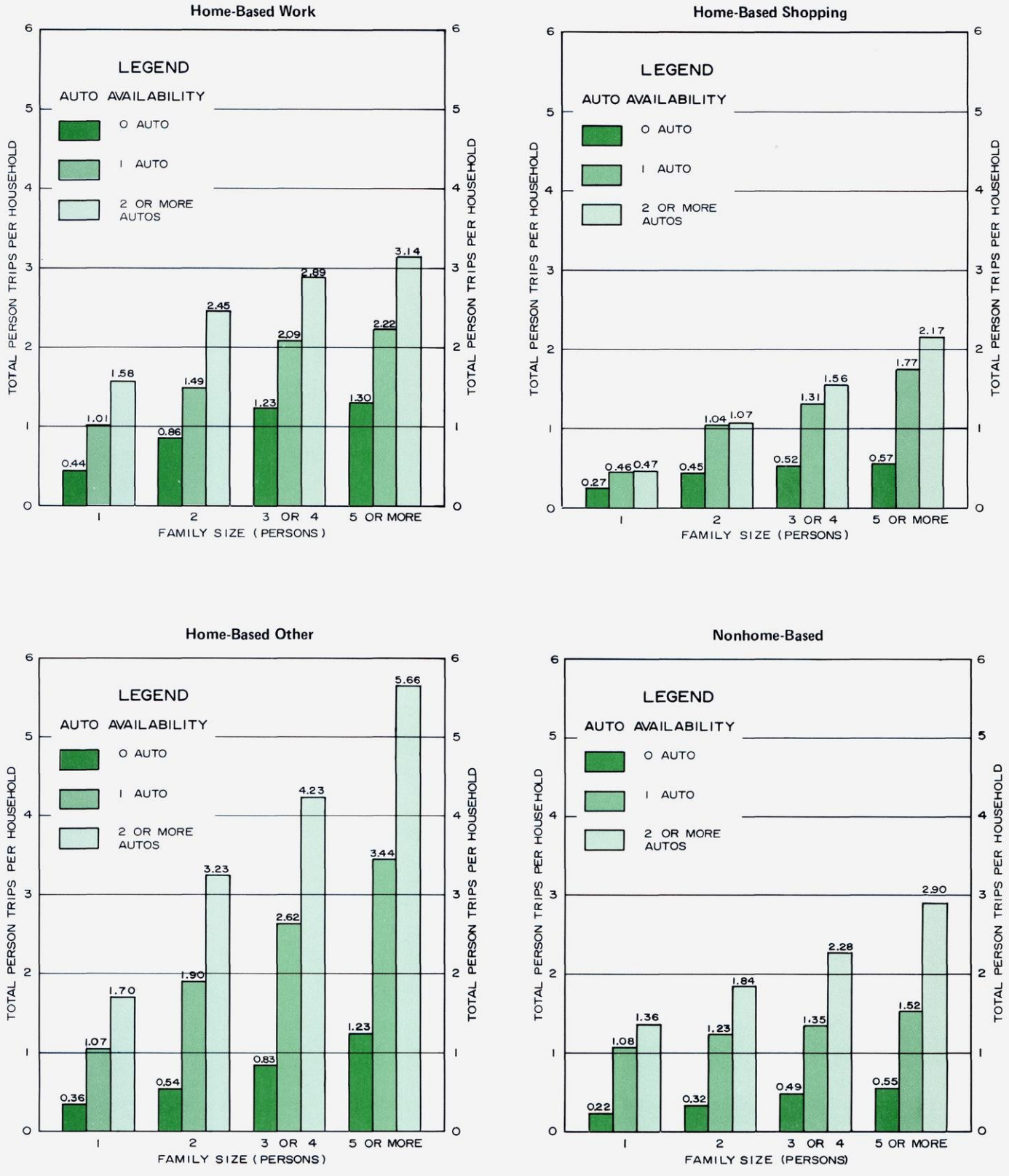


Separate person trip production category models were developed for each urbanized area within the Region as well as the rural area. The above map delineates the areas wherein each of the four models was calibrated for the year 1972.

Source: SEWRPC.

Figure 25

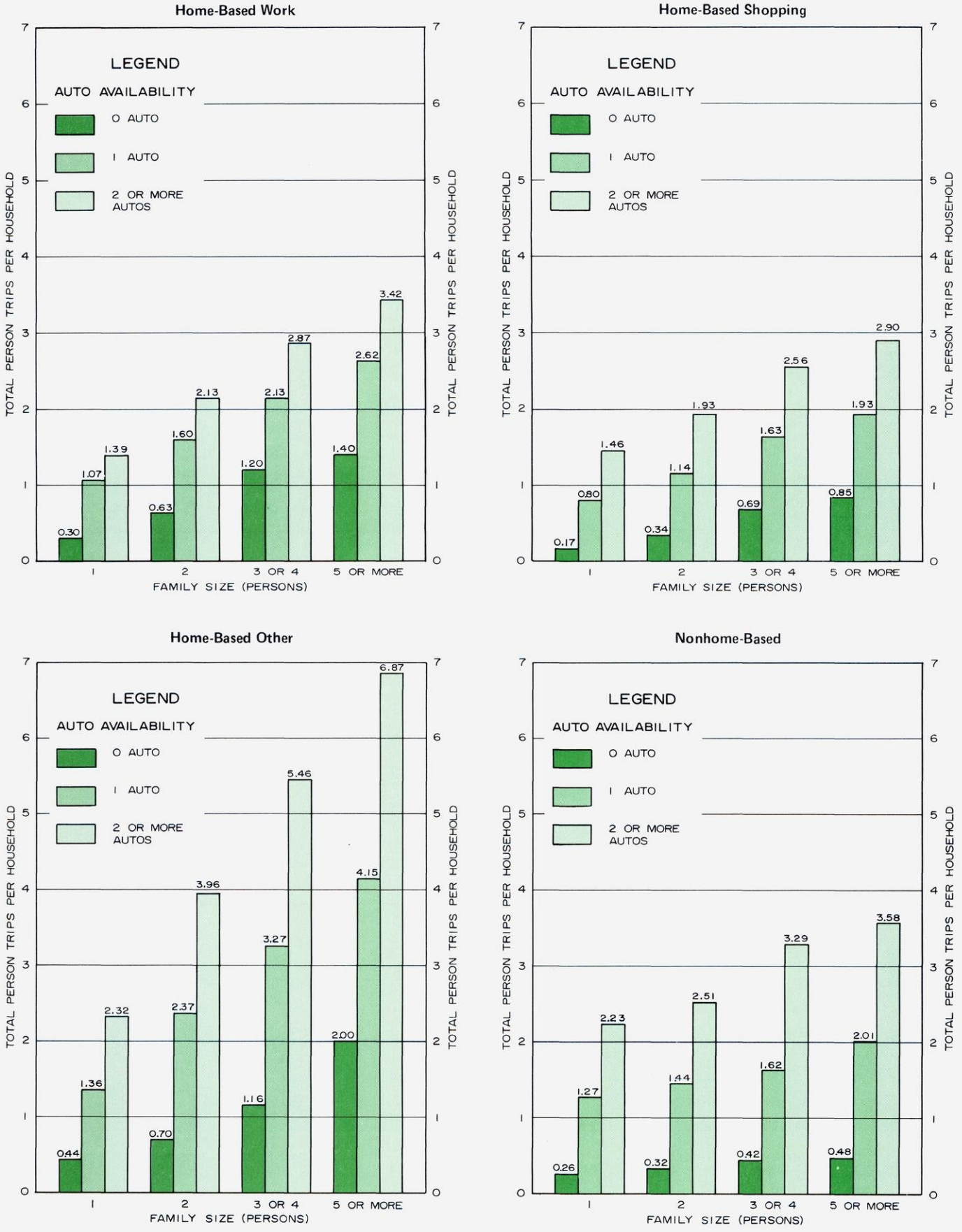
INTERNAL PERSON TRIP PRODUCTION CATEGORY MODELS: MILWAUKEE URBANIZING AREA



Source: SEWRPC.

Figure 26

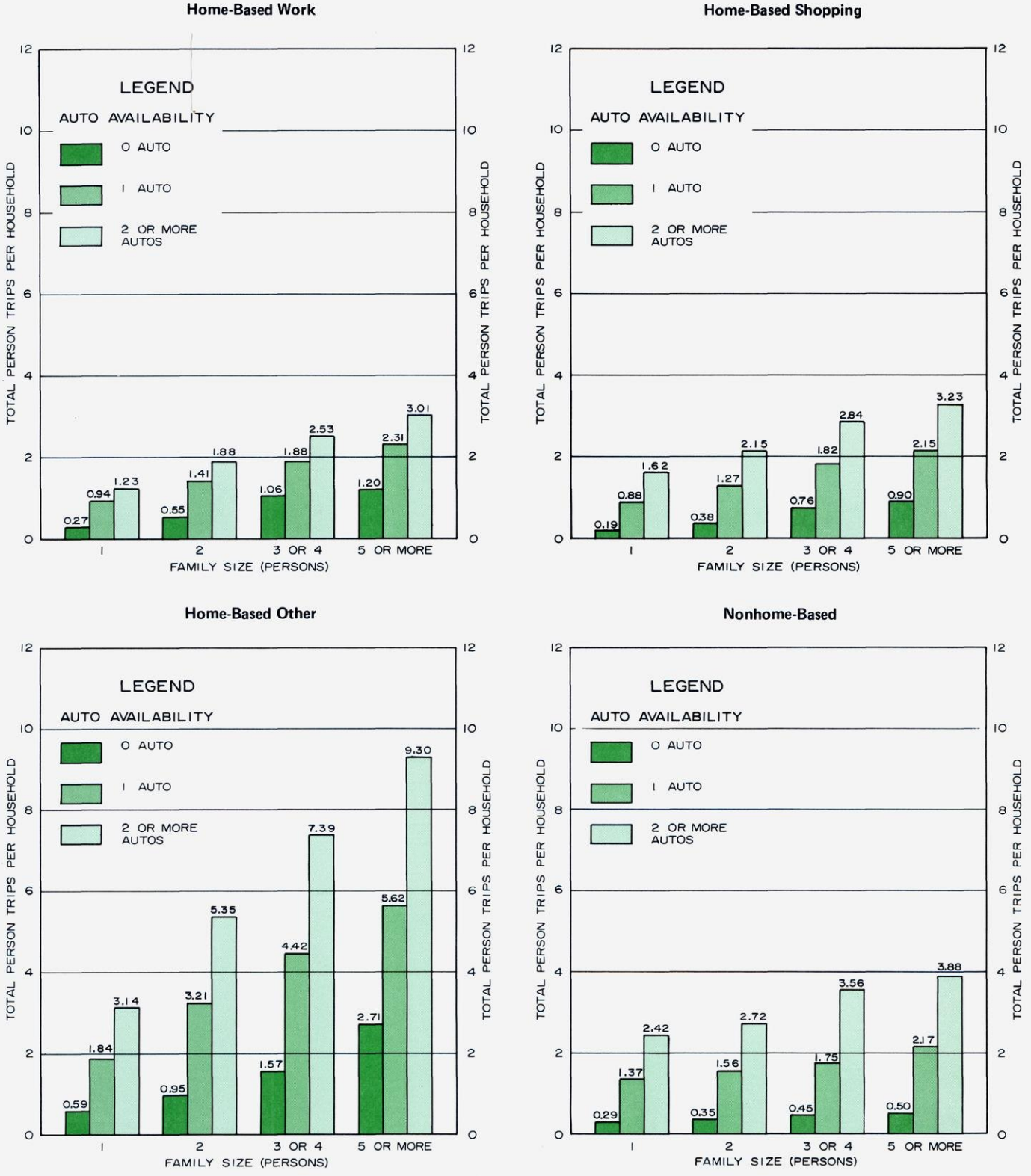
INTERNAL PERSON TRIP PRODUCTION CATEGORY MODELS: RACINE URBANIZING AREA



Source: SEWRPC.

Figure 27

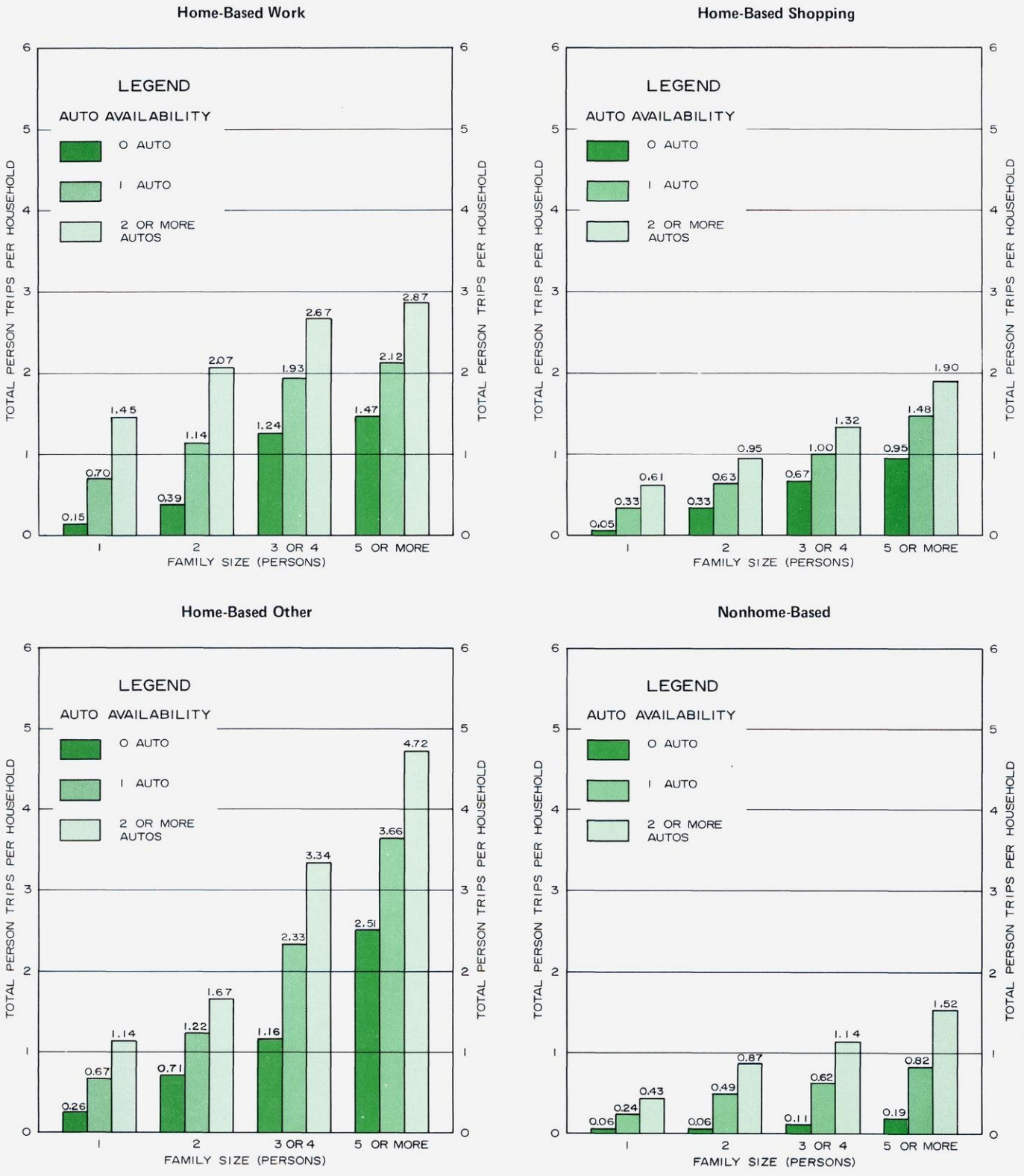
INTERNAL PERSON TRIP PRODUCTION CATEGORY MODELS: KENOSHA URBANIZING AREA



Source: SEWRPC.

Figure 28

INTERNAL PERSON TRIP PRODUCTION CATEGORY MODELS: RURAL AREA



Source: SEWRPC.

Table 37

TOTAL PERSON TRIP ATTRACTION EQUATIONS

Trip Purpose	Equation	Coefficient of Determination (r^2)	Standard Error of the Estimate[a] Expressed as a Percent of the Dependent Variable Mean (See/y)
Home-Based Work	Number of Trip Ends = 108.96 + 1.45 (Manufacturing Employment) + 1.48 (Retail Employment) + 1.88 (Governmental Employment) + 0.61 (All Other Employment)	0.91	55.6
Home-Based Shop	Number of Trip Ends = - 43.81 + 4.54 (Retail Employment) + 35.51 (Retail and Service Land)	0.53	189.9
Home-Based Other.	Number of Trip Ends = 199.68 + 2.17 (Retail Employment) + 1.88 (Governmental Employment) + 39.85 (Retail and Service Land) + 1.14 (Households)	0.61	75.9
Nonhome-Based	Number of Trip Ends = 14.64 + 0.11 (Manufacturing Employment) + 2.24 (Retail Employment) + 0.64 (Governmental Employment) + 0.09 (All Other Employment) + 25.74 (Retail and Service Land) + 0.43 (Households)	0.70	79.2

[a] *The adequacy of an equation developed through the regression analysis may be measured by two statistics: the coefficient of determination, r^2, and the standard error of estimate, s. The former provides a measure of the proportion of the variation in the dependent variable which is "explained" by the independent variables. The closer this coefficient is to 1.0, the greater is the degree of relationship. The standard error of estimate provides a measure of the closeness with which the regression equation fits the observed data from which it was derived. It defines a "confidence band" about the regression line within which two-thirds of observed data points may be expected to fall. It is important to note that the standard error of estimate applies only to the observed data used to derive the regression equation and not to forecast values.*

Source: SEWRPC.

of total regional nonhome-based productions it could not properly allocate productions to specific zones. Under the assumption, however, that cross-classification would provide a better regional estimate of total future trip productions, the zonal totals derived through application of the regression equation were factored so that the sum of zones equalled the regional cross-classification estimate. In this regard it should be noted that in no base or future year application did the sum of the zonal regression totals differ by more than 2 percent from the regional cross-classification estimate. The regression equation developed to allocate total productions to zones related the number of nonhome-based productions to the magnitude of the opportunity of making such a trip as expressed in terms of trip attractions. The calibrated equation is:

Number of Nonhome-Based Productions = 0.10 (Number of Home-Based Work Attractions) + 0.06 (Number of Home-Based Other Attractions) + 0.79 (Number of Nonhome-Based Attractions) - 33.22

The use of trip attractions as independent variables essentially implies the relationship between nonhome-based productions and the land use variables which were used to derive attraction estimates. The equation, calibrated using 1972 origin-destination data, explained 94 percent of the observed zonal variation in nonhome-based production within the Region.

The generation of school trips was accomplished in the plan reevaluation effort through the extrapolation of existing trends. Special consideration of school trips, which constituted about 6 percent of the total person trips within the Region in 1972, was also employed in the original planning effort; except, in the original effort, home-based school trips alone were treated as a special category and nonhome-based school trips were considered together with all other nonhome-based trips. The exclusion of all trips from or to all schools—elementary, junior high, senior high, vocational and technical, and college and university—from the other major internal trip production, attraction, and distribu-

tion analyses was necessary because of the limitations of available trip distribution modeling procedures, which would inherently treat all schools as possible attractions, not being able to account for limitations imposed by school service boundaries. The procedure, followed in plan reevaluation to forecast school trips, used growth factors similar to the technique developed and applied in the original planning effort. The growth factor technique was applied separately by mode: automobile, school bus, and mass transit. Comprising less than 3 percent of all vehicle trips within the Region in 1972, school trips by automobile and school bus were forecast by multiplying the observed 1972 vehicle school trip table by forecast changes in population to the year 2000. Transit trips to or from schools, which comprised approximately 31 percent of the transit person trips made within the Region in 1972, were forecast by initially applying a growth factor based upon population and by further adjusting those zones where significant changes in school enrollment are anticipated. Such adjustments were made in those areas where school service boundaries are to change in accordance with the recommended land use plan, or where new construction of educational institutions is anticipated. The most significant of these adjustments reflected the improvement of transit service to the University of Wisconsin-Milwaukee (UWM) resulting from the 1974 initiation of the UBUS program and from the opening of three new vocational school extensions: Milwaukee Area Technical College in Oak Creek and Mequon and Waukesha County Technical Institute in Pewaukee.

With regard to the UWM, the procedure essentially adjusted those 1972 person trips which might have used the UBUS service had such service been available in 1972. First, the service areas of the six UBUS routes were defined and the person trips for school purpose from these areas identified. Then, based upon student surveys conducted as a part of the UBUS Demonstration Project and upon the 1974 ridership figures for the six routes, a percentage of auto person trips was converted by route to transit trips. It should be noted that such an adjustment accounted for not only the improved transit service but also for the severe parking restrictions imposed in the vicinity of the UWM campus.

The methodology used to account for trips to the vocational school extensions not open in 1972 consisted of defining rational service areas for the new schools and diverting all trips in the service area from the central campus to the new satellite campuses. Consideration was given to the fact that while these satellite campuses are speciality schools and could thus be expected to attract trips from the entire area, the same basic core of courses is offered to each satellite campus. Enrollment estimates were then obtained from the schools to assure accurately divided trips between individual schools.

The generation of internal trips by group-quartered persons and nonresidents was accomplished by the application of uniform growth factors. The separate consideration of the trip generation of group-quartered persons—those persons residing in dormitories, convents, homes for the aged, and other similar residences—and nonresidents from those persons living in households within the Region constitutes a change from the trip generation methods employed in the initial planning effort. In the initial land use-transportation planning program, group-quartered persons and nonresidents were considered in combination with the population of the Region living in households by zone in the process of trip generation and other phases of travel simulation. This approach could not be utilized for plan reevaluation since the revised procedure utilized for forecasting trip production was based on the household level, as opposed to the zonal level used in the initial study. Moreover, analysis of 1963 and 1972 travel survey inventory data indicated that the travel behavior and characteristics of group-quartered persons in the Region and nonresidents were significantly different from those of persons living in households. Consequently, for plan reevaluation, persons living in group quarters and nonresidents were considered separately from the regional household population in the trip generation process. Accounting for less than 1 percent of the total person trips within the Region in 1972, travel by group-quartered and nonresident persons was analyzed and then forecast through use of a growth factor approach. This approach assumes that the 1972 pattern of trips can be adjusted through application of zonal growth factors which reflect the increases in travel of group-quartered persons by zone, expressed as a function of the change in the number of group-quartered persons by zone of residence. It was assumed that the trip generation rate of group-quartered persons as observed in the 1972 travel survey would remain stable through the forecast period.

The generation of truck and taxi trips was accomplished for the reevaluation effort using the same technique as for the initial study, namely, multiple regression analysis. Using the 1972 travel surveys and 1970 land use inventory, a new analysis of the relationship between land use and truck and taxi tripmaking was undertaken. The results of the analysis indicated that truck and taxi trip generation could be best expressed on a zonal level as a function of employment, population, and retail and service land—the same variables used to explain truck and taxi trip generation in the initial study. The new truck and taxi trip generation equation as derived from this analysis is:

> Number of Truck and Taxi Trip Ends = 160 + 0.26 (Total Employment) + 0.15 (Population) + 15.6 (Net Acres of Retail and Service Land)

The coefficient of determination for this equation is 0.552, the standard error of the estimate is 453 trips, and the mean is 63 trips.

Unlike the equation used in 1963, which was based on traffic analysis zone data from 619 subareas within the Region, the 1972 equation was developed for a zone system of 1,220 subareas within the Region. As a result of this change in the aggregation of the data used in the calibration of the model and because slight changes have occurred over time in the relationship between truck and taxi trip generation and population employment, and

particularly, retail and service land use; the terms and factors in the equation defined with 1972 data vary from those in the equation used in the initial planning effort. Since it was necessary that travel forecasts be provided according to a weight classification—light trucks, or trucks weighing less than 8,000 pounds, and medium and heavy trucks, or trucks weighing more than 8,000 pounds—primarily for estimating the air quality and noise implications of truck travel, two additional truck trip generation equations were developed. These two equations—one for light truck and taxi trips and the other for medium and heavy truck trips—were used to allocate the forecast additional total truck trips between the two types of trucks.

> Number of Light Truck and Taxi Trip Ends = 46 + 0.30 (Households) + 0.11 (Total Employment) + 4.92 (Retail and Service Land)

> Number of Medium and Heavy Truck Trip Ends = 69 + 0.19 (Households) + 0.12 (Total Employment) + 3.67 (Retail and Service, Wholesale and Manufacturing Land)

The generation of the final trip category, external trips, was accomplished through the use of regression analysis. This represents a change from the initial study in which all external trips were assumed to be generated at a number of points on the regional boundary, and growth factors were applied to the observed crossings to estimate future year external trips. A number of regression equations were developed for defined external and internal areas and related external trip generation to population and the magnitude residential, commercial, and industrial land use. The future year application of the revised model resulted in a much smaller annual increment in external travel than that predicted by initial study procedures.

Testing of Revised Procedures

The most basic test of the entire trip generation stage is the ability of the various calibrated relationships, applied with observed independent 1972 land use, to replicate observed 1972 trip generation. Table 38 demonstrates this ability by showing for each pertinent trip category the observed trip generation from the 1972 travel inventory surveys and the simulated trip generation derived from the revised trip generation formulations with 1972 land use inventory data. As can be seen, in no case does the simulated trip generation differ from the observed by more than 2 percent. Of particular importance are the internal person trips which, as previously noted, constitute the vast majority of total trips within the Region.

Additional tests, primarily of a statistical nature, must also be made for the individual trip generation submodels to assure their validity. In those cases where a relationship was derived by use of multiple regression analysis the relevant statistical measures of fit and explained variation were presented in the preceding section of this chapter. The emphasis of this section will thus be on the cross-classification model, not only because of the large proportion of trips that this model simulates but also because it is a relatively new and untested procedure.

Table 38

COMPARISON OF OBSERVED AND ESTIMATED TRIP GENERATION IN THE SOUTHEASTERN WISCONSIN REGION: 1972

Trip Category[a]	Observed	Estimated[b]	Percent Difference[c]
Home-Based Work	1,055,500	1,053,600	-0.2
Home-Based Shopping	673,600	664,700	-1.3
Home-Based Other	1,532,600	1,517,500	-1.0
Nonhome-Based	779,800	772,800	-0.9
School	418,900	418,900	0.0
Internal Truck and Taxi	383,600	385,000	0.4
External[d]	125,700	125,000	-0.6
Total	4,969,700	4,937,500	-0.6

[a] *Does not include group-quartered or nonresident trips.*

[b] *Estimated with 1972 models using independent 1972 land use inputs.*

[c] *Percent Difference = (Estimated-Observed) x 100/Observed.*

[d] *Includes both automobiles and trucks.*

Source: SEWRPC.

Two tests were performed on the cross-classification model to measure its effectiveness in simulating 1972 trip production in the Southeastern Wisconsin Region. The purpose of the first test was to evaluate the effectiveness of stratifying the dependent variable—trip generation rates—into the several levels of the two independent variables—household size and auto availability. A second test was conducted to appraise the accuracy of the trip generation rates themselves.

The first test utilizes an analysis of variance technique for two factors and consists of simultaneously comparing the variation in trip rates between the several levels of each of the two independent variables with the variation of trip rates about the general mean trip rate for a particular category model. If the variation between the levels of one or both of the independent variables is significantly different[4] from the variation about the general mean then the stratification of one or both of the independent variables is justified. Conversely, if the difference in variation is not significant, then stratification is not effective since it does not produce an appreciable gain in accuracy over the use of a single average trip rate for one or both of the independent variables.

A two-factor analysis of variance was applied to each of the 16 category models at a significance level of 5 percent. For the Milwaukee urban and for the "non-urban" area category models, significant variation was found between the levels of both independent variables

[4] *Significance is measured at some arbitrarily defined level of risk. This level of risk, normally expressed as a percent, represents the probability that an analyst may falsely accept the data as representative of the entire population when in fact the data is observed by chance.*

with the exception of the variation between the levels of household size for the Milwaukee nonhome-based trip purpose category and the variation between levels of auto availability for the rural home-based shop and nonhome-based trip purpose categories. The Kenosha category model, however, demonstrated no significant variation between levels of either of the independent variables except for the variation between levels of auto availability for the home-based other category. The analysis shows an even split for the Racine category model since there was significant variation between levels of auto availability, with one exception, while there was no significant variation between levels of household size, also with one exception.

The discrepancy between the generally significant results of the Milwaukee and nonurban category models and the generally insignificant results of the Racine and Kenosha models can be largely attributed to the difference in sample size. The Milwaukee and rural category models were based on a sample of 9,465 and 4,350 households, respectively, while the Racine and Kenosha category models were based on sample sizes of only 753 and 820 households, respectively. The small sample size of the latter two models places doubt on the key assumption of the normality of the variation in the population and renders the results of the analysis somewhat tenuous. Noting the significant results of the larger sample size, Milwaukee and rural category models, it is reasonable to suspect that the Racine and Kenosha category models would have demonstrated significant variation between levels of both the independent variables had a larger sample size been available. For this reason, it was decided to retain those levels of stratification in all four category models.

A major evaluation of the cross-classification model would be a test of the reliability of the trip generation rates themselves. By its nature, however, cross-classification entails no assumptions of normality and linearity in the population and does not, therefore, permit the tests for significance and reliability characteristic of regression models. However, a test was conducted to measure the temporal stability of the trip rates by comparing them with rates obtained by an identical cross-classification of the 1963 survey data. Corresponding trip rates for 1963 and 1972 were matched, and the hypothesis was tested that the difference between the corresponding trip rates equalled zero. The analysis produced a mean difference of 0.06 trips per household between the 1972 and 1963 data and a standard deviation of the differences of 0.831 trips per household. This difference is not significant even at a high level of risk of 10 percent, indicating that trip rates have indeed remained stable over time.

TRIP DISTRIBUTION

Basic Concepts

The second major step in the travel simulation process is trip distribution in which the number of trips between each zonal pair is determined. The input to this step from trip generation is the number of trip ends produced by or attracted to each zone. Additional inputs such as the travel times between zones may also be required for calibration and application depending on the type of trip distribution model used.

There are currently three basic types of trip distribution models in general use: growth factor models, the gravity model, and the opportunity model. Growth factor models derive the number of trips between two zones for some projection year as a function of the number of trips observed between those two zones in the base year and some growth factor. The growth factor may simply represent an annual increment of number of trips or may be an annual percentage increase similar to a compounding interest function. The actual growth factors used, however, are usually determined by some other characteristic such as forecast population growth. As such, this type of formulation represents a combined trip generation-trip distribution model and is used for relatively small trip categories, which cannot be easily simulated by more sophisticated techniques. The most popular growth factor model is the Fratar method in which growth factors are applied to both the trip productions and attractions. A trip generation model must precede the Fratar method as the growth factors are calculated as the ratio of projection year productions and attractions to base year productions and attractions. Calibration of the Fratar model is necessary to insure that the number of projection year trips entering or leaving each zone matches the generated productions and attractions for that zone respectively.

The gravity model is the most widely accepted and used trip distribution model. The basic premise of the gravity model is that a trip interchange, or the number of trips between two zones in the study area, is a direct function of the number of trip ends in each zone and some inverse function of their spatial separation. This function of spatial separation adjusts the relative attraction of each zone by the ability, desire, or necessity of the tripmaker to overcome the travel distance or travel time involved.

Mathematically, the gravity model may be stated as follows:

$$T_{ij} = P_i \frac{\dfrac{A_j}{d_{ij}^{\,b}}}{\left(\dfrac{A_1}{d_{i1}^{\,b}} + \dfrac{A_2}{d_{i2}^{\,b}} + \ldots + \dfrac{A_n}{d_{in}^{\,b}}\right)}$$

Where:

T_{ij} = trips produced in zone i and attracted to zone j.
P_i = trips produced by zone i.
A_j = trips attracted by zone j.
d_{ij} = the spatial separation between zones i and j, generally expressed in terms of door to door travel time.

b = an empirically determined exponent which expresses the average areawide effect of spatial separation between zones on trip interchange.
n = the number of traffic analysis zones within the planning area.

The exponent b has been observed to vary with trip purpose assuming values of about 3.0 for social trips, 2.0 for shopping trips, and 1.0 for work trips—when spatial separation has been expressed as in-vehicle travel time.

The decrease in the exponent implies that spatial separation is a less restrictive factor on a trip interchange or that people generally are willing to travel farther for a purpose such as work than for purposes such as shopping or social functions. The exponent b also has been observed to increase as the separation increased, indicating that the effect of spatial separation increases as the separation itself increases. Moreover, the value of the exponent has been found to vary from urban area to urban area, particularly for nonwork purpose trips.

As a consequence of the variance in the exponent b, it is necessary to develop and calibrate gravity work models for each region under study, as well as for each trip purpose category considered. Moreover, since past experience has demonstrated that the exponent of travel time is not necessarily constant for all intervals of time and that travel patterns are affected by various social and economic characteristics of the travelers, it has become common practice to express the gravity model formula in the following form:

$$T_{ij} = \frac{P_i A_j F_{ij} K_{ij}}{\sum_{j=1}^{n} A_j F_{ij} K_{ij}}$$

Where:

F_{ij} = an empirically derived travel time friction factor which expresses the average areawide effect of spatial separation on trip interchange between zones which are t_{ij} minutes apart.

K_{ij} = an adjustment factor applied on a zone-to-zone basis to allow for the incorporation of the effect on travel patterns of social, economic, political, or historic characteristics not otherwise accounted for in the model formulation, and:

T_{ij}, P_i, and A_j are as previously defined.

The use of the set of travel time friction factors to express the effect of spatial distribution on zonal trip interchange as a modification of the classic inverse exponential function serves to provide for the consideration that the effect of spatial separation generally increases as the separation itself increases. Derived from the characteristics of the origin and destination zones, the zonal adjustment factor is essentially the ratio necessary to adjust the model so as to match computed travel patterns with the travel patterns observed between subareas of the Region in origin and destination surveys. This factor accounts quantitatively for effects of biases which can generally be identified qualitatively through experienced knowledge about the areas affected.

In order to apply the gravity model to forecast future travel patterns it is necessary to calibrate the model to accurately reflect existing travel patterns and characteristics within a Region. This calibration process actually determines the numerical values of the travel time friction factors and the zonal adjustment factors so that the gravity model accurately simulates the trip length characteristics determined in the travel inventory. These numerical values are assumed to remain constant over time, thereby providing a model which can be used to simulate the future trip interchange patterns, given future trip productions, attractions, and travel times between subareas of the Region.

The evidence available indicates that the assumption that the friction factors are stable over time is reasonable. However, research studies have shown that drastic changes in the level of service provided by the transportation system, or radical changes in the distribution of land use activity throughout a Region, will invalidate this assumption. The assumption of constant zonal adjustment factors is more difficult to justify as social, economic, historic, or political effects or biases which exist in the base year may not exist in the future.

The final type of trip distribution model is the opportunity model, either the intervening opportunity model or the competing opportunity model. Although both of these models have a strong theoretical basis, there does not exist a standarized procedure for calibration, operation, or application, which is as efficient or as well tested as the gravity model. Moreover, little research has been done to verify the ability of the opportunity model to either replicate existing travel patterns or remain stable over time. Consequently, while investigated, the opportunity model was not considered a viable alternative for the trip distribution stage in the plan reevaluation effort.

Evaluation of Initial Study Procedure

In the initial land use-transportation study, trip distribution was conducted after mode split. The primary advantage of this sequence is that it allows for the separate distribution of automobile and transit trips, which often exhibit quite different travel patterns and trip length characteristics. As such, eight gravity models were calibrated in the initial study for the two modes of travel and for the four trip purposes of home-based work, home-based shopping, home-based other, and nonhome-based. The distribution of other kinds of trips such as truck or external trips was accomplished using either an average factor or the Fratar method. The fact that comparable, comprehensive origin-destination surveys

were conducted in both 1963 and 1972 allows for identification of any trends in trip distribution characteristics over the past 10 years. The characteristics of greatest interest in the trip distribution process are average trip length and trip length frequency distribution.

As shown in Table 39, the observed average trip length for total person travel within the Region as expressed in minutes declined moderately for all trip purposes except home-based shopping between 1963 and 1972. This can indicate either that people in the Region are traveling shorter distances or that improvements over the nine year period in the transportation system have resulted in decreased travel times for the same or greater distance trip. An examination of the observed total person trip lengths for 1963 and 1972, as measured by distance, indicate that the latter is true (see Table 39). While average trip distances have increased moderately, transportation system improvements such as the completion of certain important freeway facilities have resulted in a shortening of travel times.

Additional insights can be gained by examining the average trip lengths by mode of travel either automobile or mass transit. As shown in Table 40, the observed average trip lengths of automobile drivers have decreased from 1963 to 1972 for all trip purposes. The observed average trip lengths for transit person trips have remained stable for the purposes of home-based work and home-based other, and have increased moderately for home-based shopping and nonhome-based. As will be seen in the section on modal split, home-based work and home-based other are the two major transit trip purposes, representing 54 and 22 percent of observed 1972 total transit trips, respectively. It is interesting to note that, although these two trip purposes did not experience any increase in trip length, the relative decline in transit usage for these two purposes was significantly greater than that for either home-based shopping or nonhome-based.

More specific information on the changes in trip distribution between 1963 and 1972 is provided by a comparison of the trip length frequency distribution by mode as observed in the two inventory years. Figures 29[5] and 30[6] graphically illustrate the changes in auto driver trip length distribution as expressed in miles and minutes for each of four trip purposes. Figure 31 graphically illustrates the changes in transit person trip length distribution as expressed in minutes for each of four trip purposes.

The ability of the auto driver and transit passenger gravity models, calibrated using 1963 travel inventory data, to predict these changes in trip distribution, as measured by average trip lengths and trip length frequency distributions, was determined through the application of the models with 1972 data. The gravity model was applied using the initial study friction factors, 1972 observed productions and attractions, and 1972 observed travel times. It should be noted that a different set of travel times was used for the distribution of home-based work transit trips as opposed to the other three purposes. This was done to reflect the peak hour transit headways which are usually in effect during the home to work trip. As shown in Table 41, with the possible exception of home-based shop and nonhome-based transit trips, the average trip lengths for both modes and for all purposes were

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[5] *Figure 29 replaces Figure 81 of Volume I of this report. Those figures have been corrected to use the adjusted 1963 travel data—see footnote 3—and the door to door travel distance which includes the minor and collector street travel distance as well as the arterial street and highway distance.*

[6] *Figure 30 replaces Figure 82 of Volume I of this report. These figures have been corrected to use the adjusted 1963 travel data—see footnote 3—and the corrected 1972 door to door travel times.*

Table 39

COMPARISON OF OBSERVED AVERAGE TRIP LENGTH FOR TOTAL PERSON TRAVEL WITHIN THE REGION: 1963 AND 1972

Trip Purpose	1963 Trip Length		1972 Trip Length		Percent Change 1963-1972	
Home-Based Work	18.4[a]	6.1[b]	16.0[a]	7.1[b]	- 13.0[a]	16.4[b]
Home-Based Shopping	10.4	3.3	10.3	4.2	- 1.0	27.3
Home-Based Other	13.3	4.6	11.9	5.0	- 10.5	8.7
Nonhome-Based	13.1	4.0	12.4	4.9	- 5.3	22.5
Total (all purposes)	14.2	4.7	12.8	5.4	- 11.8	14.9

[a] *Minutes.*

[b] *Miles.*

Source: SEWRPC.

Table 40

COMPARISON OF OBSERVED AVERAGE TRIP LENGTH FOR AUTO DRIVER AND TRANSIT PERSON TRAVEL WITHIN THE REGION: 1963 and 1972

Trip Purpose	1963 Trip Length[a]	1972 Trip Length[a]	Percent Change 1963-1972
Auto Driver			
Home-Based Work	18.5	16.1	-13.0
Home-Based Shopping	9.7	9.6	- 1.0
Home-Based Other	12.7	11.6	- 8.7
Nonhome-Based	13.0	12.4	- 4.6
Transit Person			
Home-Based Work	35.9	36.0	0.3
Home-Based Shopping	28.5	34.7	21.8
Home-Based Other	35.2	32.5	- 7.7
Nonhome-Based	28.4	34.6	21.8

[a] *In minutes.*

Source: SEWRPC.

Table 41

COMPARISON OF OBSERVED AND ESTIMATED AVERAGE TRIP LENGTH FOR AUTO DRIVER AND TRANSIT PERSON TRAVEL WITHIN THE REGION: 1972

Trip Purpose	1972 Average Trip Length[a]		
	Observed	Estimated[d]	Percent Difference[c]
Auto Driver			
Home-Based Work	16.1	17.0	5.6
Home-Based Shopping	9.6	9.3	- 3.1
Home-Based Other	11.6	12.7	9.5
Nonhome-Based	12.4	12.4	0.0
Total	12.8	13.4	4.7
Transit Person			
Home-Based Work	36.0	34.9	- 3.1
Home-Based Shopping	34.7	25.8	-25.6
Home-Based Other	32.5	29.9	- 8.0
Nonhome-Based	34.6	24.9	-28.0
Total	35.0	31.5	-10.0

[a] *In minutes.*

[b] *Using 1963 friction factors and observed 1972 productions and attractions.*

[c] *Percent Difference = (Estimated-Observed) x 100/Observed.*

Source: SEWRPC.

predicted with a quite adequate degree of accuracy, considering that all data utilized to establish both the actual and estimated trip distribution were estimates derived from travel surveys. Thus, although changes in the transportation system have resulted in changes in average trip lengths, the basic relationships determined by the gravity model between relative travel times and trip distribution have remained relatively stable over time. An examination of the trip length frequency distributions also indicates a close correspondence between observed and predicted distributions for all trip purposes. The only significant difference noted is that the calibrated initial study gravity models predicted that the time interval containing the peak percentage of trips would occur earlier in the trip length frequency distribution than that observed in the 1972 travel survey data.

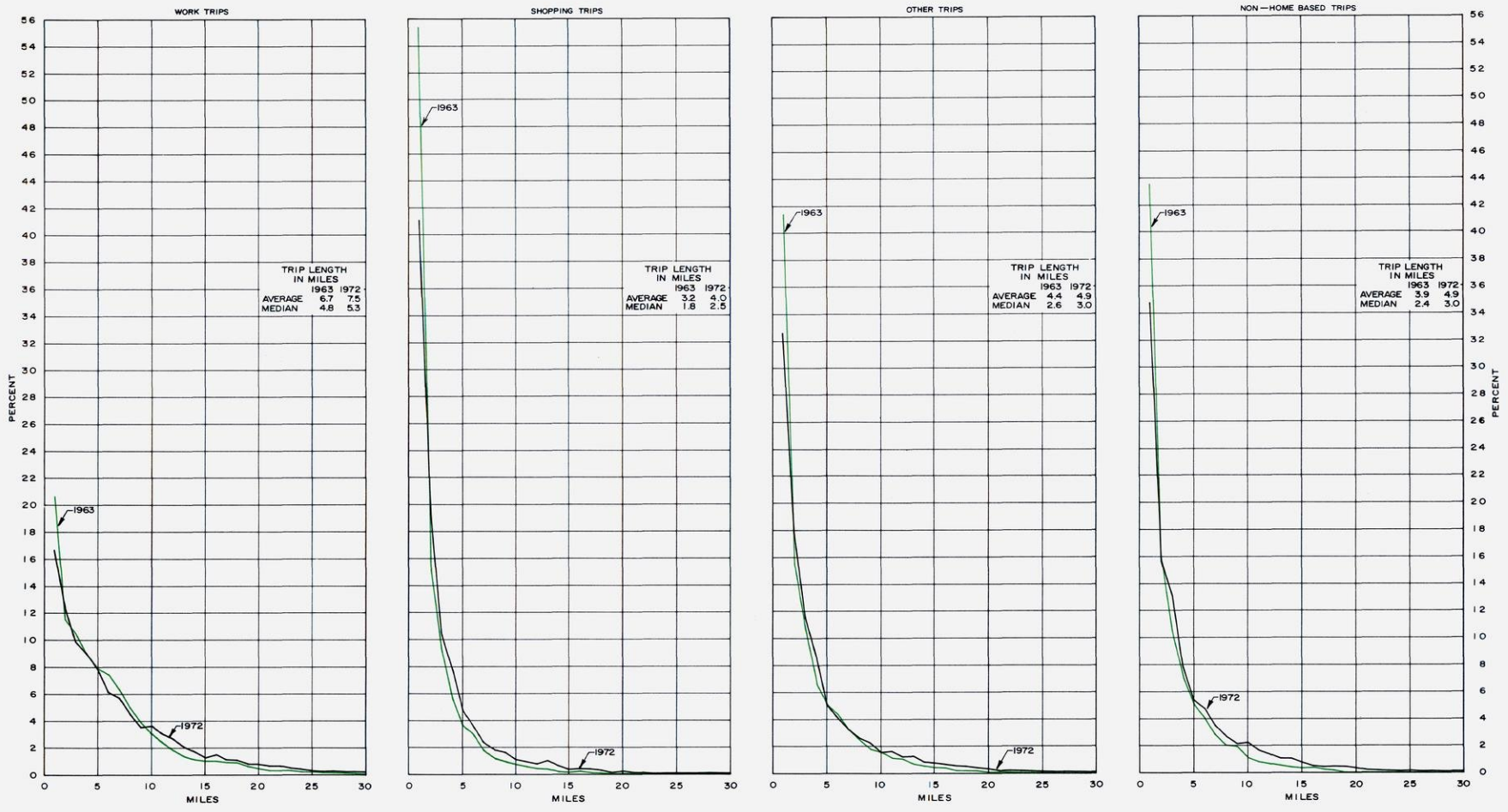
REVISED TRIP DISTRIBUTION PROCEDURES

Due largely to the effectiveness of the gravity model formulation in the initial study, the distribution of major internal trips was again accomplished in the reevaluation effort by use of the gravity model. Because a post-distributional mode split sequence was utilized, the gravity mode was calibrated for total internal person trips rather than by mode, as in the initial planning effort. Four gravity models were thus calibrated for total internal automobile and transit person trips for the trip purposes of home-based work, home-based shopping, home-based other, and nonhome-based. Indicating the effect of spatial separation on trip interchanges observed in the 1972 travel surveys, the calibrated friction factors for each trip purpose are shown in Figure 32. As friction factors are relative, of greater importance than their absolute magnitudes is the slope of the smoothed friction factor curve. For this reason, the friction factor curves in Figure 32 were normalized and plotted on logarithmic scales to facilitate a comparison of trip purposes. As can be seen, the friction factor curve with the smallest negative slope is home-based work indicating the smaller effects of spatial separation on the distribution of work trips as the travel time is increased. Conversely, the distribution of home-based shopping trips shows the greatest sensitivity to spatial separation as the travel time is increased. It is interesting to note that the relative slopes of the friction factor curves calibrated for the reevaluation effort correspond quite closely to those calibrated in the intial land use-transportation planning effort.

The distribution of both truck and taxi and external trips was accomplished through the use of the Fratar method. This represents a change in trip distribution procedures from the initial study, wherein external trips were generated and distributed simultaneously through the application of an average growth factor. The Fratar method essentially derives future year interchange volumes by applying to base year interchanges, a growth factor, derived separately for each zone. In this particular case, the growth factors represented the ratio of forecast year productions, as derived from the trip generation stage, to base year (1972) productions. The major problem with this procedure is that unlike the gravity model, unless trips were observed between two zones in the base year, the Fratar model will not forecast any future trips for that interchange regardless of the number of future trip ends forecast for either zone. For the reason the Fratar distribution of truck and taxi and external trips was conducted in the reevaluation effort at the planning analysis area level. The interplanning

Figure 29

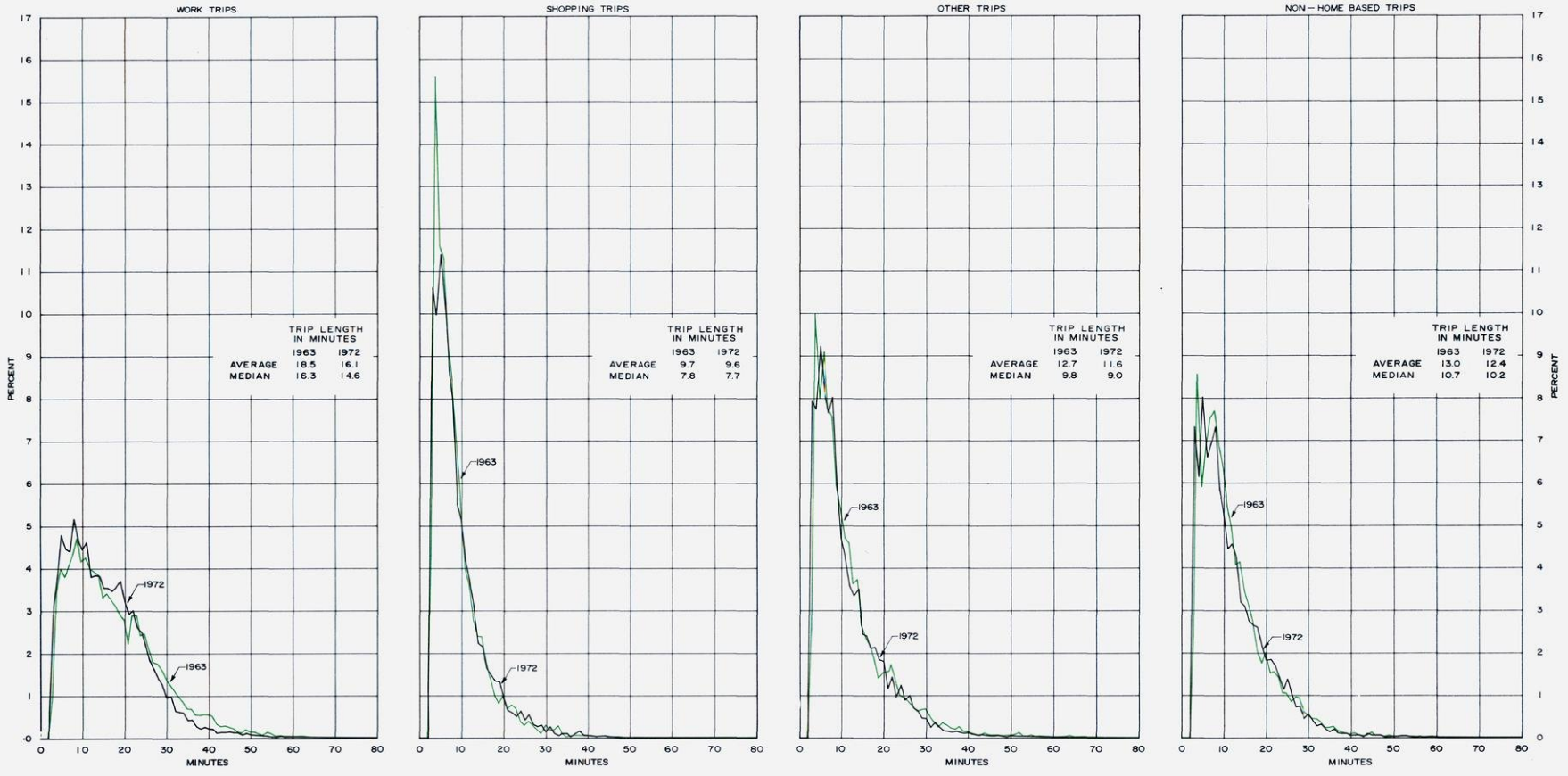
AVERAGE TRIP LENGTHS IN MILES OF AVERAGE WEEKDAY AUTO DRIVER TRAVEL IN THE REGION BY TRIP PURPOSE: 1963 AND 1972



Source: SEWRPC.

Figure 30

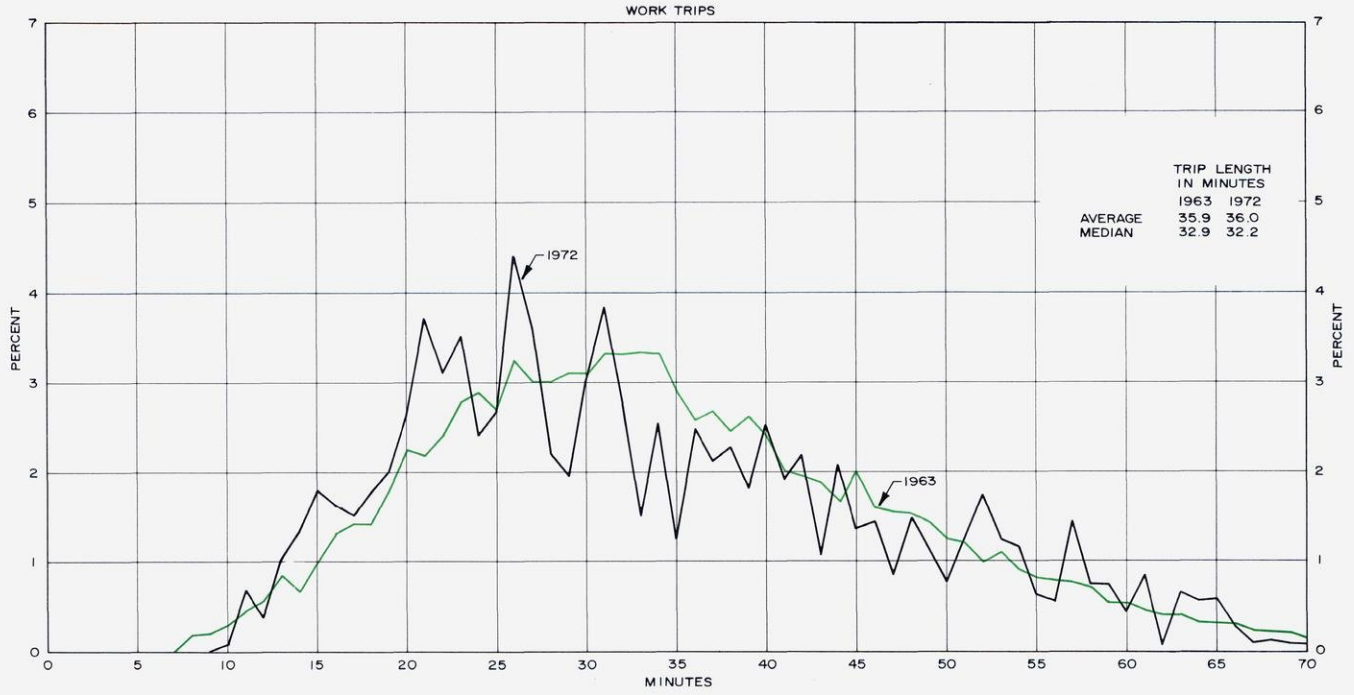
AVERAGE TRIP LENGTHS IN MINUTES OF AVERAGE WEEKDAY AUTO DRIVER TRAVEL IN THE REGION BY TRIP PURPOSE: 1963 and 1972



Source: SEWRPC.

Figure 31

AVERAGE TRIP LENGTHS IN MINUTES OF AVERAGE WEEKDAY TRANSIT PASSENGER TRAVEL IN THE REGION BY TRIP PURPOSE: 1963 AND 1972



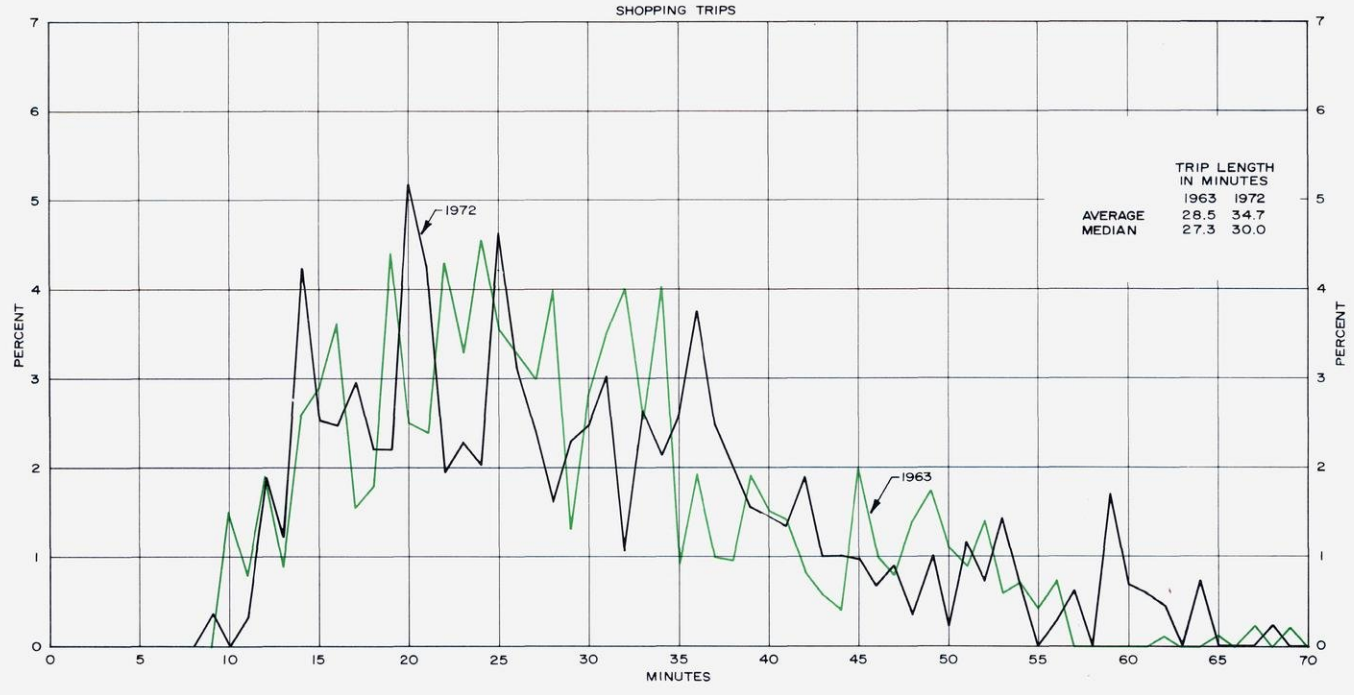
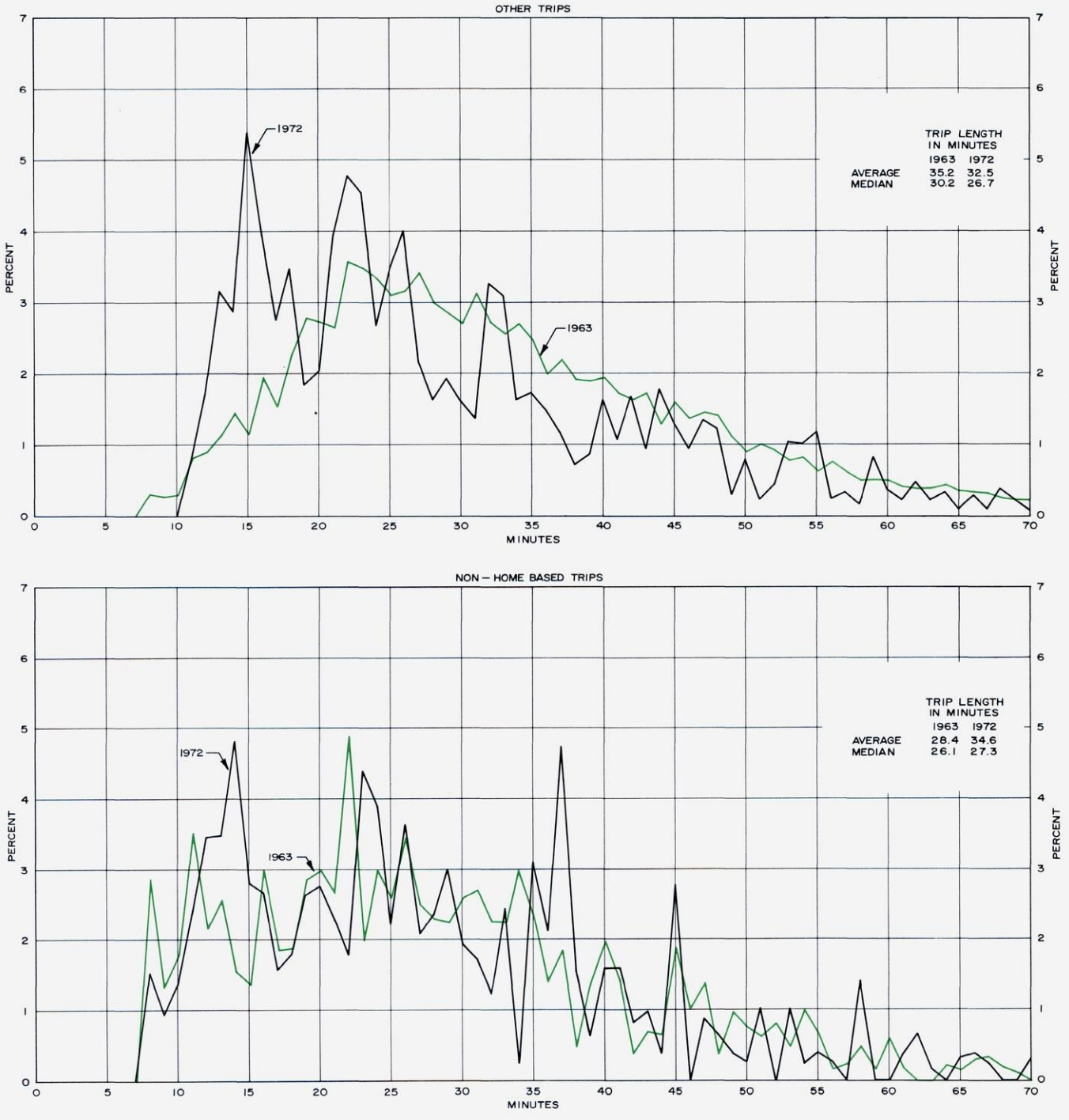


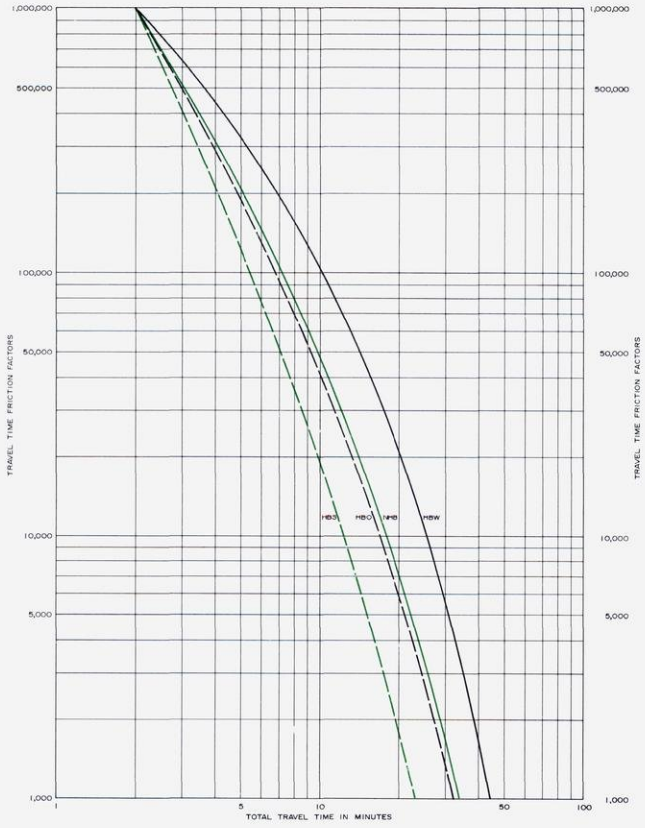
Figure 31 (continued)



Source: SEWRPC.

Figure 32

TRAVEL TIME FRICTION FACTORS FOR INTERNAL TOTAL PERSON TRIPS IN THE REGION: 1972



Source: SEWRPC.

analysis area volumes were then disaggregated to the traffic analysis zone level on the basis of the proportions of future year productions.

Testing of Revised Procedures

There are a number of ways in which the validity of a calibrated gravity model can be determined. As noted earlier, a very important characteristic of the distribution process is the average trip length. An indication of the reasonableness of the gravity model specification is thus a comparison of the average trip lengths as observed from travel inventory data and as simulated by the gravity model. Current standards of acceptability dictate that simulated trip lengths be no more than 3 percent higher or lower than observed. As can be seen in Table 42, the calibrated total person gravity model used for the reevaluation process quite closely matches observed average trip lengths for all trip purposes.

Another indication of the validity of the calibrated gravity model can be discerned from a comparison of observed and simulated trip length frequencies, that is, the proportion of trips within each one-minute time increment. Figure 33 graphically illustrates this comparison by showing for all trip purposes the trip length frequency distribution curves for the inventory data and for the gravity model. In general, the frequencies match reasonably well although the gravity model calibration process has the tendency to smooth trip length frequency and thus does not reflect the peaks of the observed trip frequencies.

The final and most stringent test of the gravity model consists of a comparison of observed and simulated trip interchange volumes. For this purpose the calibrated gravity model was applied to the 60 internal planning analysis areas of the Region using observed 1972 productions and attractions and observed 1972 travel times. The result of this application was, for each of the four trip purposes, the number of trips produced in each planning analysis area and attracted to all other such areas. The home-based trips were then balanced so as to reflect the number of trips originating in each planning analysis area and ending in all other such areas. The four trip tables— each containing values for the 3,600 possible trip interchanges between the 60 planning analysis areas— were than compared with observed trip tables from the 1972 origin-destination survey. Within a number of arbitrarily defined volume ranges, statistical measures of similarity between the observed and the gravity model simulated trip tables were determined including sum of differences, sum of squares, mean difference, root mean square error, percent root mean square error, variance, and standard deviation. In addition, the residuals were examined to determine the need for the use of K factors in the event of an interchange which is grossly under- or overestimated. Although all of the statistical measures of similarity are analytically valuable, of particular value is the percent root mean square error. This is true because in evaluating the accuracy of a trip distribution model, the accuracy of the origin-destination survey date must

Table 42

COMPARISON OF ESTIMATED AND OBSERVED TOTAL PERSON 1972 AVERAGE TRIP LENGTHS BY TRIP PURPOSE

Trip Purpose	1972 Average Trip Length[a]		
	Estimated[b]	Observed	Percent Difference[c]
Home-Based Work	15.70	15.96	-1.6
Home-Based Shopping . .	10.44	10.25	1.9
Home-Based Other	12.04	11.89	1.3
Nonhome-Based.	12.38	12.40	-0.2
Total (all purposes)	12.80	12.78	0.2

[a] *In minutes.*

[b] *Estimated using 1972 calibrated friction factors and observed productions and attractions.*

[c] *Percent Difference = (Estimated-Observed) x 100/Observed*

Source: SEWRPC.

also be considered. The percent root mean square error expected from the 1972 origin-destination survey was computed and compared with that resulting from the application of the gravity model. It should be noted that this procedure, which involves the comparison of compressed binary trip tables, is actually more stringent than the normal procedure of comparing loaded spider networks where geographic and socioeconomic biases are averaged out in the assignment process. Nevertheless, it was found that the calibrated gravity model added little in all volume ranges to the error inherent in the origin-destination survey data. The greatest degree of similarity between observed and simulated trip volume interchanges was exhibited by home-based work trips while the least was exhibited by home-based other trips. In some cases, primarily in the lower volume ranges, the percent root mean square error from the gravity model was actually significantly smaller than that expected from error in sampling. An example from this comparison is given in Table 43 which lists the percent root mean square error from the distribution of home-based work trips and the percent root mean square error inherent in the survey data. As can be seen, the distribution model added little to the random error expected from the travel survey data. It was thus concluded that the calibration of gravity model was complete and that no further adjustments, such as the use of K-factors, was required.

Table 43

COMPARISON OF ERROR FROM TRIP DISTRIBUTION AND INHERENT ERROR FROM TRAVEL SURVEY DATA—HOME-BASED WORK

Volume Range	Mean Base Volume	Distribution Error[a]	Survey Error[b]
0-49	5.6	526.7	404.9
50-99	71.4	94.0	116.6
100-199	141.6	53.3	83.4
200-299	245.2	52.7	63.8
300-399	346.1	46.4	53.9
400-499	443.0	47.8	47.8
500-999	721.8	32.7	37.7
1,000-4,999	2,101.1	28.4	22.4
5,000-9,999	6,507.3	17.7	12.9
10,000-19,999	13,580.2	21.2	9.0
20,000 +	22,406.3	11.0	7.0

[a] $\text{Percent Root Mean Square Error} = \dfrac{100\sqrt{\dfrac{\Sigma\,(\text{base-test})^2}{n}}}{\Sigma\,\text{base}/n}$

Where base = observed survey volume
test = volume from trip distribution
n = number of interchanges

[b] $\text{Percent Root Mean Square Error} = \dfrac{1624}{(\text{base}^{0.4884})\sqrt{\%DUS}}$

Where %DUS = percent of dwelling units sampled

Source: SEWRPC.

MODAL SPLIT

Basic Concepts

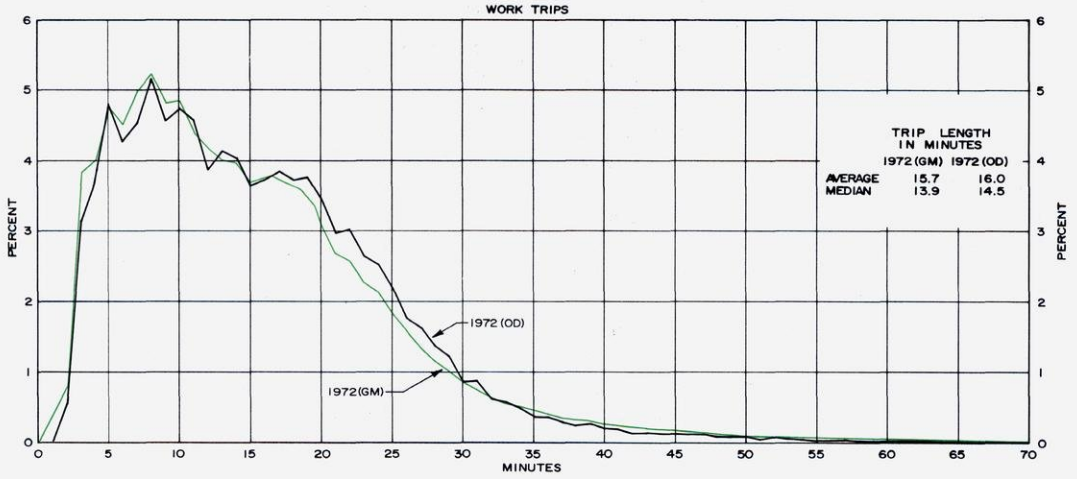
The third major step in the travel simulation process is modal split in which the total number of trips are divided on the basis of travel mode used. Primarily this involves the division of internal person trips between the two major modes of travel, public mass transit and the private automobile. There is also the need, however, to determine the modal split for smaller trip categories such as the division of school trips between school bus and automobile or the division of external trips between automobile and truck. The final phase of the modal split step is an auto occupancy model which determines for each interchange the average number of persons per automobile trip. In this manner, automobile person trips are converted to automobile vehicle trips, which is the necessary input to the traffic assignment step.

As already noted in this chapter, modal split can be applied either before or after trip distribution. Commonly referred to as a "trip end model," modal split applied prior to trip distribution establishes the percentage of total person trip productions and attractions for each traffic analysis zone that may be expected to use mass transit. This approach was used in the initial land use-transportation study. When mode split is applied after the simulation of trip distribution, it is termed a "trip interchange model" in that the percentage of transit use is determined for each zone-to-zone pair or interchange. The primary advantages of this latter approach are that it allows for the explicit consideration of factors affecting mode choice at both ends of the trip and that it allows for the explicit consideration of transportation system characteristics.

In either case, the determination of modal split is essentially an evaluation of the potential demand for mass transit service. The aggregate demand for mass transit service is determined by many individual decisions, and many factors operate to influence each individual choice concerning the use of public, as opposed to private, transportation. It is for this reason that of the four major steps in the travel simulation process, modal split is by far the least standardized. Within the past 20 years nearly every major transportation study has developed its own modal split model, making the classification of basic mode split approaches very difficult. For analytical purposes, however, the factors affecting individual modal choice can be summarized under three general groupings: factors relating to the characteristics of the tripmaker, factors relating to the characteristics of the trip, and factors relating to the characteristics of the transportation system. Automobile availability and income level are examples of important tripmaker characteristics; trip purpose is an example of an important trip characteristic; and relative system travel times, costs, comfort, convenience, reliability, and accessibility are examples of important transportation system characteristics relating to modal choice. The purpose of modal split modeling is to select from these three general groups those variables which best explain the choice of mode and which can be readily quantified. The following

Figure 33

COMPARISON OF ORIGIN AND DESTINATION SURVEY AND GRAVITY MODEL TRIP LENGTH FREQUENCY DISTRIBUTIONS BY TRIP PURPOSE FOR INTERNAL TOTAL PERSON TRIPS IN THE REGION: 1972



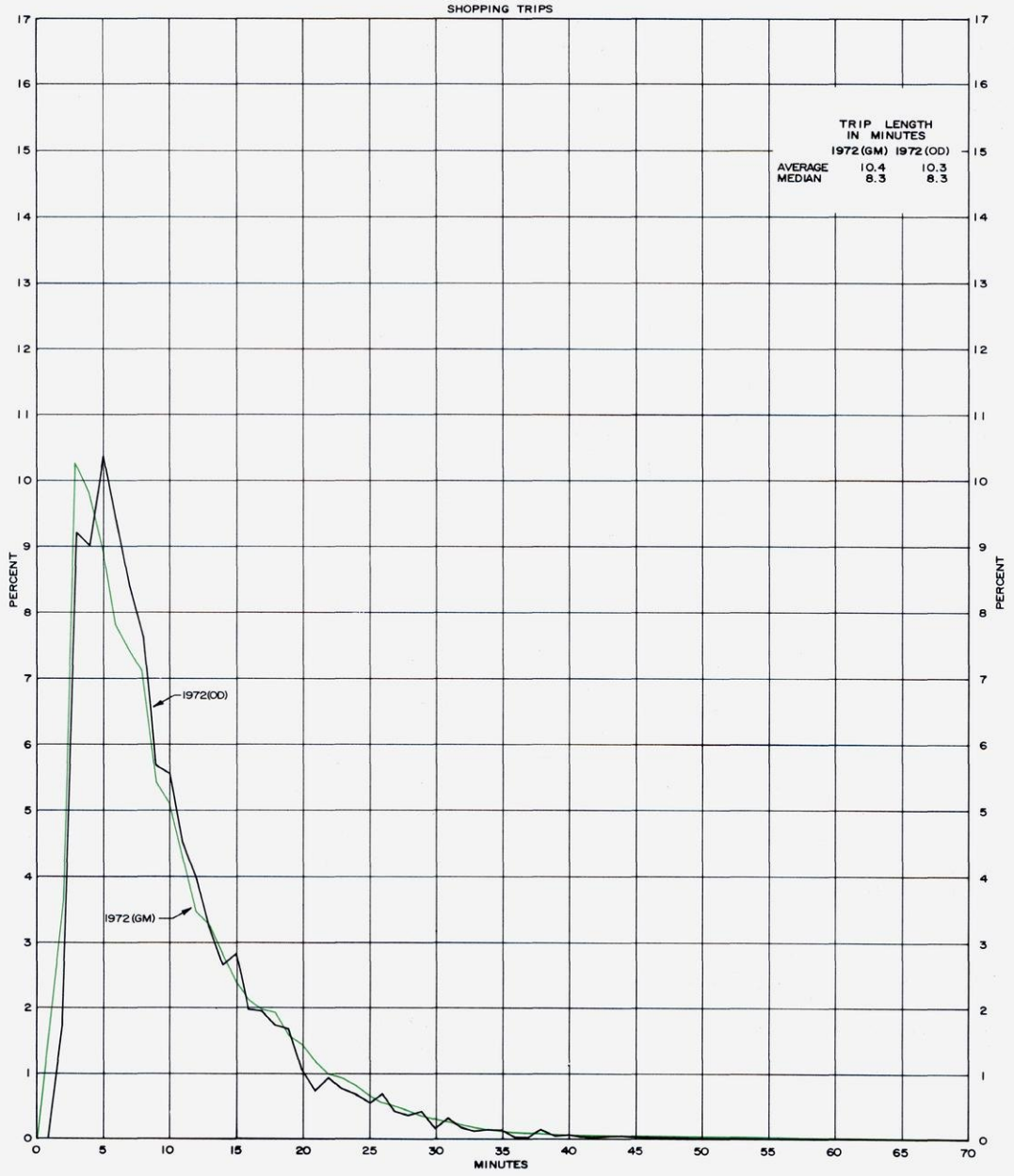
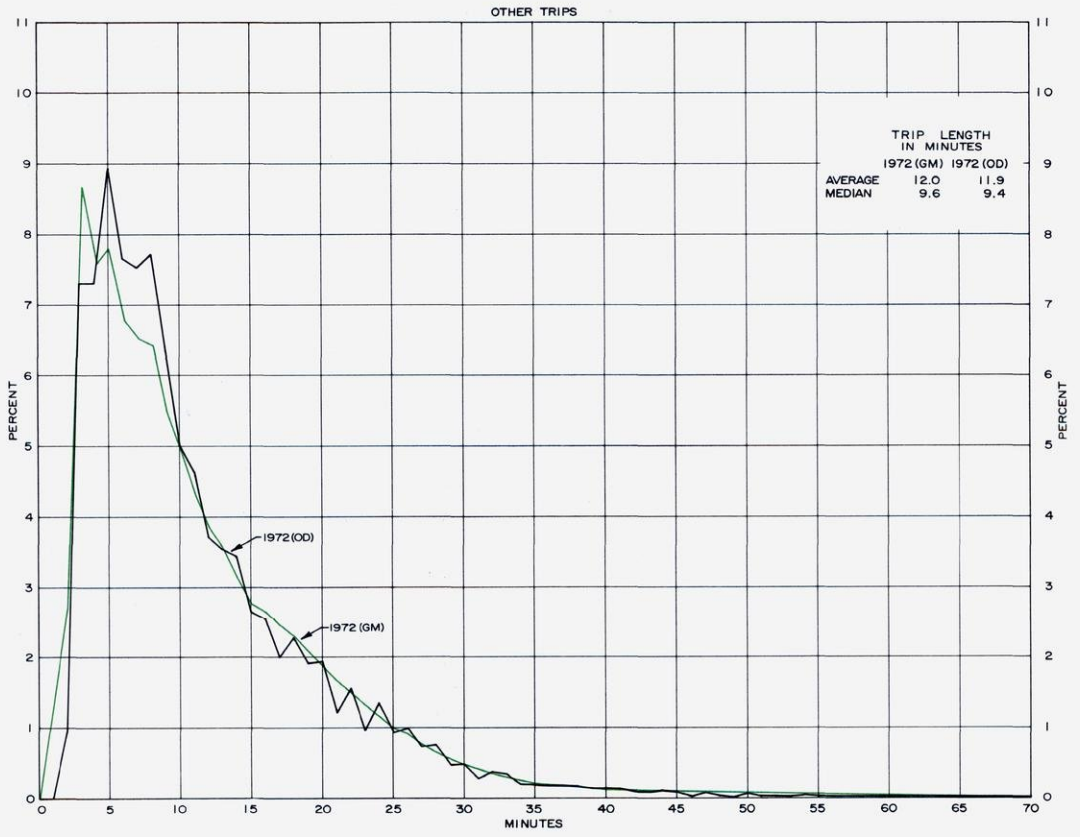
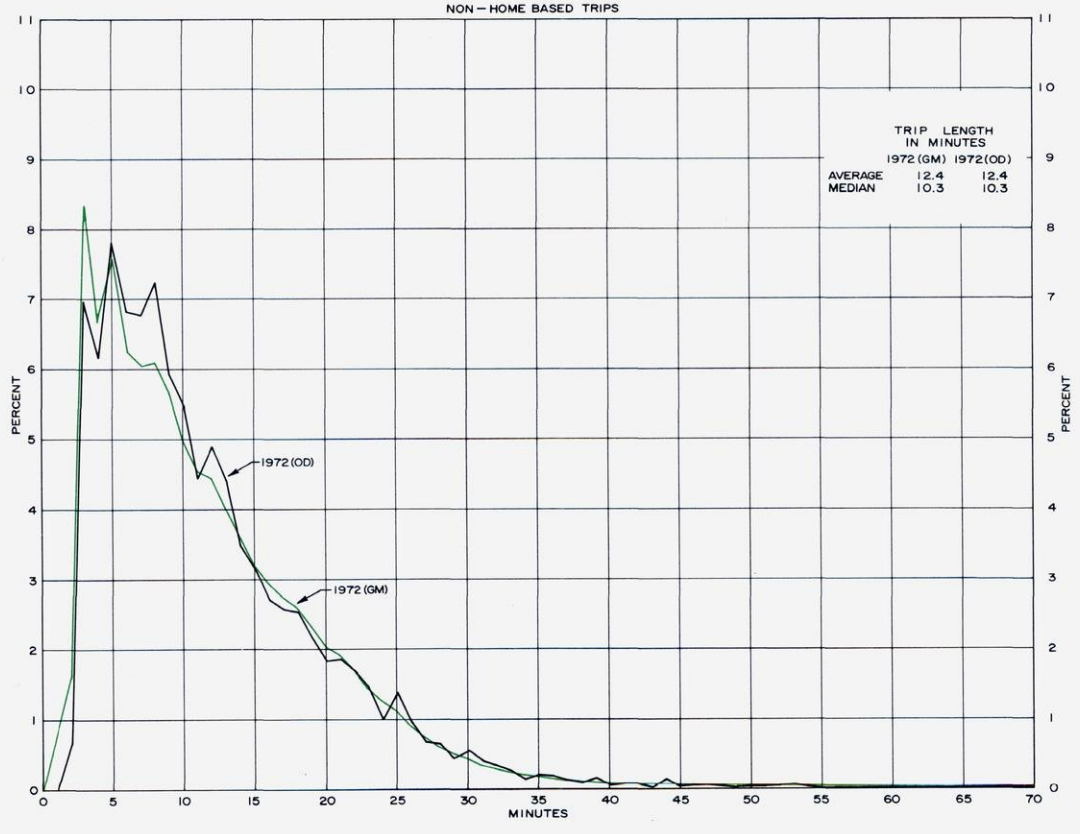


Figure 33 (continued)





Source: SEWRPC.

sections contain a description and evaluation of the initial study modal split procedure and a detailed description of the formulation, application, and testing of the modal split procedures used in the plan reevaluation effort.

Evaluation of Initial Study Procedure

In the initial regional land use-transportation study, modal split was determined prior to trip distribution, immediately following trip generation. As such, the modal split stage determined the percentage of productions and attractions per zone which would use each alternative mode of travel. Although there is a need for a division by mode in some of the small trip classes, of primary importance in the modal split stage is the division of internal person trips between the automobile and public mass transit. The smaller trip categories were divided in the initial study on the basis of observed modal split. For example, external trips were divided between automobile and truck on the basis of the split observed in the cordon line surveys. Home-based school trips were considered separately for automobile and bus in the trip generation stage and thus required no mode split analysis. Following the major division of internal person trips into automobile and transit, the second important component of the modal split stage is the determination of automobile occupancy. Essentially this step divides the automobile person trips into driver and passenger, thereby determining the vehicle trips produced and attracted in each zone.

The division of major purpose internal person trips between the automobile and mass transit was accomplished in the initial study through the application of a set of trip end models. The models were based on the relationships found to exist between the percent transit use in each traffic analysis zone and average household automobile availability and the relative availability and quality of highway and transit service in the zone as measured by an accessibility ratio.[7] Two separate sets of modal split models were calibrated, one set for the Milwaukee urbanized area and the other set for the Racine and Kenosha urbanized areas combined. This separate consideration of transit tripmaking within the Region was viewed as necessary in the initial study since large differences in transit utilization existed between the Milwaukee urbanized area and the Racine and Kenosha urbanized areas. In all, seven mode usage relationships were developed: four for the Milwaukee urbanized area and three for the Racine and Kenosha urbanized areas. The Milwaukee urbanized area relationships were developed for four trip purposes: home-based work, home-based shopping, home-based other, and nonhome-based. The Racine and Kenosha urbanized area equations were developed for three trip purposes: home-based work, home-based other and shopping, and nonhome-based. The need to consider mode usage within each area by trip purpose, and the choice of the model form and variables utilized, were established through a detailed analysis of mode choice behavior in these three urbanized areas.[8]

The modal split relationships were defined mathematically by developing three-dimensional response surfaces whose orthogonal axes were: automobile availability expressed in terms of the number of automobiles per household in a zone, the accessibility ratio of a zone for the trip purpose considered, and the percent transit utilization, as shown in Figure 34. Thus, the percent of total person trip productions that would use public mass transit could be determined for any traffic analysis zone within the Region, given the automobile availability and

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[7] *The accessibility ratio, a quantitative measure of the relative availability and quality of highway and transit service provided to a subarea of the Region, was defined in the initial regional land use-transportation planning effort as the ratio between accessibility indexes established for each mode. The accessibility index from any given subarea, i, within the Region to any other given subarea, j, was defined as the product of the trip attractions, either transit or automobile, in subarea j multiplied by the gravity model friction factor for the zonal interchange determined from the travel time for that interchange. These products are summed from subarea i to all other subareas in the Region to obtain the accessibility index for subarea i. The index may be defined mathematically as:*

$$V_{im} = \sum_{j=1}^{n} A_j F_{ijm}$$

where V_{im} = *the accessibility index for zone i with respect to all other zones for mode m.*

A_{jm} = *the trip attractions in zone j for mode m.*

F_{ijm} = *the gravity model travel time friction factor of mode m for travel from zone i to zone j on the particular transportation network being considered.*

n = *the number of traffic analysis zones in the Region.*

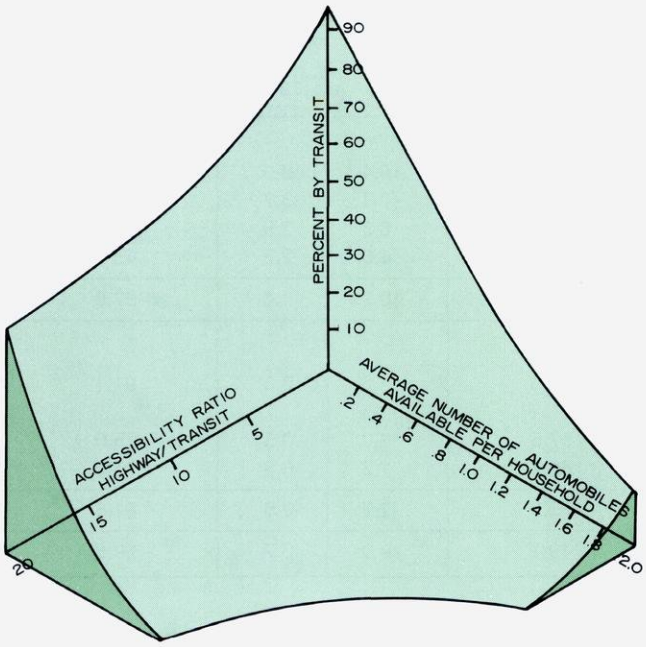
The gravity model friction factor is defined as the inverse of the door to door travel time raised to some power, b, which varies with the travel time and may be defined in mathematical terms as:

$$F_{ij} = \frac{1}{t^b}$$

[8] *For a detailed description of the analysis of mode choice behavior conducted as a part of the initial land use-transportation study, see SEWRPC Technical Record, Volume 2, No. 6, "A Modal Split Model for Southeastern Wisconsin."*

Figure 34

GRAPHIC EXAMPLE OF MODAL SPLIT SURFACES DEVELOPED AND USED IN INITIAL LAND USE-TRANSPORTATION STUDY



Source: SEWRPC.

accessibility ratio of the zone. The calculation of the percentage of trip productions utilizing transit was accomplished by applying a planar interpolation procedure which, in effect, served to connect known points on the three-dimensional response surface defined by the relationships with straight lines to simplify determination of intermediate values.

This modal split modeling procedure utilized in the initial land use-transportation study for the Milwaukee area was reviewed and modified slightly as a part of the Milwaukee County Mass Transit Technical Planning Study initiated in 1968 and completed in 1971. The modification made to the original modal split model as a part of this study included the consideration of home-based shopping, home-based other, and nonhome-based trips in a single combined model as opposed to three separate models in the initial study, and a redefinition of the accessibility ratio as utilized in the original model formulation.[9]

The ability of the modal split models[10] to predict actual 1972 transit usage within the Region was evaluated using 1972 origin and destination survey data. As shown in Table 44, transit usage within the Southeastern Wisconsin Region, as measured by the Commission's travel survey, has decreased significantly from 1963 to 1972, in terms of both transit trips and the percent of the total market which utilized transit for tripmaking. Over the past nine years a reduction in transit tripmaking of over 50 percent occurred in the Milwaukee urban area. During this same period in the Racine and Kenosha urban areas, transit usage was observed to decline by almost 82 percent. As documented in Chapter VIII of Volume One of this report, the substantial declines in transit ridership may be attributed in part to declines in the level of service and in part to increases over the nine-year period in the adult cash fare from $0.25 to $0.40 in the Kenosha and Racine urbanized areas and from $0.25 to $0.50 in the Milwaukee urbanized area. The declines in transit ridership in the Kenosha and Racine urbanized areas may also be partly attributable to a lack of continuity in service resulting from changes in the system ownership and operation. Such changes have resulted in three operators serving the Kenosha area and two extended periods during which no service was provided at all; and two operators serving the Racine area during the nine-year period.

The ability of the modal split models as formulated and calibrated in the initial transportation study and modified for the Milwaukee urbanized area to estimate this change in regional transit usage of the past nine years is illustrated in Table 45. As can be seen, the models tended to significantly overestimate transit usage for all purposes in the Kenosha and Racine areas while replicating with remarkable accuracy the transit usage in the Milwaukee area, particularly the usage for work trips. This level of accuracy was achieved despite the fact that the structure of the model does not consider the effect of changes in fare on transit usage. The poorer performance of the

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[9] *The revision in the accessibility ratio was a result of a redefinition in the calculation of the accessibility index. The index was redefined so that the only variable contributing to the difference between the accessibility indexes of automobile and transit was the mode's traveltime, expressed in terms of a friction factor. The revised mathematical definition of the model is as follows:*

$$V_{im} = \sum_{j=1}^{n} A_j F_{ijm}$$

where V_{im} = *the accessibility index for zone i for mode m with respect to all other zones.*

A_j = *the total person trip attractions in zone j.*

F_{ijm} = *the gravity model traveltime friction factor defined for total person travel from zone i to zone j based on the traveltime for mode m.*

n = *the number of traffic analysis zones in the Region.*

[10] *The reference is to those models developed and used in the initial land use-transportation study for the Racine and Kenosha urbanized areas and in the Milwaukee County Mass Transit Technical Planning Study for the Milwaukee urbanized area.*

Table 44

COMPARISON OF TRANSIT USAGE WITHIN THE SOUTHEASTERN WISCONSIN REGION BY URBANIZED AREA AND TRIP PURPOSE: 1963 AND 1972

Trip Purpose	Transit Trips			Percent Transit Usage		
	1963	1972	Percent Change 1963-1972	1963	1972	Percent Change 1963-1972
Milwaukee						
Home-Based Work	146,400	70,100	- 52.1	19.4	9.0	- 53.6
Home-Based Shop	28,200	18,000	- 36.2	7.4	3.7	- 50.0
Home-Based Other[a]	51,700	26,900	- 48.0	6.5	2.5	- 61.5
Nonhome-Based[a]	18,100	12,600	- 30.4	4.0	2.2	- 45.0
Subtotal	244,400	127,600	- 47.8	10.2	4.4	- 57.0
Racine-Kenosha						
Home-Based Work	6,400	600	- 90.6	5.6	0.5	- 91.1
Home-Based Shop and Other[a]	4,700	2,000	- 57.5	2.0	0.5	- 75.0
Nonhome-Based[a]	1,300	400	- 69.2	1.2	0.3	- 75.0
Subtotal	12,400	3,000	- 75.8	2.7	0.5	- 81.5
Regional Total[b]	256,800	130,600	- 49.1	9.0	3.7	- 59.8

[a] *Excludes trips for school purpose.*

[b] *Includes intra-urbanized area trips only.*

Source: SEWRPC.

Table 45

COMPARISON OF OBSERVED AND ESTIMATED TRANSIT TRIPS USING THE INITIAL AND MODIFIED STUDY PROCEDURES: 1972

Trip[a] Purpose	Observed	Estimated[b]	Percent Difference
Milwaukee			
Home-Based Work	70,100	72,100	2.9
Nonwork	57,500	48,800	- 15.1
Subtotal	127,600	121,000	- 5.2
Racine-Kenosha			
Home-Based Work	600	3,300	450.0
Home-Based Shop and Other	2,000	2,900	45.0
Nonhome-Based	400	900	125.0
Subtotal	3,000	7,100	136.7
Total	130,600	128,100	- 1.9

[a] *Does not include school bus.*

[b] *Using observed total person productions and independent 1972 land use data.*

Source: SEWRPC.

models in the Kenosha and Racine urbanized areas can be attributed in part to changes in attitudes regarding transit usage, particularly for the work trip purpose. These attitudes were derived from the perceived lack of stability in service providsions noted earlier.

The second important part of the modal split stage of the travel simulation modeling process involves the determination of automobile occupancy. This determination is necessary in order to convert the total person trips calculated as using the automobile mode—the difference betweeen total person trips and transit person trips—to vehicle trips and thereby to the actual traffic loading on the arterial street and highway system. In the initial planning effort, the calculated automobile occupancy was applied at the trip production and attraction level to the total automobile person trip productions and attractions, as calculated from the trip end modal split model, to determine vehicle trip productions and attractions by trip purpose. The occupancy factors were selected by applying the 1963 origin and destination survey data to a system of 91 subareas within the Region, referred to as traffic analysis districts. The average occupancy for the trip productions and attractions for these subareas, as calculated from the 1963 data, was assumed to remain constant over the forecast period.

The ability of the automobile occupancy forecasting procedure utilized in the initial study to accurately predict 1972 regional automobile driver trip productions

and attractions was tested using inventory data from the 1972 travel surveys. The inventory indicated that the observed 1963 occupancy factors have remained relatively stable on a regional level over the past decade. As a result, the actual loading on the arterial street and highway system in 1972, expressed in terms of vehicle trip productions and attractions within the Region was predicted with a high degree of accuracy.

Although the performance of the revised modal split and auto occupancy models of the original planning effort, as modified, indicated that the models could continue to be employed in a refined form through calibration with more recent travel survey data, certain advances in the state of the art of modal split modeling indicated that other types of modal split models should be considered for travel simulation in the plan reevaluation. Within the past several years, considerable effort has been directed towards refining the modal split element of the travel simulation process. As a result of this effort, alternatives to the more traditional aggregate predistribution modeling approach used in the initial land use-transportation study have been developed. These alternatives consist primarily of improved techniques for postdistribution modal split determination and disaggregate approaches to mode choice analysis.

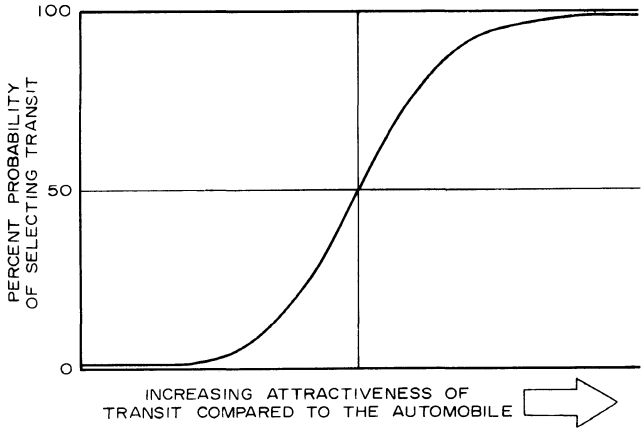
In predistribution, or trip end, modal split models, modal split is determined prior to trip distribution as a proportion of the total travel demand generated within each zone. The split trips are then distributed to areas of attraction within a region. Consequently, only characteristics of the trip and tripmaker can be considered explicitly in the model formulation while characteristics of transportation systems can only be implicitly considered in the form of a general accessibility measure. Therefore, it has been suggested that such models may not be able to adequately reflect the effects of significantly improved service, particularly when analyzed on a travel corridor level. Such models also inherently assume that mode choice is only related to conditions existing at one end of a trip—the production end—therefore, important factors, such as parking costs, cannot be readily considered in the modeling. Thus, the primary defect in predistribution models is the inability of such models to directly and explicitly consider transportation system characteristics and the variables associated with modal choice at the attraction as well as the production end of trips.

In postdistribution or trip interchange mode choice models, modal split is established after trip distribution, as zonal trip interchanges determined by trip distribution are split among the transportation modes. As a result, mode-specific trip distribution models cannot be applied and, consequently, such models are often developed as a single multimode distribution model. This is commonly accomplished by calibrating a trip distribution model for total person trips using traveltime data from the predominant mode of travel, the automobile. In most cases, the use of such a multimode distribution model has been justified because the automobile is overwhelmingly the predominant mode of travel. An important advantage of postdistribution models is the ability of such models to incorporate factors affecting mode choice at both ends of a trip and to incorporate characteristics of the trip, tripmaker, and transportation system. And, since the model is developed and applied to interzonal trip interchanges, it can reflect changes in mode choice resulting from transportation improvements in specific travel corridors. Moreover, this type of model can be readily expressed in disaggregate form and can be formulated in a policy-sensitive manner reflecting the effects on mode choice of changes in vehicle operating and parking costs. Thus, the postdistribution mode choice modeling approach is capable of explicitly considering trip, tripmaker, and transportation system characteristics including factors affecting mode choice at both ends of a trip; considering results of specific corridor improvements; and examining the implications of policy decisions concerning transportation pricing.

Another factor which must be considered in the selection of the approach to be used in modal split modeling is adaptability of the approach to disaggregate modeling, an option readily available in postdistribution mode choice simulation. The relative advantages and disadvantages of aggregate and disaggregate modeling approaches, as discussed under trip generation simulation, also apply to mode choice modeling. Disaggregate analysis of modal split has resulted in the development of postdistribution models of mode choice based on theories of consumer behavior and personal choice. Essentially, these models of mode choice establish for categories of travelers the probabilities of choice for the alternative modes available based on a sigmoid relationship between choice probability and system and user characteristics as shown in Figure 35. The models utilize the principles of consumer choice theory in that mode choice is defined as being a function of comparative system characteristics or utilities. And, since these models assume a sigmoid

Figure 35

GENERAL FORM OF MODE CHOICE MODELS BASED ON THEORIES OF CONSUMER AND HUMAN CHOICE



Source: SEWRPC.

relationship between the probability of mode choice and comparative system characteristics, they also derive their basis from modern theories of personal choice, which identify the relationship between a specific choice and an increasing choice stimulus to be essentially of a sigmoid nature. This sigmoid relationship is further compatible with consumer behavior theory as it indicates the diminishing marginal returns obtained with progressive improvement in one alternative over another.

A number of statistical techniques are available to develop these models of mode choice, including logit analysis,[11] probit analysis, and discriminant analysis. All of these techniques essentially define a nonlinear sigmoid relationship of continuously varying probability between 0 and 1 using data observations of a binary nature—having a value of either 0 or 1—which indicate a specific choice of mode.[12] These models of mode choice, which are based on the translation of decisionmaking theory to operational models, are referred to as disaggregate, probabilistic, behavioral models of mode choice. The models are termed disaggregate because they utilize areawide data for individual travelers; behavioral since they are based on causal hypotheses; and probabilistic because they establish the probability of individual choice.

The advantages of this mode choice modeling technique are a result of their disaggregate, behavioral, probabilistic nature. As the models are calibrated using individual traveler observations, the advantages associated with using a disaggregate model form are obtained. In addition, these models are thought to possess greater predictive validity as a result of their behavioral nature which proceeds from their theoretical basis. Moreover, as a result of their disaggregate formulation and theoretical foundation in consumer and human choice behavior, only very small surveys are required for calibration, making the model form ideal for the monitoring and updating functions necessary to any continuing land use-transportation planning effort. In addition, the model can be aggregated to any level by summing the probabilities of choice for each individual in a grouping. Also, the disaggregate, behavioral, probabilistic models provide a means to estimate the values placed on the characteristics of the transportation system, such as the value of time, constituting a useful input to plan evaluation.

Because of these advantages, it was decided to use the disaggregate postdistribution mode choice modeling approach in the plan reevaluation. The principal advantages of the postdistribution and disaggregate approach which influenced this decision was its substantially lower data requirements as compared to the 1963 models which require full scale surveys to provide aggregate measure of modal split and trip attraction for model monitoring and updating.

Revised Modal Split Procedure

It was originally intended to develop two different modal split models for use in the plan reevaluation process, one for the Milwaukee urbanized area, and one for the Racine and Kenosha urbanized areas. Such separate analysis and forecast of mode choice within the Region was initially

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[11] *Logit analysis as applied to modal split is based upon two basic assumptions. The first pertains to the general nature of modal split: a) the modal split of each mode is between 0 and 1 and the sum of all modal shares is 1; b) the modal splits are monotonic functions of all the independent variables; and c) if the increase (decrease) in the value of the transportation variable expressed as the disutility of travel leads to a decrease (increase) in a certain mode, then the modal share of all other modes will necessarily increase (decrease). The second basic assumption, which pertains to the actual relationship between modal split and the independent variables, is that the resulting change in the probability of using mode k is proportional to the probability of using mode k, the linear function of the probabilities of using all other modes and the change in the independent variable. These assumptions lead to a set of partial differential equations of the modal split of mode m (P_m) with respect to the ith attribute of mode j (X_{ij}) of:*

$$\frac{\partial P_m}{\partial X_{ij}} = \alpha_{im} P_m (1-P_m) \qquad \text{if } m = j$$

$$\frac{\partial P_m}{\partial X_{ij}} = -\alpha_{ij} P_m P_j \qquad \text{if } m \neq j$$

where α_{im} and α_{ij} are coefficients to be determined. The solution of these equations which define modal split for mode m is

$$P_m = \frac{e^{(\sum_i \alpha_{im} X_{im} + \beta_m)}}{\sum_j e^{(\sum_i \alpha_{ij} X_{ij} + \beta_j)}}$$

If only the binary choice of auto or transit is involved, this expression can be simplified to

$$P_t = \frac{e^{\sum_i \alpha_i X_{it}}}{e^{\sum_i \alpha_i X_{it}} + e^{(\sum_i \alpha_i X_{ia} + \beta)}}$$

where P_t = probability of using transit.
X_{it} = ith attribute of transit.
X_{ia} = ith attribute of auto.
α_i = calibrated attribute coefficients.
β = auto bias coefficient.

The probability of using auto would simply be $1-P_t$. The task of logit analysis is thus to determine the coefficients and which most closely replicate the observed modal split as determined by observed user and system attributes. After calibration the specific mode split for a zonal interchange is determined by inserting into the logit equation the appropriate attributes for that interchange. The total number of persons using a particular mode for the interchange would then be determined by multiplying the probability of that mode by the total person trips.

[12] *Peter R. Stopher, "Goodness-of-Fit Measures for Probabilistic Travel Demand Models," Transportation, April 1975.*

indicated by the fact that, while transit use and user characteristics in the Racine and Kenosha urbanized areas were quite similar, significant differences in mass transit use (see Table 44) and in user characteristics were found to exist between the Milwaukee and the Racine and Kenosha urbanized areas in both the 1963 and the 1972 travel surveys. More detailed analyses of both mass transit supply and demand in the Racine and Kenosha areas revealed that in 1972 these areas experienced very low levels of transit service and ridership levels which were, in fact, lower than those existing in both preceding and following years. Moreover, these analyses indicated that the overwhelming majority of the mass transit users in the Racine and Kenosha urban areas in 1972 were from households which did not own a car and which had a low household income. In view of these findings, the development of a separate modal split model for the Racine and Kenosha areas was considered undesirable, for the development of such a separate model would require the basic assumption to be made that the travel relationships used to develop the model could be expected to remain stable over time. Such an assumption about transit use in the Racine and Kenosha area would, regardless of the level of service provided, result in future transit use composed almost entirely of persons from households which own no automobiles and have very limited incomes. Stated another way, a mode choice model calibrated with data derived from entirely captive users in which little or no choice is observed cannot be used to simulate the future mode choice of noncaptive, automobile owning, high income users under improved transit service conditions. Consequently, it was decided that rather than developing separate mode choice models for the Racine and Kenosha areas, the mode choice model developed for the Milwaukee urban area would be applied in the Racine and Kenosha urban areas. This decision implicitly assumes that the characteristics of mass transit use in the Racine and Kenosha urban areas can be expected to change in the future to approximate those existing in the Milwaukee area.

Three sets of mode choice models were developed by trip purpose: home-based work, home-based shopping and other purposes combined, and nonhome-based. The method used to mathematically define the mode choice models was logit analysis, one of the three techniques available to calibrate disaggregate, behavioral, probabilistic models of mode choice. The general logit equation for the probability of mode choice in a binary situation—two modes, automobile or transit—is:

$$P = \frac{1}{1+e^{(a+b_1x_1+b_2x_2+\ldots+b_nx_n}}$$

where $a, b_1, b_2 \ldots b_n$ = calibrated coefficients
$x_1, x_2 \ldots x_n$ = socioeconomic characteristics of the tripmaker, or differences between modal attributes
P = probability of selecting the mode of transit

The procedure used to calibrate the logit equation is known as the maximum likelihood technique. The technique is based on establishing the coefficients—a, b_1, $b_2, \ldots b_n$—which have the greatest likelihood of replicating the data used for calibration.

A detailed analysis of mode choice behavior in the Milwaukee and combined Racine and Kenosha urbanized areas, as observed in the Commission's 1963 and 1972 travel surveys, was undertaken to identify the variables which could be expected to best describe and predict mode choice behavior. The analysis was based on the testing of alternative mode choice model formulations, that is, the calibration and testing of mode choice models including many different variables and variable combinations. The testing process for each model formulation considered whether each variable had a logical relationship, consistent with past experience, between its variation and the probability of mode choice, and whether the variable was statistically significant in explaining mode choice behavior, as well as the ability of the model formulation to replicate existing transit use on regional and subregional levels. The testing for the replication of existing transit use included analyses of the ability of mode choice models to estimate total observed transit trips, observed transit trip interchanges on a district level, and observed transit trip productions and attractions at both zonal and district levels. The analysis of mode choice behavior also included graphical investigations of the direct effect of certain variables on modal split. Other important considerations in the selection of variables and development of model structures were that the variables utilized have a good correlation with mode choice and that the variables utilized could be readily forecast.

Essentially, the variables considered for inclusion in model development were the tripmaker characteristics of household income and automobile availability and the transportation system characteristics of automobile and transit travel times, and automobile and transit out-of-pocket costs. The modal travel times considered included in-vehicle, out-of-vehicle, and total door-to-door travel times. Representing that part of door-to-door travel time which is spent outside of a vehicle, out-of-vehicle time includes any walking time for automobile travel, and all walking, waiting, and transferring time associated with travel on mass transit. In-vehicle time represents that part of door-to-door travel time spent inside the mass transit vehicle or the automobile. A distinction was made between the in-vehicle and out-of-vehicle portions of total travel time as studies have shown that travelers find time spent walking, waiting, or transferring—that is, outside of the vehicle—to be more discommoding than time spent in the in-vehicle portion of a trip. The other transportation system variable considered was intended to represent those costs of travel that individuals normally consider in their mode choice decision. People rarely are aware of and consider the total costs involved in travel by mode. Therefore, only the out-of-pocket, or direct, costs of travel normally perceived by travelers were used

in the modal split model. Out-of-pocket costs for transit were considered to consist only of fares, as observed in 1972. Out-of-pocket costs associated with automobile travel were considered to consist only of parking and operating costs. Total average parking cost was estimated on a zonal basis by trip purpose as derived from 1972 origin-destination survey data and special parking study data. Operating costs perceived by the traveler included the costs of gasoline, oil, and maintenance. Based upon observed conditions in 1972, an average perceived—as opposed to actual—operating cost of five cents per mile was derived.

The models formulated to simulate modal choice in the Milwaukee and, consequently, in the combined Racine and Kenosha urbanized areas, based on the results of the testing process previously described, are set forth in Table 46. The models calibrated for the trip purposes of home-based work and home-based shopping and other, express the probability of mode choice as a function of household automobile availability and in-vehicle, out-of-vehicle, and out-of-pocket cost differences between automobile and transit modes. The nonhome-based mode choice model expresses the probability of mode choice as a function of in-vehicle and out-of-vehicle time and out-of-pocket cost differences. No tripmaker characteristics were used because forecasts of future tripmaker characteristics can only be readily made for the home zone—the production zone for home-based trips—which is not associated with either end of a nonhome-based trip.

Table 46

MODE CHOICE MODELS FOR PLAN REEVALUATION

Home-Based Work

$$P = \frac{e^{(-0.0162TC - 0.0301TI - 0.082TO)}}{e^{(-0.0162TC - 0.0301TI - 0.082TO)} + e^{(-0.0162HC - 0.0301HI - 0.082\,HO + 1.943A - 1.574)}}$$

Home-Based Shopping and Other

$$P = \frac{e^{(-0.0572TC - 0.0597TI - 0.1067TO)}}{e^{(0.0572TC - 0.0597TI - 0.1067TO)} + e^{(-0.0572HC - 0.0597HI - 0.1067HO + 2.3143A - 2.1219)}}$$

Nonhome-Based

$$P = \frac{e^{(-0.0345TC - 0.0277TI - 0.124TO)}}{e^{(-0.0345TC - 0.0277TI - 0.124TO)} + e^{(-0.0345HC - 0.0277HI - 0.124HO + 1.0305)}}$$

Where:

P = probability of transit use.
A = number of automobile per household of trip made.
TC = transit cost.
TI = transit in-vehicle time.
TO = transit out-of-vehicle time.
HC = highway cost.
HI = highway in-vehicle time.
HO = highway out-of-vehicle time.

Source: SEWRPC.

The mode choice models as developed by trip purpose for the Milwaukee urbanized area and applied in the Racine and Kenosha urbanized areas can be applied to estimate modal split for any geographic subarea of the Region—given estimates of the independent variables in the equations—by summing the individual probability of mode choice for all travelers facing the mode choice decision.

The second major part of the mode split stage is the determination of automobile occupancy. An auto occupancy model is required to convert auto person trips into auto vehicle trips by determining the proportion of auto persons who are auto drivers or, synonomously, by determining the average auto occupancy (persons/auto). In the initial study, auto occupancy was determined for trip ends, that is, an average auto occupancy was derived to split the auto person productions from each zone. The new postdistribution mode split sequence of the plan reevaluation required the development of an auto occupancy for use on the interchange as opposed to the zonal level. A number of strategies including logit analysis, regression analysis, and cross classification analysis were investigated using a variety of explanatory variables in order to determine a significant relationship. None of the techniques, however, determined a relationship which gave results significantly different from the observed average auto occupancy. An intensive search of the state of the art also failed to reveal any newer techniques which had proven to be reliable in operational application. As the initial study procedure predicted 1972 automobile occupancy with reasonable accuracy, the same procedure was selected for the reevaluation effort. Initially an average automobile occupancy was determined for each planning analysis area from the 1972 travel survey, and each zone of the planning analysis was assigned the respective automobile occupancy. To determine the average automobile occupancy for a zonal interchange, the average of the two zonal values was calculated.

These average automobile occupancies, while varying for trip purpose, were relatively similar for all interchanges within a particular trip purpose. The mean regional automobile occupancy, as observed in the 1972 travel surveys, was 1.17 for home-based work, 1.47 for home-based shopping, 1.54 for home-based other and 1.38 for nonhome-based trips. The auto occupancy so derived for each zonal interchange was assumed to remain stable throughout the forecast period.

Testing of Revised Procedures

There are basically three considerations in determining the validity of the calibrated logit equations used to simulate mode choice. These include the ability of the model to replicate base year transit use, the statistical tests of the model, and the reasonableness of the model implications.

Unlike the case of an aggregate procedure such as regression analysis, the ability of a disaggregate model to match base year data on a regional level is a nontrivial test of the model's validity. The reason is that the model is

calibrated using individual household observations but is applied using average zonal characteristics. A logit formulation could thus provide a good fit with regard to the calibrating household observations but may not provide reliable mode split estimates at the zonal interchange level. To test this, the calibrated logit equations were applied at the zonal interchange level using observed 1972 costs, times, and auto availability. As can be seen in Table 47, the regional totals for transit trips were accurately simulated, especially for the important work trip purpose. Further examination was then conducted at the district interchange level using R^2, a goodness of fit measure which indicates the percentage of the variation in transit tripmaking which is explained by the model. At this interchange level an R^2 value was calculated of 0.69 for work trips, 0.64 for nonwork trips, and 0.77 for total trips, indicating a certain degree of compensation between trip purposes. An R^2 value was also calculated for trip ends at the zonal level. Such a test indicates how well the models simulated the number of transit trips produced or attracted by individual zones irrespective of their distribution. In this case an R^2 was calculated of 0.82 for total transit productions and 0.91 for total transit attractions. It was thus concluded that the models replicated base year transit use with very acceptable accuracy.

The second major consideration is the various statistical tests of the models. These tests primarily indicate how well the models match or explain the base year calibrating data, that is, the individual household trip records from the origin-destination survey. Because logit analysis defines a nonlinear relationship and uses discrete dependent variable observations to derive a continuous dependent variable, many of the standard measures such as the correlation coefficient are inappropriate. Nevertheless a number of general tests and tests based upon the calibration procedure—known as maximum likelihood—can be made. Because maximum likelihood estimators are normally distributed and asymptotically unbiased, the coefficients can be individually tested with Student's T-test. Since the hypothesis to be tested is that the coefficients are not significantly different from zero, the T-ratio would merely be the coefficient divided by its standard error. All coefficients used in the mode choice models were found to be significantly different from zero at the 99 percent level of confidence.

A second test involves the direct output of the maximum likelihood procedure. The null hypotheses that all modes have an equal probability of being chosen and that the probability of choosing a mode is equal to the proportion of observed users were tested by performing a likelihood ratio test. The test statistics are then compared to a variable with chi-squared distribution and the appropriate degrees of freedom. In all cases, a chi-squared value was calculated which far exceeded the table values with a 0.01 confidence interval.

Finally a measure called the correlation ratio was used to test the models. Unlike the correlation coefficient, no assumptions of the geometric relationship between dependent and independent variables are made in the calculation of the correlation ratio. An F-test can then be made to test the hypothesis that the observed probabilities are the same as the expected probabilities based upon the calibrated model. In all cases an F-statistic was calculated which exceeded the F value at the 99 percent level of confidence with the appropriate degrees of freedom.

The third and final consideration is the reasonableness of the model implications. Since they are based upon economic and behavioral theory, the calibrated logit equations have important implications for the evaluation stage particularly in terms of the value of travel time and the elasticity of modal demand. An examination of the calibrated equation for the work purpose, for example, shows an implied value of $1.11 per hour for in-vehicle time and $3.04 per hour for out-vehicle time. These values were deemed reasonable and consistent with past estimates of this kind. The elasticity of modal demand[13] is also easily calculated from the logit equations. Table 48 shows these values for the calibrated work purpose formulation, evaluated at the means of the independent variables.

The calibrated mode choice equations derived for the transportation reevaluation effort are able to accurately replicate base year aggregate data, are sound from a statistical standpoint, and result in reasonable and useful implications for the evaluation stage. It was thus concluded that those models could be used with confidence for the simulation of future mode choice.

Table 47

COMPARISON OF OBSERVED AND ESTIMATED REGIONAL TRANSIT TRIPS USING REVISED PROCEDURES: 1972

Trip Purpose	Observed Transit Trips	Estimated Transit Trips	Percent Difference[a]
Home-Based Work . . .	70,700	71,300	0.8
Home-Based Shopping and Other.	46,900	49,200	4.9
Nonhome-Based.	13,000	13,500	3.8
Total	130,600	134,000	2.6

[a] *Percent difference = (estimated-observed) x 100/observed.*

Source: SEWRPC.

[13] *The elasticity of modal demand may be defined as the percentage changes in the utilization of the various modes attendent to a 1 percent change in an attribute of one of the modes. Direct elasticity of demand is that change in the utilization of a given mode which results from a change in one of the attributes of that mode. Cross elasticity of demand is that change in the utilization of a given mode which results from a change in one of the attributes of a competing mode.*

Table 48

ELASTICITIES OF DEMAND FOR TRANSIT AND AUTOMOBILE FOR HOME-BASED WORK TRIPS

Variable[a]	Transit		Automobile	
Transit Cost	D[b]	-0.67	C[c]	0.04
Transit In-Vehicle Time	D	-0.69	C	0.04
Transit Out-Vehicle Time	D	-1.54	C	0.08
Auto Cost	C	0.54	D	-0.03
Auto In-Vehicle Time	C	0.42	D	-0.02
Auto Out-Vehicle Time	C	0.22	D	-0.01
Auto Availability	C	-2.60	D	0.01

[a] *Elasticities calculated at variable means.*

[b] *D indicates direct elasticity.*

[c] *C indicates cross elasticity.*

Source: SEWRPC.

TRAFFIC ASSIGNMENT

The fourth and final major step in the traffic forecasting and analysis process consists of assignment of the zonal trip interchanges derived in the trip distribution and modal split phases to specific routes of existing and proposed alternative transportation systems. The same basic traffic assignment process may be used to estimate future traffic loads on the various segments of the existing and proposed highway and transit systems or to simulate existing loads on the existing systems. To simulate the existing traffic loads, the actual interzonal traffic movements determined from the origin and destination survey are used as input to the assignment process; to simulate future traffic loads, the forecast interzonal traffic movements prepared in the distribution analyses are used as inputs. The output of the process is, for the arterial street and highway system, an estimate of the number of vehicles per unit time expected to use each segment of the system by direction complete with turning movements at intersections. The output for the transit system is an estimate of the number of passengers per unit time expected to use each segment of the transit system by direction complete with transfers at route intersections.

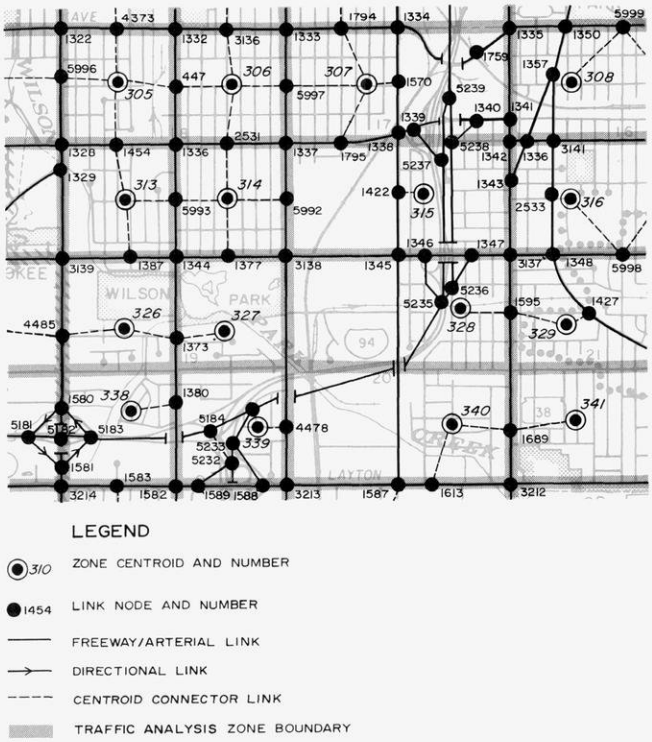
The assignment of future traffic demand to the existing and proposed transportation systems is accomplished separately for the highway and transit systems and in several steps. The first step in the assignment process involves the preparation of a matrix or table of both vehicle trip interchanges and transit passenger trip interchanges between all of the traffic analysis zones within the planning area and the preparation of a complete and definitive description of the spatial location, capacity, and operating characteristics of the specific transportation system to be tested. For assignment of the existing traffic demand to the highway and transit systems, the trip interchange tables prepared from the origin and destination surveys were used directly. For assignment of future traffic demand to the highway system, 11 individual trip interchange tables which were direct outputs of the application of the modal split and trip distribution models were combined to provide total zonal trip interchange volumes: internal vehicle trips by automobile for each of the five trip purposes used in the modal split phase, internal automobile and truck trips made by nonresidents of the Region, automobile trips made by group quartered persons, external vehicle trips by automobile, and internal and external truck and taxi trips. For assignment of trips to the transit system, five individual trip interchange tables had to be combined consisting of the transit person trip interchange tables for each of the four trip purposes derived from the modal split phase and school purpose transit person trips.

The definitive description of the highway and transit systems to be tested involves the preparation of highway and transit network maps and the collection, coding, and transfer to computer tape of data describing the location, capacity, and operating speeds of each link in the two networks so that the operation of the overall transportation system can be simulated. Preparation of the arterial street and highway network requires the assignment of node numbers to all intersections and to all access points in the system, with each segment between two nodes being defined as an arterial link (see Figure 36). Each arterial link in the network is thus defined by the node number pair describing its termini, and by attendant data pertinent to systems analysis, such as link capacity and operating speed. The preparation of the transit system network similarly requires assignment of node numbers to all transfer and terminal points, each section between two nodes being defined as a transit route link. Transit lines are then defined by the series of node number representing the transfer and terminal points provided with service along a given transit route and the operating headways associated with that route. The resulting transit network is more complex than the arterial network having "artificial" links representing combination walk and wait times and combination auto travel and wait times for simulation of both walk-in and auto access to the transit service (see Figure 37). It should be noted that, at the time of the conduct of the initial transportation study, the concept of the transit line description in network simulation had not yet been developed to an operational stage. Consequently, the transit network under the initial planning effort was represented by the use of "friction" links simulating the walk, wait, and transfer times representative of out-of-vehicle travel time.

For both the highway and transit networks, it is necessary to "connect" the network to the land uses served. This is done by the use of load nodes located at the centroids of the various traffic analysis zones and representing the points at which all trips originating from, and destined to, the zones enter or leave the transportation network. These load nodes are connected to the network access points by means of access or loading links. In the

Figure 36

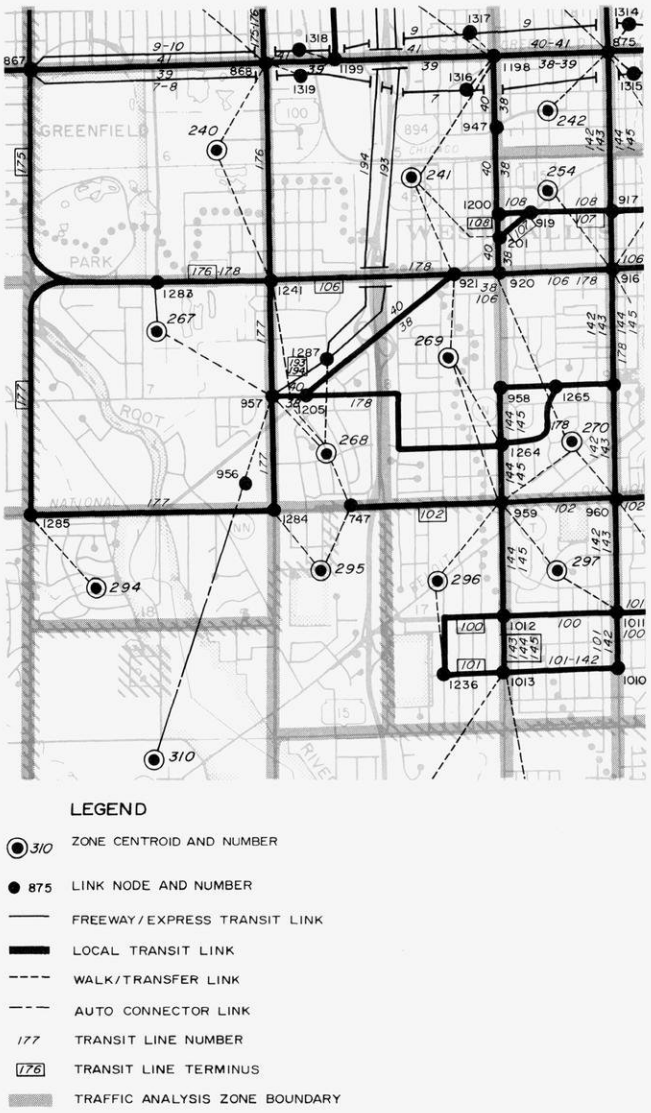
EXAMPLE OF HIGHWAY NETWORK MAP



Source: SEWRPC.

Figure 37

EXAMPLE OF TRANSIT NETWORK MAP



Source: SEWRPC.

arterial street and highway network, the loading links represent collector streets, and in the transit network the links represent the means by which passengers go to or from the actual points of trip origin and destination from the transit stops. Once network maps have been prepared for the existing systems, highway and transit facility plan proposals can then be readily tested by the insertion of new links into the network or modification of the data describing the existing links in the network representing, respectively, new facility construction or the improvement of existing facilities and services.

The second step in the assignment process involves the computation from the descriptions of the transportation networks of two sets of minimum time paths from all traffic analysis zones within the Region to all other such zones, one for automobile travel and one for transit travel. This is accomplished using a method by which the minimum time paths are computed by a systematic comparison of travel time for all links in the system in successively outward steps from the starting node until the shortest time path to all nodes has been computed. As each node in the network is considered, the method accumulates travel times back to the starting node and records the immediately preceding node in the direction of travel to return to the centroid involved. Thus, the shortest travel time and route through the system between the starting node and all other nodes is systematically recorded and mapped. The resulting minimum time path routes are referred to as "trees" and represent the shortest door-to-door travel times between any two zones within the Region, including walk times at either end of the trip, wait and transfer times for transit trips, and park and unpark times for automobile trips.

In the next step, the zone-to-zone trip volumes—that is, the matrix of average weekday trip interchange volumes created by the process of trip generation, trip distribution, and modal split—are assigned to all links, that is, to all individual route segments comprising the minimum time path for the various zonal trip interchanges. Thus, traffic volumes are accumulated on the links for all zonal interchanges resulting in a complete assignment of

traffic demand to the network. Since all of the trips are so assigned to the shortest time paths through the networks, some of the volumes on the individual links of the network may exceed the actual capacity of the transportation facilities being simulated, thus affecting the travel time used to initially determine the minimum time paths. The output of the assignment program at this stage is termed an "unrestrained" assignment. The ratios of the assigned volumes to the capacity for each link in the network are then calculated. The travel times are then reduced for those links having a volume-to-capacity ratio of less than one and increased for those links having a ratio greater than one. Minimum time paths are then recomputed, and the trip interchanges are reassigned on the basis of the revised minimum time path through the network. This iterative process is continued until the assigned volumes are observed to stabilize. Thus, the operating speed at which each segment of the transportation system can be traveled is modified to simulate the effect of increasing congestion in the system; and the resulting capacity restraint serves to modify the unrestrained assignment volumes and provide a more realistic distribution of traffic over the system by simulating the manner in which vehicle operators will seek less congested arterial routes in tripmaking. For the transit system capacity restrained assignments are not required because the physical capacities of the transit facilities within the Region are not approached. Consequently, additional transit capacity can be readily provided by the provision of additional transit vehicles and the attendant reduction of headways to satisfy any observed capacity deficiencies.

It should be noted that the procedure used results in the calculation of traffic loadings expressed in terms of 24-hour average weekday traffic volumes, which in this form are comparable to the network capacities derived from the transportation system inventories conducted. These 24-hour average weekday traffic volumes can be converted to peak hourly volumes by the application of the appropriate factors shown in Tables 49 and 50.

Calibration

In order to calibrate the assignment procedure, the trip interchanges derived from the 1972 origin and destination survey were assigned to the existing highway and transit networks and compared with corresponding actual volumes determined by ground counts. If the comparisons so indicated, modifications were made and the information coded into the networks describing the transportation system so that the simulated traffic volumes would satisfactorily correspond with the observed volumes. Such modifications include for the highway network: adjustments in link operating speeds, addition or deletion of second loading links, and modification in the location of load nodes; and for the transit network, modification of the walk, wait, and transfer times.

Traffic Assignment Comparison

The link by link traffic volumes derived from the traffic assignment model are the final product of the four step travel simulation process. While each individual model in the process should perform accurately, the results of the models in concert are of particular importance to the transportation planning process. The accuracy of the modeling process can be most rigorously tested by comparing simulated traffic volumes to actual traffic ground counts. The inventoried land use and socio-economic data are input to the travel simulation process, in this case for both the model applied in the initial transportation planning study and the model as developed during the plan reevaluation process, to generate the base year travel demand which is then assigned to the existing transportation system to produce simulated traffic volumes for comparison to ground counts. It is important to note that no data such as origin-destination survey results were used in the model verification, and that each submodel was applied as initially calibrated.

The traffic ground counts, against which the simulated traffic volumes are compared, were collected for each link in the network as a part of the 1972 travel inventory. Ideally, all traffic count information should be collected using a uniform methodology, and over a common time span. In practice, however, it was not feasible to count the volume on every segment of the regional arterial street and highway system within a single year. Consequently, the traffic ground counts were taken over a triennial period centered on the base year. As such, the counts reflect yearly and seasonal variations in traffic flow as well as the random errors that occur in the counting process itself.

In evaluating the performance of the models, it is important to recognize that the ability of the traffic assignment process to simulate actual traffic flows is limited by the assumption that all of the traffic generated within a traffic analysis zone enters the system at a single point—the load node representing the particular zone. This assumption results in an underassignment of travel to the arterial street and highway network since intrazonal trips are not represented in the assignment. This affect is minimized primarily by decreasing the size of the individual traffic analysis zones, thus reducing the amount of unassigned intrazonal travel. The traffic assignment process will tend to particularly understate travel on those segments of the system located in areas generating a high degree of ingress to and egress from abutting land uses. Examples of such locations are strip commercial areas abutting an arterial street or highway and business districts where auto trip makers may have to circulate within the traffic analysis zone prior to parking the vehicle within the traffic analysis zone. The effects of these shortcomings in the assignment process can only be addressed by manually adjusting the traffic assignments on the basis of observed differences between actual and assigned traffic volumes in areas similarly developed.

In any comparison of actual and simulated traffic flows it must be recognized that, with the exception of counts from the 15 continuously operated traffic count stations within the Region, the traffic counts from the other 4,850 stations represent sample measurements of the actual traffic flow. It is estimated that the traffic counting program used estimates the annual average weekday

Table 49

FACTORS TO CONVERT AVERAGE WEEKDAY HIGHWAY TRAVEL TO PEAK PERIOD TRAVEL: 1972

Arterial Type	Proportion of Total Vehicle Travel on the Arterial Street and Highway System in the Peak Hour			
	Milwaukee Central Business District		Remainder of Region	
	Peak Hour Both Directions	Peak Hour Peak Direction	Peak Hour Both Directions	Peak Hour Peak Direction
Freeways	0.080	0.040	0.080	0.048
Standard Surface Arterials	0.100	0.050	0.100	0.060

Source: SEWRPC.

Table 50

FACTORS TO CONVERT AVERAGE WEEKDAY TRANSIT TRAVEL TO PEAK PERIOD TRAVEL: 1972

Trip Purpose	Proportion of Transit Person Travel by Period of Day			
	6 A.M. to 9 A.M. Morning	9 A.M. to 3 P.M. Midday	3 P.M. to 6 P.M. Evening	6 P.M. to 6 A.M. Night
Home Based Work	0.370	0.160	0.390	0.080
Home Based Shopping	0.000	0.590	0.340	0.070
Home Based Other	0.080	0.480	0.270	0.170
Nonhome Based	0.080	0.450	0.410	0.060
School	0.420	0.190	0.390	0.000

Source: SEWRPC.

traffic volumes to within plus or minus 10 percent in 68 percent of all cases.

The comparison of the simulated travel demand and observed traffic ground counts was conducted for both batteries of travel simulation models—the battery used in the initial transportation study and the battery developed for the plan reevaluation. The comparison demonstrates the validity of the traffic simulation process by use of three different tests. The first test is intended to demonstrate that a direct relationship exists between the simulated and observed data. The second test is intended to measure the accuracy of the simulated data on a link by link basis. The third test is intended to measure the accuracy of the simulated data on a system-wide basis. It should be noted at the outset that the test of the simulation procedures was done without adjustment of the model results for unassigned intrazonal tripmaking or for local traffic circulation.

The test used to determine the relationship between simulated and observed data involved the calculation of a coefficient of correlation using the simulated traffic volumes and the traffic ground counts as paired data points on a link by link basis. The coefficients were calculated at 0.98 and 0.90 for the initial study models and the plan reevaluation models, respectively. A perfect linear relationship would be indicated by a coefficient of 1.00. Thus the calculated coefficients indicated in both instances that the models were producing results that were directly related to the observed ground counts.

The test of the accuracy of the models on a link by link basis was conducted by comparing the simulated directional volumes with traffic ground counts for each link in the arterial street and highway network. The results of the comparison of simulated and ground counted traffic volumes are shown in Tables 51 and 52 for the initial study and the plan reevaluation models, respectively. For purposes of the comparison, the networks links were grouped on the basis of traffic ground count by ranges of volume. This grouping is desirable because relatively larger errors can be tolerated for links with a low volume without affecting the validity of decisions based on the traffic forecasts, while the relative error on links with high volumes must be smaller.

As can be seen in Table 51, the comparison indicates that for the initial study models the average traffic assignments for all links up to and including the ground count range of 15,001 to 20,000 vehicles per day lay within the range of counts in which the link was grouped.

Table 51

COMPARISON OF INITIAL SIMULATION TRAFFIC ASSIGNMENT TO TRAFFIC GOUND COUNT BY VOLUME GROUP

Initial Study Travel Simulation Procedure						
Volume Group (vehicles)	Number of Links	Mean Volume in Range		Difference (vehicles)	Root Mean Square Error[a]	
		Traffic Ground Count	Traffic Assignment		(vehicles)	Percent of Ground Count[b]
1 - 2,500	3,368	1,135	1,533	398	1,491	131
2,501 - 5,000	1,933	3,726	3,767	41	2,497	65
5,001 - 8,000	1,455	6,366	5,391	- 975	3,309	52
8,001 - 11,500	653	9,357	7,995	- 1,362	4,491	48
11,501 - 15,000	229	13,296	11,902	- 1,394	5,314	40
15,001 - 20,000	151	16,961	18,159	1,198	6,606	39
20,001 - 26,000	51	23,197	29,187	5,990	9,308	40
26,001 - 32,000	57	28,544	38,123	9,579	11,084	39
32,001 - 50,000	81	41,421	51,578	10,157	12,917	31
50,001+	33	53,974	59,627	5,653	8,411	16

[a] *Root Mean Square Error* = $\Sigma \frac{(\text{Traffic Ground Count} - \text{Traffic Assignment})^2}{\text{Number of Observations}}$

[b] *Percent of Ground Count = 100 x (Root Mean Square Error ÷ Mean Traffic Ground Count)*

Source: SEWRPC.

Table 52

COMPARISON OF PLAN REEVALUATION TRAVEL SIMULATION TRAFFIC ASSIGNMENT TO TRAFFIC GROUND COUNT BY VOLUME GROUP

Reevaluation Study Travel Simulation Procedure						
Volume Group (vehicles)	Number of Links	Mean Volume in Range		Difference (vehicles)	Root Mean Square Error[a]	
		Traffic Ground Count	Traffic Assignment		(vehicles)	Percent of Ground Count[b]
1 - 2,500	4,127	1,144	1,311	167	1,068	93
2,501 - 5,000	2,417	3,690	3,116	- 574	1,929	52
5,001 - 8,000	1,717	6,363	4,622	- 1,741	2,949	46
8,001 - 11,500	783	9,355	6,778	- 2,577	3,927	42
11,501 - 15,000	257	13,259	10,516	- 2,743	5,102	38
15,001 - 20,000	164	16,913	15,761	- 1,152	5,588	33
20,001 - 26,000	51	23,197	24,260	1,063	5,844	25
26,001 - 32,000	59	28,544	31,868	3,324	4,686	16
32,001 - 50,000	81	41,458	43,430	1,972	5,702	14
50,001	33	53,974	51,483	- 2,491	5,240	10

[a] *Root Mean Square Error* = $\Sigma \frac{(\text{Traffic Ground Count} - \text{Traffic Assignment})^2}{\text{Number of Observations}}$

[b] *Percent of Ground Count = 100 x (Root Mean Square Error ÷ Mean Traffic Ground Count)*

Source: SEWRPC.

Furthermore, the percent average error, as measured by root mean square error,[14] is decreasing as the link volume increases. Table 51 indicates, for example, that for those urban freeway segments with observed traffic ground counts ranging from 64,000 to 100,000 vehicles per average weekday the travel simulation models yielded forecasts which ranged from 57,000 to 108,000 vehicles per average weekday, or within 11 percent of the ground count values. As would be expected, the models tend to undersimulate traffic volumes for links in the range of 5,000 to 15,000 vehicles per day because the assignments have not been adjusted for intrazonal travel or for local circulation.

The comparison of traffic volumes derived from the travel simulation models developed for the plan reevaluation with traffic ground counts is shown in Table 52. The comparison indicates results similar to those observed in comparing the initial study models to the traffic ground counts. It is important to note, however, that the error as expressed in terms of the root mean square error and the percent of the average traffic ground count which that error represents is lower for all groupings of links. Thus, it can be concluded that the models developed for the plan reevaluation are performing as good as, if not better than, the initial study models.

Table 53 summarizes vehicle miles of travel per average weekday as estimated from traffic ground counts and as simulated by the traffic simulation models. In the case of both traffic simulation modeling procedures, the models predict total regional travel within 10 percent of the estimated actual travel. On a subregional basis, the models used in the initial study tend, in all counties, to overstate the vehicle miles of travel, the overstatement varying from about 3 percent in Milwaukee County to about 32 percent in Walworth County. Table 53 further indicates that the models developed for the plan reevaluation, with the exception of Racine County, tend to understate the vehicle miles of travel, the understatement ranging from about 1 percent in Kenosha County to about 14 percent in Washington County. The models overstate travel in Racine County by about 2 percent. As previously noted, no adjustments have been made to the individual link traffic assignments to account for intrazonal travel and traffic circulation.

From the foregoing it may be concluded that both of the traffic simulation models have the ability to forecast traffic volumes with adequate accuracy for transportation planning purposes, and with proper adjustment for the effects of intrazonal travel and local traffic circulation, for transportation facility design purposes.

[14] *Root mean square error is the mean of the absolute differences between traffic ground count and simulated volumes for all links within a range.*

TRANSPORTATION SYSTEM DESIGN

Introduction

It is in the system design phase of the transportation planning process that alternative future transportation networks are synthesized to satisfy the regional transportation system development objectives and standards formulated for the study, while meeting the overriding criteria of system integration and continuity. The design of future transportation networks is a highly complex process, requiring not only the assimilation of large amounts of information and the development and application of traffic simulation models but also the exercise of experienced engineering judgment. To a considerable extent, the process is one of finding successive approximations to the best design solution, with specific solutions being proposed to specific system problems in each iteration, then tested through application of the traffic simulation models. The more comprehensive and detailed the knowledge and understanding of the regional traffic patterns to be served, the more readily can sound design solutions be found to satisfy the development objectives.

Proper utilization of the traffic assignments, derived from application of the traffic simulation models requires careful analysis of the resulting network volumes to find possible design solutions to indicated problems. Such utilization also requires the conversion of these volumes to a form usable in plan evaluation to determine the degree to which the plan objectives and standards are met by the design solutions. The analyses made for system design and evaluation purposes involve application of certain well developed engineering techniques, the most important of which warrant brief description here.

Design of Street and Highway System Alternatives

The first step in the design of alternative arterial street and highway system plans is to determine the deficiencies of the existing system under alternative future land use and travel demand conditions. The identification of these deficiencies constitutes one of the most important inputs to the development of future alternative transportation networks.

It should be noted that the physical inventory of the transportation system conducted for the plan reevaluation necessarily dealt only with the arterial street and highway and transit systems as these systems existed within the Region in the year 1972. Because the regional land use-transportation planning program was operating within the context of ongoing state and local planning and plan implementation programs, it was recognized that certain additional transportation facilities not actually in existence in 1972 had to be recognized as "committed facilities" which would be constructed before the design year regardless of the results of the plan reevaluation process. The committed highway facilities were to consist solely of highway improvement projects actually under construction, the cancellation of which was deemed to be not only extremely costly and uneconomical but administratively and politically impractical.

Table 53

COMPARISON OF AVERAGE WEEKDAY VEHICLE MILES OF TRAVEL ESTIMATED AND SIMULATED BY TRAVEL SIMULATION MODELS

County	Estimated from Traffic Counts	Simulated Initial Transportation Study Models		Simulated Plan Reevaluation Models	
	Vehicle Miles of Travel	Vehicle Miles of Travel	Difference from Estimated (percent)	Vehicle Miles of Travel	Difference from Estimated (percent)
Kenosha	1,428,000	1,618,000	13.3	1,415,000	- 0.9
Milwaukee	10,695,000	11,024,000	4.1	9,306,000	- 13.0
Ozaukee	850,000	932,000	9.6	798,000	- 6.1
Racine	1,813,000	2,164,000	19.4	1,852,000	2.2
Walworth	873,000	1,156,000	32.4	796,000	- 8.8
Washington	1,151,000	1,323,000	14.9	990,000	- 14.0
Waukesha	3,314,000	3,780,000	14.1	3,167,000	- 4.4
Region	20,124,000	21,997,000	9.3	18,324,000	- 8.9

Source: SEWRPC.

Accordingly, an inventory of all highway construction projects currently underway within the Region was conducted by contacting all line agencies within the Region having responsibilities for highway improvements; and data concerning the status, design features, and construction schedule of all such projects were obtained. The inventory results were reviewed by both the Technical Coordinating and Advisory Committee and the Citizens Advisory Committee and the identification of committed facilities of the projects agreed upon. These committed facilities were then added to the existing highway network and future trips assigned to the resulting "existing plus committed" network used to identify the resulting system deficiencies under future conditions. The committed facilities consisted of the arterial street and highway system completed and open to traffic as of July 1, 1975, with the addition of only the following four freeways:

1. Rock Freeway (STH 15) from the City of Elkhorn to the Rock County Line.

2. IH 43 through Ozaukee County.

3. IH 794 from its present eastern terminus over the Harbor Bridge to a connection with the surface arterial system at Carferry Drive.

4. The Airport Spur Freeway.

In any transportation system analysis, the possibility always exists that the existing plus committed transportation facilities may prove adequate to meet the future travel demand, in which case no further transportation system improvements are required by the design year. This was found to be the situation within the Region for the majority of standard arterial streets and highways, and local transit routes. This situation, however, was not found to exist for a number of important standard arterial streets and highways which exhibited high congestion levels under future loading conditions. Although the identification of these major network links having excessively high volume-to-capacity ratios under probable future load conditions provided a good indication of network deficiencies, reliance could not be placed solely on such identification for system design. This is because future traffic assignments alone will not identify the characteristics of the trips causing the overloads and, thereby, will not effectively suggest possible design solutions to most effectively eliminate these overloads.

To provide the additional information required, special screen line, trip origin-destination, and selected link analyses were made using the traffic simulation models. In the screen line analyses, traffic distribution within major corridors of transportation movement was examined along sections across the corridors which cut all of the major transportation facilities serving the corridors. The sections, or screen lines, were delineated on the basis of an analysis of the results of the initial traffic assignments. The distribution and characteristics of the traffic crossing the screen line on the major facilities within the corridor were then determined and compared with the distribution of the physical capacity of the various facilities serving each such corridor, the total transportation system capacity in the corridor evaluated against the loads, and the possible diversion of traffic between overloaded and underloaded facilities within the corridor analyzed.

Tripmakers within an urban region tend to regard transportation facilities as integral parts of a single system.

Since highway service is virtually ubiquitous within the Region, if direct routes do not exist between two subareas of the Region, trips desired to be made between such areas will still be made but by less direct routes. Also, as the more desirable transportation facilities between two subareas of the Region become overloaded, additional trips between these areas will still be made, but on less direct routes utilizing facilities that have available capacity. Traffic loads, therefore, are continuously redistributed as existing facilities become overloaded and new facilities are constructed until a state of equilibrium is approximated in the system. If the volume of future trips between certain concentrations of trip origins and destinations within the Region is sufficiently large, the construction of a direct transportation facility linking such concentrations may be justified to assist in achieving the desired equilibrium in the system. The need for such direct facilities becomes particularly acute if the circuitous movement of heavy traffic volumes between portions of the Region results in the overloading of facilities required to serve other travel demands. To facilitate identification of the demand for such direct movement between subareas of the Region, the Region was divided into planning analysis areas consisting of combinations of adjacent traffic analysis zones. In this way, the shorter local trips could be treated as intraarea travel desire lines and considerably fewer traffic movements could be studied to ascertain major future travel desires. Similar results can also be achieved by assigning selected trip length categories to the existing plus committed transportation network, a technique which was also used in the plan reevaluation.

Finally, a better understanding of the characteristics of trips utilizing overloaded links in the network was gained through selected link analyses. This involved the selection of a small number of heavily overloaded links in the existing plus committed network and identification of the origins and destinations of all trips passing through these links. Thus, it was possible to identify the specific interzonal trips which utilize heavily overloaded facilities and analyze the feasibility of rerouting these trips over other portions of the system. This technique provided a particularly powerful tool to identify circuitous travel paths and facilities requiring additional capacity to relieve overloads on more direct routings.

On the basis of the analyses of the assignment of future trips to the existing plus committed transportation facilities, utilizing the techniques described, the need for new facilities was identified and a transportation system plan synthesized for each alternative regional land use plan. The assignment of future trips was then made to the existing plus committed plus proposed system of highway and transit facilities and the analysis procedure repeated until a practical and workable transportation system design had been evolved. Thus, proposals advanced to overcome indicated deficiencies in the transportation system were tested and evaluated. The results of these tests and evaluations are discussed for each alternative land use-transportation plan combination in the following chapters of this report dealing with the description of the alternative plans.

It is important to note that, in the regional arterial street and highway plan synthesis, preliminary design solutions to be tested and evaluated were drawn from three sources. The first source consisted of highway improvement proposals advanced through the detailed reconsideration of the adopted regional transportation plan by the State Highway Commission of Wisconsin, the seven county highway agencies concerned, the local municipal planning and public works agencies within the Region, and local elected officials as a part of the jurisdictional highway planning programs undertaken pursuant to recommendations contained in the adopted regional transportation plan. These improvement proposals thus originated with the experienced professional engineers and planners in the employ of the state, county, and local units of government who had a very intimate knowledge of, and long-standing experience with, highway traffic and transportation systems within the Region and the local elected officials who had a very intimate knowledge of public attitudes within their political jurisdictions and who served together on the seven jurisdictional highway planning committees created by the Commission following adoption of the initial regional transportation plan.

The second source for design solutions was developed directly from the traffic assignments and subsequent network analyses in which solutions to correct system deficiencies became apparent through the knowledge acquired of the existing and probable future traffic patterns within the Region and the manner in which these were being distributed on the existing plus committed network.

The third source for design solutions was developed indirectly from the land use planning process in which suggestions for service based upon land use development objectives were advanced.

All proposed design solutions developed from these three sources were carefully reviewed by both the Technical and Citizen Advisory Committees. As approved or modified by the Committee process, the proposed improvements were then added to the network and the resulting system tested. Where design solutions drawn from the first source proved inadequate to properly alleviate system deficiencies or where no solution had been so proposed, resort was made to the second source of design solutions. The third source for design solutions was primarily advanced for the newly developing areas within the Region.

Design of Transit System Alternatives

Because existing transit facility capacity within the Region is not a meaningful factor in system utilization, no parallel analysis to the highway network deficiency analysis could be practically developed by which transit plan proposals could be synthesized. Moreover, transit service, unlike highway service, is not generally available throughout the entire Region and, therefore, certain trips cannot be made solely by transit. Consequently, the potential demand for transit service in areas of the Region not presently served could not be readily assessed. This made the development of a transit system plan in

some respects more difficult than the development of a highway system plan.

The regional transit system existing in 1972 consisted primarily of buses operating over the existing street and highway systems, and no major capital investments in fixed rights-of-way or line structures had been committed. Therefore, the committed transit facilities consisted of the following proposed service improvements for the Milwaukee area:

1. A restoration of the 1972 service level.

2. Addition of three new freeway flyer lines, as described in Chapter V of this volume.

3. The addition of a new primary transit route from the Bayview area of the City of Milwaukee, the City of Cudahy, and the City of South Milwaukee into the central business district of Milwaukee across the Harbor Bridge.

For the Racine and Kenosha areas, transit service was assumed to be provided as proposed in the transit development programs prepared for those two areas consisting of improved transit routing and half-hour headways. These service improvement recommendations for use as committed transit services were developed in cooperation with the public and private line agencies within the Region having responsibility for transit service. These recommendations were reviewed and agreed upon by both the Technical Coordinating and Advisory Committee and Citizens Advisory Committee. These committed transit services were then added to the existing transit network and future trips assigned to the resulting existing plus committed network used to identify the resulting system deficiencies under future conditions.

Three sources of design solutions were used in the synthesis of future transit systems. The first consisted of a set of future transit service proposals that had been advanced by the transit agencies operating within the Region and by local units of government in the detailed reconsideration of the adopted regional transportation plan undertaken in the preparation of transit development programs for the Milwaukee, Racine, Kenosha, and Waukesha areas. These improvements consisted primarily of changes in route configurations and headways, the extension of existing service into developing areas of the Region and the improvement of service through the institution of modified rapid transit service in the form of buses operating over the developing freeway network, and of express bus service operating over surface arterials.

The second source of such design proposals consisted of a set of future transit service proposals postulated on the basis of an analysis of the socioeconomic and existing travel characteristics in the Region. These consisted primarily of improvement of existing service and provision of new service in major corridors of transportation movement that the analyses indicated possessed a high transit traffic potential, especially those corridors which possessed inadequate highway capacity but served areas of the Region with high- and medium-density residential development and low automobile availability.

A third source of such design proposals grew directly out of the network analyses in the form of future provision of rapid transit service in corridors of especially heavy travel demand. As with the proposed highway improvements, the proposed transit improvements were reviewed and approved by both the Technical and Citizen Advisory Committees. The transit system improvements proposed were then tested to determine whether the potential passenger traffic demand would justify incorporation into alternative transportation systems.

TRANSPORTATION ENVIRONMENTAL IMPACT MODELS

Since transportation facilities may have significant impacts on ambient air quality and on noise levels, it is essential that these impacts be explicitly assessed within the plan reevaluation effort. Models to quantify these impacts are closely related to the travel simulation process since such models generally use the direct outputs of the traffic assignment model. The following sections document the development and application of the models used in the plan reevaluation to measure transportation effects on ambient air quality and noise levels.

Air Quality Model

Concurrently with the land use and transportation plan reevaluation, the Commission is developing an air quality maintenance plan for the Region. As an integral part of the development of this plan, an air quality simulation model was developed and used to forecast ambient air pollutant concentrations in the year 2000. A brief discussion of the operational characteristics of the air quality simulation model is provided herein. A more detailed explanation of the model calibration and validation procedures as well as a complete discussion of the model development, application, and results may be found in Chapter X of SEWRPC Planning Report No. 28, A Regional Air Quality Maintenance Plan for Southeastern Wisconsin.

Air quality simulation models provide a means by which the capability of the atmosphere to disperse air pollutant emissions from one or more sources, under a given set of meteorological conditions, may be replicated through numerical approximation techniques. Such simulation models are the singularly most important analytical device presently available for quantitatively evaluating the air quality impact of existing and forecast pollutant emission sources with respect to established state and federal standards and for the design, test, and evaluation of alternative control strategies for the reduction of ambient air pollution levels. Simulation modeling also serves as an adjunct to the air quality monitoring network since the model results characterize pollutant concentrations over the entire Region rather than at a few discrete points of actual physical measurement.

The air quality simulation model chosen for use in the Commission air quality maintenance planning program is the Wisconsin Atmospheric Diffusion Model developed by the Air Quality Modeling Group of the University of Wisconsin-Madison. The Wisconsin Atmospheric Diffusion Model was selected since, in its present stage of development, it is one of the most advanced in the United States. The model consists of four submodels: 1) a steady-state multiple point source model used to simulate annual particulate matter and sulfur dioxide concentrations; 2) a steady-state area and line source model for annual particulate matter and sulfur dioxide concentrations; 3) a time-dependent version of the steady-state multiple point source model using a gaussion distribution and applicable to short-term—that is one-hour, three-hour, eight-hour, and 24-hour—point source modeling; and 4) a time-dependent version of the steady-state area and line source model for the short-term pollutant concentrations from area and line source emissions. The Wisconsin Atmospheric Diffusion Model simulates the diffusion of both solid and gaseous pollutants through the atmosphere. It is not capable of accounting, however, for chemical transformations or photochemical oxidation processes occurring in the free air. At the present state of the art of air quality simulation model development, no model has successfully replicated both the transport and the reactivity of pollutant emissions.

For ambient air pollutant concentrations due to line source and area source emissions, the Wisconsin Atmospheric Diffusion Model is based on a solution of the species continuity equation for a turbulent atmospheric boundary layer in a three-dimensional Lagrangian coordinate system. Concentrations due to point source emissions are calculated on the basis of a gaussian plume distribution. The area and line emission sources are specified on a cubic grid as a function of both position and height, while the point source emissions are identified in a Eulerian coordinate system with the origin at the southwestern corner of the Region and the effective height of pollutant discharge being calculated for each source according to individual stack characteristics and prevailing meteorological conditions. Wind and eddy diffusivity profiles are specified by inputting the height of the mixing layer, the wind speed, the net heat flux, and the surface roughness. A rotation transformation is performed on the source array in order to change the effective wind direction. The annual average concentration is obtained by iteration over 50 sets of meteorological conditions.

The generalized meteorological conditions considered in determining annual average pollutant concentrations are three stability classes, three wind speed categories, and eight wind directions. To consider each condition possible would require 72 analyses. Eliminating those combinations of meteorological conditions that are physically impossible or extremely unlikely, 50 sets of meteorological conditions remain for those pollutant concentrations which must be investigated.

The basic output of the Wisconsin Atmospheric Diffusion Model is the forecast of the distribution of pollutant concentrations. The distributions are generally displayed as a series of isopleths, or lines of constant pollutant concentrations in the ambient air on a map of the Region. When air quality measurements are available, the model forecasts for specific locations can be readily compared with the monitored values and a calibration diagram produced.

Regional Noise Impact Model

Traffic on arterial streets and highways is recognized as an important source of urban noise. As such, it is desirable that the environmental impact of highway noise be explicitly assessed in the transportation plan reevaluation effort. Such an assessment should be based upon a model which simulates traffic noise on an areawide basis and a procedure to evaluate the noise impact of alternative transportation plans. This section is intended to document the noise model development and formulation. The use of this model in plan evaluation is discussed in Chapter VI of this Volume.

The SEWRPC highway noise model is based upon the well established noise simulation techniques developed under the auspices of the National Cooperative Highway Research Program (NCHRP). These techniques, referred to hereafter as the design guide methodology, are documented in a series of NCHRP reports.[15] The design guide methodology, representing the synthesis of a number of previous empirical and analytical noise models, is primarily intended for use in the design stage of specific highway construction projects. In adopting this methodology to a regional level analysis, it was necessary to employ certain assumptions about the detailed characteristics of street and highway elements. In so doing, no attempt was made to recalibrate the model on the basis of observed noise levels taken on individual street and highway segments in southeastern Wisconsin. It should be noted, however, that the outputs of the model were not used in the evaluation process on a link by link basis. Instead the model provided a relative measure of the noise effects of different street and highway alternatives. Such a comparison of alternatives was facilitated by the simulation of noise levels using the existing street and highway system and observed traffic counts. In addition, the model outputs were used to identify traffic corridors where traffic noise may constitute a significant problem. Such information is beneficial as the cost of such things as noise barriers or grade depression can then be included when additional construction of facilities in that corridor is considered.

The NCHRP design guide methodology begins with two basic relationships: the first which relates the mean noise level generated by automobile traffic on a highway element to the average automobile traffic speed and volume and to the relative displacement of the observer

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[15] *Highway Noise, Measurement, Simulation and Mixed Reactions, NCHRP Report No. 78, 1969; Highway Noise, A Design Guide for Highway Engineers, NCHRP Report No. 117, 1971; and Highway Noise, A Field Evaluation of Traffic Noise Reduction Features, NCHRP Report No. 144, 1973.*

from the element; and the second which relates the mean noise level generated by the truck traffic to the truck density and to the observation distance. The distinction between automobiles and trucks is necessary due to the significant difference in the noise producing characteristics of these vehicles. In this respect it should be noted that individual truck noise is relatively independent of operating speed while automobile noise increases as speed increases. More specifically:

$$L_{50}\ (a) = 10 \log V_a - 15 \log D + 30 \log S + 10 \log (\tanh (1.19 \times 10^{-3} V_a D/S)) + 29$$

$$L_{50}\ (t) = 10 \log V_t - 15 \log D + 20 \log S + 10 \log (\tanh (1.19 \times 10^{-3} V_t D/S)) + 95$$

Where:

- L_{50} (a) = mean noise level in dBA produced by automobile traffic
- L_{50} (t) = mean noise level in dBA produced by truck traffic
- V_a = automobile traffic volume in vehicles/hour
- V_t = truck traffic volume in vehicle/hour
- S = average vehicle speed in miles/hour
- D = observation distance in feet

Three of the independent variables in these relationships are direct outputs of the assignment model. The hourly automobile and truck volumes are derived by applying appropriate factors to the average daily volumes from the assignment while average vehicle speed is the capacity restrained speed directly from the assignment. The final variable, observation distance, is obtained by introducing the concept of the "single lane equivalent." Theoretically, a single imaginary lane carrying the total traffic volume can be located which, in terms of acoustical effects, is identical to the actual situation if the volume is uniformly distributed on all lanes. The distance from the observer to this imaginary lane can further be shown to be closely approximated by the geometric mean of the distances from the observation point to the centers of the farthest and nearest traffic lanes. Defining the observation point to be the building setback line, this distance can be derived by first categorizing each link into one of 18 cross section types. The cross section types classify links on the basis of number of lanes, pavement width, median width, typical building setback distance, and area served (i.e., urban or rural). From this information it is possible to determine the "single lane equivalent" distance which provides the final input to the noise model.

The procedure above calculates the mean noise level, that is, the noise level in decibels which is exceeded 50 percent of the time. From a plan evaluation standpoint, however, the peak noise levels are of greater significance. Typically, the peak noise level is defined as the L_{10} level or the noise level in decibels which is exceeded 10 percent of the time. To derive the peak (L_{10}) noise level from the mean (L_{50}) noise level, an empirically derived curve from the NCHRP design guide methodology was utilized. This design curve, shown in Figure 38 relates the difference between the L_{10} and L_{50} noise levels to the traffic volumes, average speed, and observation distance.

SUMMARY

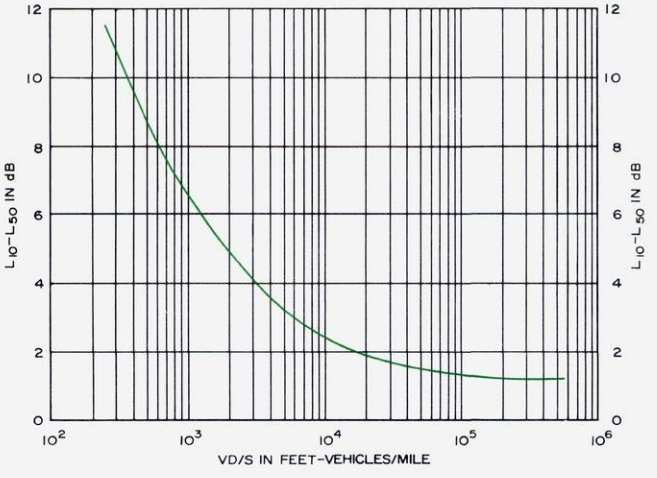
This chapter describes the derivation of the travel simulation models, systems engineering techniques, and the environmental impact models used in the design, test, and evaluation of the alternative transportation plans under the regional transportation plan reevaluation process. These relationships and techniques are important, not only because they provide the technical basis for the design of a regional transportation system plan which is properly fitted to the traffic loads that it must carry but also because these techniques provide the practical link between land use and transportation system planning.

The travel simulation process consists of four major steps: trip generation, trip distribution, modal split, and traffic assignment. The first step in the development of these models for the reevaluation effort was a rigorous assessment of the models developed and used in the initial land use-transportation planning effort. Such an assessment was possible due largely to the fact that two identical travel surveys were available for 1963 and 1972 allowing the testing of temporal stability. Despite major changes in land use and transportation system development that have occurred in the interim, the travel simulation models from the initial study demonstrated their ability to accurately simulate 1972 travel habits and patterns.

In spite of the excellent performance of the travel and traffic forecasting models developed under the initial transportation planning effort, and the conclusion that these models could continue to be used with confidence in either their original form or in an updated form through recalibration with more recent travel survey data,

Figure 38

MEAN TO PEAK NOISE LEVEL CONVERSION CURVE



Source: SEWRPC.

advances in the state of the art of regional transportation planning indicated that certain refinements in the models would be desirable. These included the adoption of a disaggregate household approach—as opposed to the more traditional zonal aggregate approach used in the original modeling effort—for person trip generation; the adoption of a postdistribution, or trip interchange, modal split model—as opposed to the predistribution, trip end modal split model used in the initial planning effort; and the refinement in the external travel demand forecasting technique. The disaggregate approach to trip generation modeling was selected primarily because such disaggregate models lend themselves more readily to surveillance and updating than the aggregate models, an important consideration within the context of a continuing land use-transportation planning effort. The trip interchange modal split model was selected primarily because such a model was believed to be able to more adequately reflect the effects on transit utilization of improvements in transit service, particularly on a travel corridor level, than could the trip end models. Moreover, such a model permits other important factors influencing transit use, such as transit fares and parking costs, to be directly and explicitly considered in the simulation process.

A summary of the travel simulation models used in the plan reevaluation effort can be found in Table 33. Each of these models was individually tested using travel survey data and the entire process tested by comparing the outputs from the assignment phase to observed ground counts. These analyses clearly demonstrated the propriety of the four step simulation approach and the validity of the calibrated models to predict future travel demand under a variety of conditions with occurrences adequate for transportation system planning and design purposes.

This chapter also has described the systems engineering techniques used to synthesize alternative transportation plans. Finally, the models are described which are used to measure the effect of transportation on regional air quality and regional noise levels.

These improved models are believed to provide the Region with a technically sound transportation systems planning tool which can be used with confidence in the planning and design of surface transportation facilities within the Region.

Chapter V

REGIONAL DEVELOPMENT ALTERNATIVES

INTRODUCTION

As noted in Chapter III of this report, further population growth, redistribution, and attendant urbanization in southeastern Wisconsin appear inevitable even though the rates and magnitude of such growth, redistribution, and attendant urbanization have declined somewhat in recent years. Hence, the question facing public officials and citizen leaders within the Region is not whether such growth, redistribution, and attendant urbanization will occur but how it might best be shaped and guided in the public interest. An urbanizing region, such as southeastern Wisconsin, can develop in a number of ways; and any one of a number of regional development patterns could conceivably meet agreed-upon regional development objectives to a certain degree. Each such alternative development pattern, however, represents a particular response both to the manner in which growth has occurred to date and to established regional development objectives. One of the most critical tasks in planning for the orderly development of an urbanizing region consists, therefore, of selecting from the alternatives available the development pattern which offers the greatest potential for attaining the agreed-upon development objectives.

Volume One of this report presented in summary form pertinent data on the demographic, economic, and public financial resource base; the natural resource and public utility base; the historic and existing land use patterns; the local community development objectives as expressed in local plans and zoning ordinances; and the transportation facilities and travel characteristics of the Region, all as a necessary basis for the reevaluation of the adopted 1990 regional land use and transportation plans and the preparation of new alternative plans for the year 2000. In addition, the preceding chapters of this volume have presented forecasts of probable future population and economic activity levels, land use requirements, and automobile and truck availability within the Region, along with regional development objectives, principles, and standards as additional bases for the preparation of new alternative plans. This chapter presents two alternative regional land use plans for the year 2000, each with three supporting alternative transportation system plans, all prepared upon the foundation of factual planning and engineering data collected and analyzed in the initial and continuing regional land use-transportation studies.

One of the important conclusions set forth in Volume One of this report was that, with respect to the reevaluation of the adopted 1990 regional land use plan, work efforts should be centered on revisions to the basic controlled existing trend plan that was selected for adoption as the initial regional land use plan. This conclusion was reached on the basis that work conducted under the initial regional land use-transportation study had clearly demonstrated that the controlled existing trend plan was the best of the four alternative land use patterns then considered; that surveillance activities conducted since adoption of the regional land use plan indicated that population growth within the Region could be expected to be relatively modest over the next two to three decades and that, therefore, consideration of any land use plan which required for implementation a drastic departure from existing trends was apt to be impractical; that the controlled existing trend plan was the most energy efficient of the alternative plans previously considered insofar as the transportation implications were concerned; and that significant progress had been made in the intervening years in regional land use plan implementation, particularly with respect to environmental corridor preservation and, to a lesser degree, preservation of prime agricultural lands.

It was further concluded in Volume One of this report that in the revision of the controlled existing trend plan as initially prepared and adopted, two somewhat different development concepts would be explored, requiring the preparation of two different alternative controlled existing trend land use plans for the year 2000. These two plans—a controlled centralization plan and a controlled decentralization plan—are described in this chapter and compared and evaluated in Chapter VI. In the controlled centralization plan, the development concept emphasized is one of centralization, as the name implies, with virtually all new urban development located within areas readily served by such important urban utilities and facilities as centralized public sanitary sewer, public water supply, and mass transit. Under this development concept, new urban development would occur in planned neighborhood development units, primarily at medium population density levels—that is, with new single family residential development averaging about four dwelling units per net residential acre and with new multiple family residential development averaging about 10 dwelling units per net residential acre. This development concept is identical to that utilized in the preparation of the adopted 1990 regional land use plan. The controlled centralization plan presented herein reflects the changes in population distribution and land use development which have occurred within the Region from 1963 to 1970, the regional and county population forecasts for the year 2000 set forth in Chapter III of this Volume, and certain key recommendations of other regional and subregional plan elements prepared and adopted since 1966, including, most importantly, the regional sanitary sewerage system plan.

In contrast, the controlled decentralization plan presented herein places less emphasis on centralization of urban development, on the concentration of residential development in planned neighborhood units, on the provision of public sanitary sewer and water supply, and on the attainment of medium population density levels, and more emphasis on the use of onsite soil absorption sewage disposal systems (septic tanks) and private water supply wells. This plan was prepared because Commission behavioral and attitudinal studies both indicated a need—even within the broad concept of a controlled existing trend land use plan—to accommodate low-density, unsewered urban development, and in direct response to direction from the technical and citizen advisory committees concerned, the Commission, and certain appointed and elected public officials. The controlled decentralization plan presented herein also reflects the changes which have occurred within the Region from 1963 to 1970 but does not reflect the county population forecasts for the year 2000 set forth in Chapter III. Instead, this alternative plan is based upon an alternative regional population distribution, one based upon extrapolation of short-term trends in county population growth over the period from 1970 to 1975.

Both the controlled centralization and controlled decentralization land use plans represent, although to different degrees, a conscious continuation of historic development trends within the Region, with urban development occurring generally in concentric rings along the full periphery and outward from the major existing centers within the Region. The resulting development patterns are largely, although not entirely, continuous, both radially and circumferentially; they recognize the effects of the urban land market in shaping the land use pattern, and are linked to the commercial and industrial activities of the larger central cities. The plans differ primarily with respect to densities and the extent to which new urban development is served by a full set of urban services and facilities, primarily centralized sanitary sewer, water supply, elementary school, and mass transit services and facilities.

For each of the two alternative regional land use plans, two alternative transportation plans were prepared and are described herein along with an analysis in each case of the "no build" alternative. As was the case in the design of the two new alternative land use plans, in the preparation of the alternative transportation plans, the initial 1990 adopted regional transportation plan, as amended, was drawn upon as a source of possible solutions to any existing and probable future system deficiencies indicated by the analyses. The two alternative transportation plans prepared for each alternative land use plan were: a highway supported transit plan and a transit supported highway plan. In each case, the alternative plans contained significant proposals for both highway and transit facility improvements; and the "labels" attached to the alternatives refer only to the relative degree to which highway and transit improvements were relied upon in the selection of design solutions.

The transit supported highway alternative transportation plans presented herein propose somewhat fewer highway improvements, particularly in the urbanized areas of the Region, than the adopted 1990 regional transportation plan, while recommending transit improvements beyond those initially proposed in the 1990 plan. The highway supported transit alternative transportation plans propose significantly fewer highway improvements in the urbanized areas of the Region than the initial 1990 regional transportation plan, compensating for the lower level of highway improvements in the urbanized areas with a higher level of transit service proposed to be provided through a more extensive network of exclusive rights-of-way and reserved travel lanes for transit vehicles. Like the alternative regional land use plans, the alternative regional transportation plans are described herein and compared and evaluated in Chapter VI.

LAND USE PLAN DESIGN METHODOLOGY

The methodology applied in the preparation of the regional land use plans was a design-oriented mapping activity concerned primarily with the spatial distribution of the various land uses within the Region, carefully relating these to existing development and to the natural resource base through application of well-established physical planning and engineering principles. While the planning techniques applied in this procedure are traditional and well-established, a great deal more information about the physical features of the Region, important to plan design, was available under both the initial and continuing regional land use-transportation planning efforts than normally would be the case in such land use planning activities.

This information, summarized in a series of Commission planning and technical reports, including Volume One of this report, includes definitive data on the following natural features of the Region: topography and drainage patterns; soils; surface waters; floodlands; wetlands; woodlands; wildlife habitat; sites having historic, scientific, and other cultural value; existing and potential park and related open space sites; and groundwater recharge areas. Particularly important with respect to the relationship of these natural features to regional development is the concept of the environmental corridor as an elongated area which encompasses the most significant and highest quality elements of the regional resource base, including the best remaining surface waters and associated floodlands and shorelands; the best remaining woodlands, wetlands, and wildlife habitat areas; and valuable historic, scenic, scientific, and cultural sites. One of the basic concepts embodied in the design of the initial regional land use plan was the preservation of these environmental corridors in essentially natural, open uses. This concept recognized that failure to protect these corridors from improper development would ultimately result in the loss of the best remaining prime potential park and related open space sites, deterioration or destruction of the best remaining wildlife habitat, further encroachment of urban development on the natural floodlands of perennial streams and water courses; loss of water impoundment

areas and reduction of groundwater recharge; loss of the largest and best remaining woodlands and wetlands; and continued deterioration of surface water quality within the Region. This important concept of preserving the primary environmental corridors of the Region was carried over into the design of both the controlled centralization and controlled decentralization land use plans.

In addition to the physiographic data, the information base for the physical planning techniques also included very definitive data on the extent and location of existing development within the Region, including: data on the existing distribution of population and economic activity, the existing land use, the existing highway and transit facilities, and the existing public utility facilities. The information base also included data on local proposals for future development within the Region, including data provided in local community plans and zoning ordinances and locally proposed service utility areas. In addition, the data base included information on prime agricultural areas delineated on the basis of soil capabilities, size of the farm units, capital investment in such agricultural improvements as irrigation and drainage systems, and demonstrated ability to provide higher than average crop yields.

It is important to note that the information data base available for preparation of both the controlled centralization and controlled decentralization land use plans was greatly expanded over the data base available in 1963. Most importantly, this expansion involved definitive data on natural floodlands developed as part of the Commission's watershed planning programs for the Root, Fox, Milwaukee, and Menomonee River watersheds; data permitting the delineation of logical future sanitary sewer service areas as developed in the regional sanitary sewerage system planning program; community level land use data developed as part of comprehensive planning programs for the Kenosha and Racine Urban Planning Districts; data concerning airport system development and land use planning in and around airports developed under the regional airport system planning program; and the substantial amount of detailed data made available through the Commission continuing community assistance program, including logical growth area delineations, refined community level land use plans, and neighborhood development plans. These important Commission planning efforts since adoption of the initial regional land use and transportation plans greatly strengthened Commission capability in the plan reevaluation effort to prepare the alternative regional land use plans.

Specific Design Methodology—
Controlled Centralization Land Use Plan

As noted above, the controlled centralization plan is conceptually identical to the controlled existing trend land use plan that became the adopted 1990 regional land use plan under the initial regional land use-transportation study. Accordingly, the following three guidelines were used in the design of this alternative:

1. New urban development would emphasize medium density and would be located in those areas of the Region readily provided with essential urban services, particularly centralized sanitary sewer, water supply, and transit services; and new residential development would occur largely in planned neighborhood units.

2. No new urban development would be allocated to the delineated primary environmental corridors in order to preserve the best remaining elements of the natural resource base of southeastern Wisconsin.

3. To the maximum extent possible, no new urban development would be allocated to the delineated prime agricultural lands, thereby preserving highly productive lands for the continuing production of food and fibre.

The specific procedures utilized in preparing the controlled centralization plan were as follows:

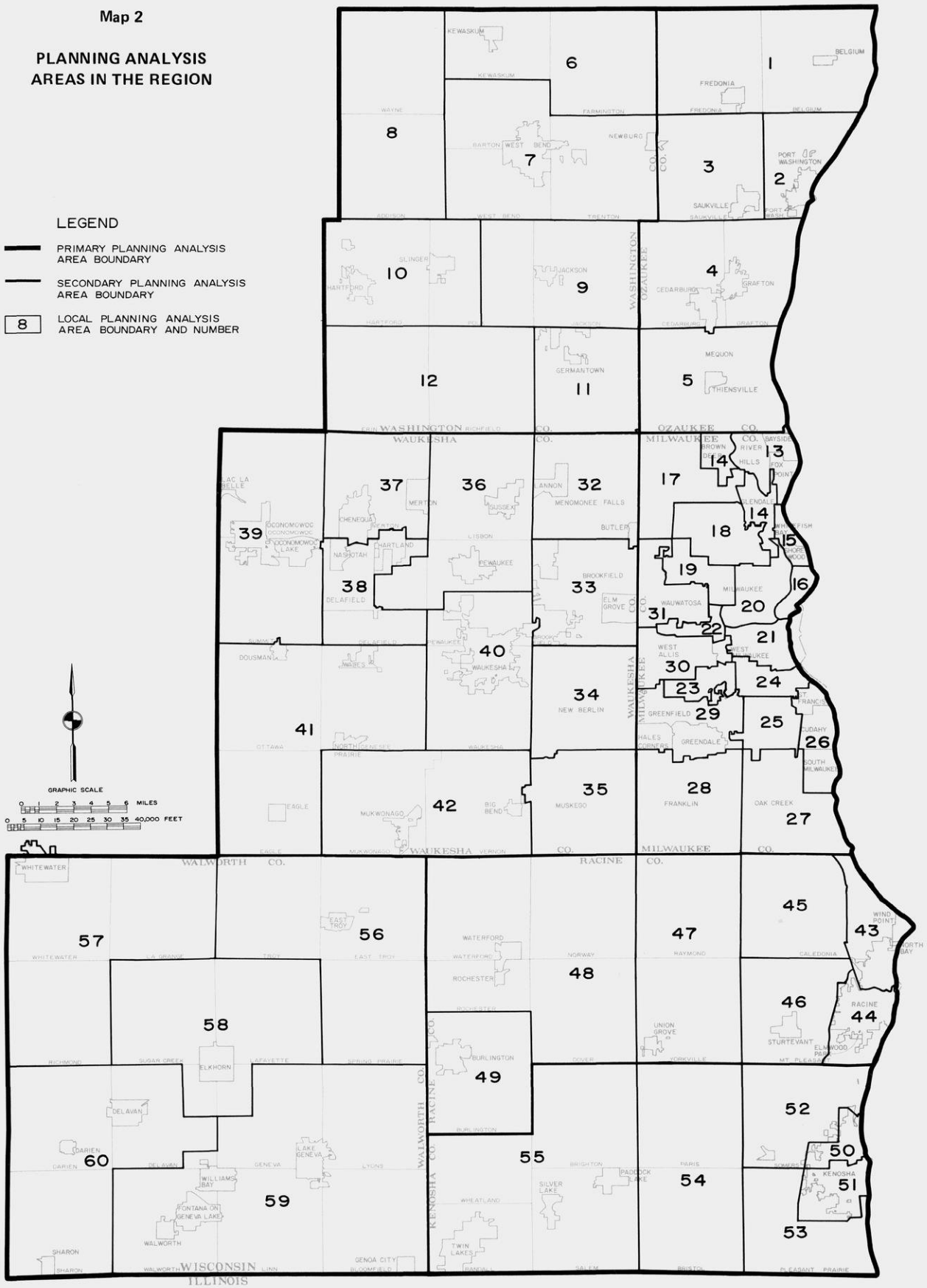
1. A determination was made of the amount of "developable" land located within each U. S. Public Land Survey quarter section. Developable land was defined as land which, while not presently developed for urban use, was suitable and could be assumed available for such use. The developable land area was determined for each quarter section by subtracting from the quarter section total the area within the quarter section included in primary environmental corridors, the area covered by soils having "severe" and "very severe" limitations for urban development even with public centralized sanitary sewers, and the area covered by existing urban development.

2. An identification was made of those quarter sections currently served by public sanitary sewerage facilities and those planned to be served by such facilities in the adopted regional sanitary sewerage system plan.

3. An assignment of a proposed potential urban or rural density was made to each quarter section based upon consideration of existing development densities in the quarter section concerned and in adjacent quarter sections, trends in densities in adjacent quarter sections, the forecast population increase in the planning analysis areas (see Map 2), community plans and zoning provisions, and planning judgment. The specific density categories utilized in the plan preparation are identified and defined in Table 54 (see also Appendix Tables G-1 and G-2). These categories include urban high-density, with a net lot area per dwelling unit ranging from 0.06 to 0.14 acre; urban medium-density, with a net lot area per dwelling unit ranging from 0.15 to 0.44 acre; urban low-density, with a net lot area per dwelling unit ranging from 0.45 to 1.44 acres; suburban residential density,

Map 2

PLANNING ANALYSIS AREAS IN THE REGION



Planning analysis areas serve as a common geographic basis within which basic demographic, economic, land use, transportation, water resource, and housing data can be presented, analyzed, and utilized in the preparation and implementation of regional and subregional plans. A total of 60 planning analysis areas have been created in the Region and consist of groups of minor civil divisions or, where single minor civil divisions were considered too large to constitute a meaningful planning analysis area, subareas within a minor civil division.

Source: SEWRPC.

Table 54

RESIDENTIAL DENSITY CLASSIFICATIONS USED IN REGIONAL LAND USE PLAN PREPARATION

Residential Density Classification	Net Lot Area Per Dwelling Unit		Number of Dwelling Units Per Net Residential Acre[a]	Number of Persons Per Net Residential Acre				
	Square Feet	Acres		Kenosha and Walworth Counties[b]	Milwaukee County[c]	Ozaukee and Waukesha Counties[d]	Racine County[e]	Washington County[f]
Urban High-Density	2,439- 6,230	0.06-0.14	7.0-17.9	21.0-54.0	18.2-46.8	24.5-63.0	21.7-55.8	23.1-59.4
Urban Medium-Density	6,231- 18,980	0.15-0.44	2.3- 6.9	6.9-20.9	6.0-18.1	8.1-24.4	7.1-21.6	7.6-23.0
Urban Low-Density	18,981- 62,680	0.45-1.44	0.7- 2.2	2.1- 6.8	1.8- 5.9	2.5- 8.0	2.2- 7.0	2.3- 7.5
Suburban	62,681-217,800	1.45-5.00	0.2- 0.6	0.6- 2.0	0.5- 1.7	0.7- 2.4	0.6- 2.1	0.7- 2.2
Rural	> 217,800	> 5.00	< 0.2	< 0.6	< 0.5	< 0.7	< 0.6	< 0.7

Residential Density Classification	Number of Dwelling Units Per Gross Acre	Number of Persons Per Gross Square Mile[g]				
		Kenosha and Walworth Counties[b]	Milwaukee County[c]	Ozaukee and Waukesha Counties[d]	Racine County[e]	Washington County[f]
Urban High Density	4.8-11.9	9,199-22,797	7,973-19,757	10,735-25,000[h]	9,508-23,557	10,121-25,000[h]
Urban Medium-Density	1.7- 4.7	3,327- 9,198	2,883- 7,972	2,882-10,734	3,438- 9,507	3,660-10,120
Urban Low-Density	0.6- 1.6	1,045- 3,326	906- 2,882	1,200- 3,881	1,080- 3,437	1,084- 3,659
Suburban	0.2- 0.5	315- 1,044	273- 905	368- 1,219	326- 1,079	347- 1,083
Rural	< 0.2	< 315	< 273	< 368	< 326	< 347

[a] *A net residential acre includes only land actually devoted to residential use; that is, land within the "site" boundaries including the building ground area coverage together with the necessary onsite yards and open spaces.*

[b] *Assumes that each dwelling unit is occupied by 3.0 persons.*

[c] *Assumes that each dwelling unit is occupied by 2.6 persons.*

[d] *Assumes that each dwelling unit is occupied by 3.5 persons.*

[e] *Assumes that each dwelling unit is occupied by 3.1 persons.*

[f] *Assumes that each dwelling unit is occupied by 3.3 persons.*

[g] *A gross residential square mile includes the net area devoted to residential use plus the supporting land uses, such as streets, parks, schools, churches, and neighborhood shopping centers.*

[h] *A population density of 25,000 persons per gross square mile was considered to be the maximum desirable population density level within the Region.*

Source: SEWRPC.

with a net lot area per dwelling unit ranging from 1.45 to 5.00 acres; and rural residential density, with a net lot area per dwelling unit exceeding 5.00 acres. The standards set forth in Chapter II of this Volume require that the urban high-, medium-, and low-density categories of residential development be provided with a full array of urban services, including centralized sanitary sewer and water supply services and walk-in elementary school service. The standards further require that the suburban residential density category be provided with partial urban services, including solid waste collection and police, fire and rescue services, but not including walk-in elementary school nor centralized sanitary sewer and water supply services. Thus, within the context of this report, the term "suburban" is utilized in its literal sense; that is, "sub-urban," indicating that a particular area of urban development is being provided with less than the full range of available urban services. This meaning of the term suburban should not be confused

with the more popular meaning used to identify civil divisions adjacent to a large central city. Taken together, the urban high-, medium-, and low-density and the suburban residential density categories constitute the full range of urban development contemplated in the proposed land use plans, with any development exceeding a net lot area of five acres per dwelling unit deemed by definition to constitute either rural estate or farm residential development.

4. A determination was made of the location of all proposed major regional land uses by quarter section, including major multipurpose commercial centers; major industrial centers; major state, regional, and county parks; and major airports as determined in the adopted regional airport system plan.

5. A determination was made of those quarter sections to which new urban development should be assigned, following the three guidelines set forth above.

6. A distribution of proposed urban development was made to the developable land areas in those quarter sections identified for urban development by the following five major categories: high-, medium-, and low-density urban residential; neighborhood and community commercial; and community industrial. Under this plan alternative, no new suburban density residential development was allocated. All new residential development was assumed to occur in planned neighborhood units containing supporting local, park, institutional, governmental, transportation (streets and highways), and commercial land uses. The distribution of land was based upon land development percentages established by analysis for each density category (see Table 1, Chapter II of this Volume). New residential development was allocated first to all land identified in the 1970 land use inventory as "under development"; that is, land platted and committed for residential use but not yet used for such development. When the existing supply of residential land under development was exhausted, the remaining quantity of new residential development was allocated to available developable land.

7. A calculation was made of the incremental and total housing units and population by quarter section and planning analysis area. Assumptions concerning the average household size were varied by county based on a trend analysis (see Table 54).

8. An adjustment was made of the planned land use distribution, including population and housing units, utilizing the 2000 regional and county population forecasts for control totals as set forth in Chapter III of this Volume.

9. A permanent controlled centralization plan computer tape file was prepared for use in the assignment of forecast employment, for the development of alternative transportation plans, and for area source air pollution analyses.

Specific Design Methodology—
Controlled Decentralization Land Use Plan

As already noted, the controlled decentralization plan differs conceptually from the controlled centralization plan in that it places more emphasis on the use of onsite soil absorption sewage disposal systems and private water supply wells and on the attendant low development densities necessitated by reliance on onsite utilities. The following guidelines were used in the design of this alternative:

1. New urban development would emphasize medium and low urban densities and suburban density in the relative proportion at which such development took place within the Region over the period from 1963 to 1970. That portion of the new development that was proposed to occur at medium or low urban densities would be allocated to those areas of the Region where centralized sanitary sewer and water supply services could be readily extended or otherwise provided and would be assumed to occur in planned neighborhood units. That portion of the new urban development that was proposed to occur at the suburban residential density would be allocated to those areas of the Region covered by soils having only "very slight," "slight," or "moderate" limitations for development without centralized sanitary sewer service and would not occur in planned neighborhood units.

2. No new urban development would be allocated to the delineated primary environmental corridors in order to preserve the best remaining elements of the natural resource base of southeastern Wisconsin.

3. New urban development would be allocated to the delineated prime agricultural lands only in those cases where there did not exist sufficient areas of nonprime agricultural lands and other open lands to accommodate the forecast land use demand, so as to preserve to the maximum extent possible, given the type of suburban development postulated in this alternative, highly productive land for the continuing production of food and fibre.

A determination was made to utilize an alternate regional population distribution for the purposes of preparing the controlled decentralization plan. This determination was made in part because of the observed sharp decline in the resident population of Milwaukee County over the period 1970 to 1974 and in part to present public officials and concerned citizens with a sharper identification of the implications of the two alternative regional development patterns. Accordingly, it was assumed that, while the year

2000 regional population would be the same under both the controlled centralization and controlled decentralization plans, the distribution of that regional population among the seven counties would be somewhat different under the two alternatives. In order to provide a basis for the distribution of population used in the preparation of the controlled decentralization plan, it was assumed that the recent trend in population decline in Milwaukee County would continue to the year 2000. Under this assumption, the resident population of Milwaukee County by the year 2000 would approximate 900,000 persons, or about 150,000 persons less than the 1970 level of about 1.05 million persons. By way of contrast, the population forecast for Milwaukee County presented in Chapter III of this Volume envisions a relatively stable population in Milwaukee County over the 25-year planning period. This assumption required the redistribution of about 150,000 persons to the remaining six counties in the Region. This redistribution was based on the proportion of new population growth that each of the six counties was forecast to receive during the period 1970 to 2000 in the county forecasts set forth in Chapter III. The results of this redistribution of the forecast population are graphically shown for each county in Figure 39.

The specific procedures utilized in preparing the controlled decentralization plan were as follows:

1. A determination was made of the amount of "developable" land located within each U. S. Public Land Survey quarter section in the same manner as for the controlled centralization plan.

2. An identification was made of those quarter sections with soils rated as having "very slight," "slight," or "moderate" limitations for large lot—one acre or more of net lot area per dwelling unit—residential development without public sanitary sewer service, together with the amount of such land in each identified quarter section.

3. An identification was made of those quarter sections currently served by public sanitary sewerage facilities and those planned to be served by such facilities in the adopted regional sanitary sewerage system plan.

4. A determination was made of the proportion of residential land development occurring within each planning analysis area during the period 1963 to 1970 that was either served or committed to be served by public sanitary sewerage facilities. This proportion was used to determine the amount of new urban development in each planning analysis area to be allocated to the low and medium density urban categories and the amount to be allocated to the unsewered, suburban residential development category.

5. An assignment was made of a proposed potential urban or rural density to each quarter section in the same manner as for the controlled centralization plan.

6. A determination was made of those planning analysis areas in Milwaukee County, the only regional County to lose population under the regional population distribution assumed for preparation of the controlled decentralization plan, to be reduced in population size. This determination was based upon observed trends over the period from 1963 to 1970. In addition, a determination was made of planning analysis areas in the outlying six counties of the Region to be increased in population size, with such determination also based upon observed trends over the period from 1963 to 1970.

7. A determination was made of the location of all proposed major regional land uses by quarter section identification, in the same manner as for the controlled centralization plan.

8. A determination was made of those quarter sections to which new urban and suburban development should be assigned, following the three guidelines set forth above.

9. A distribution of proposed urban development was made to the developable land areas in those quarter sections identified for urban development by the following seven major categories: high-, medium-, and low-density urban residential; suburban residential; rural residential; neighborhood and community commercial; and community industrial. The distribution of land was based upon land development percentages established for each density category (see Table 1, Chapter II of this Volume). Available residential land under development was utilized first, in the same manner as for the controlled centralization plan.

10. A calculation was made of incremental and total housing units and population by quarter section and planning analysis area. Assumptions concerning the average household size were varied by county based on a trend analysis (see Table 54).

11. An adjustment was made of the planned land use distribution, including population and housing units, utilizing the 2000 regional population forecast, as set forth in Chapter III of this Volume, and the alternative county population distribution, as set forth in Figure 39, for control totals.

12. A permanent controlled decentralization plan computer tape file was prepared for use in the assignment of forecast employment, for the development of alternative transportation plans, and for area source air pollution analyses.

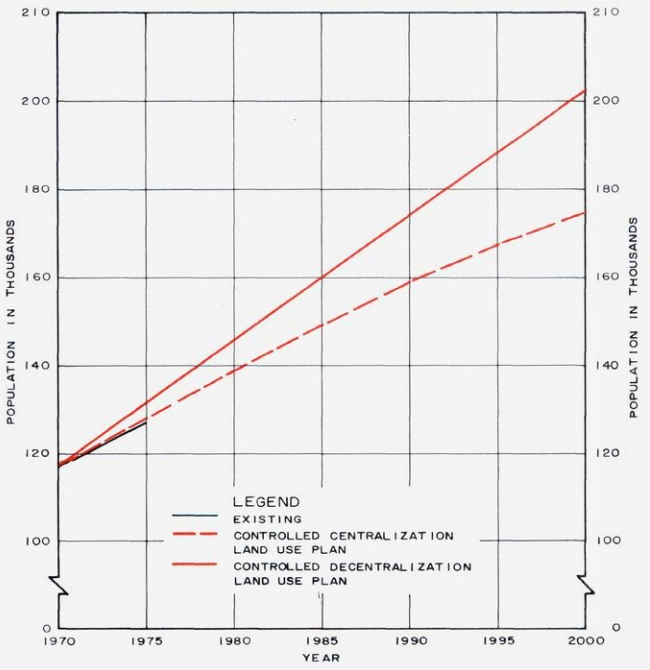
CONTROLLED CENTRALIZATION LAND USE PLAN DESCRIPTION

Like the adopted 1990 regional land use plan, the controlled centralization alternative plan for 2000 represents a conscious continuation of historic development trends

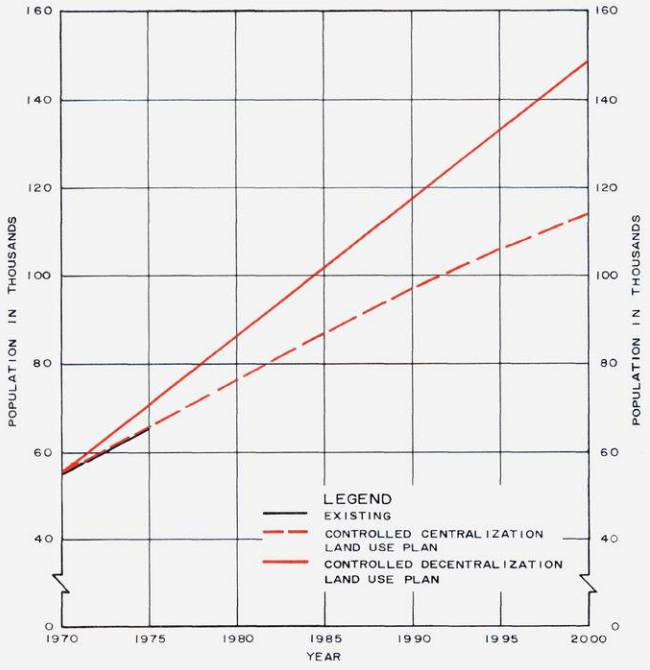
Figure 39

EXISTING AND PLANNED
POPULATION IN THE REGION: 1970-2000

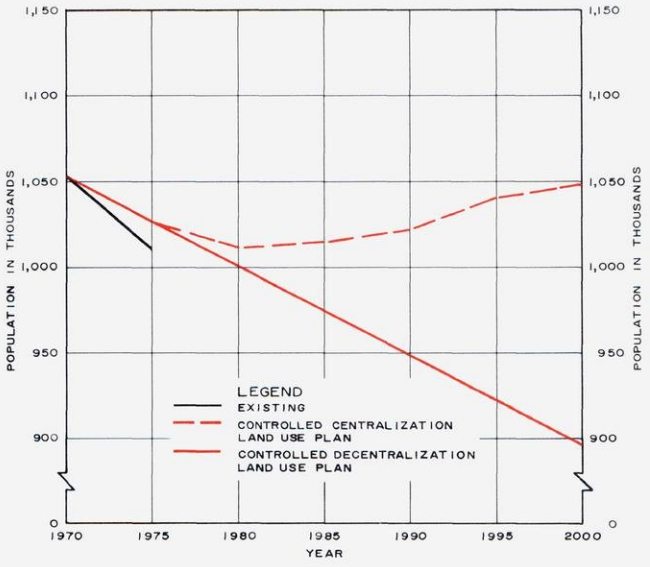
Kenosha County



Ozaukee County



Milwaukee County



Racine County

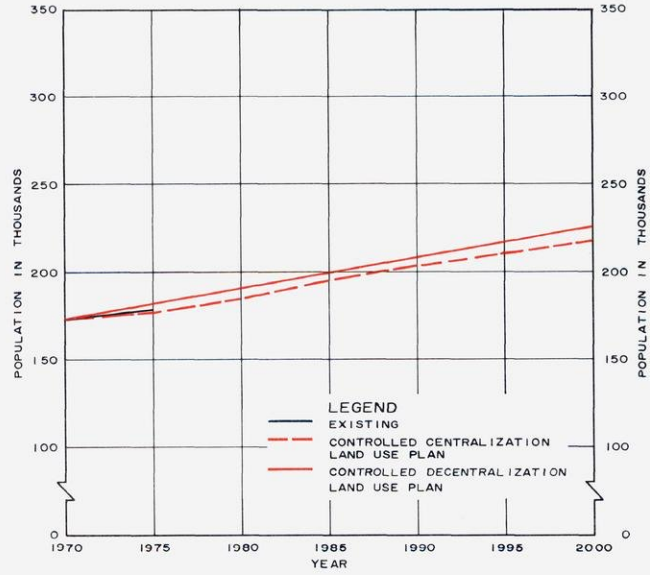
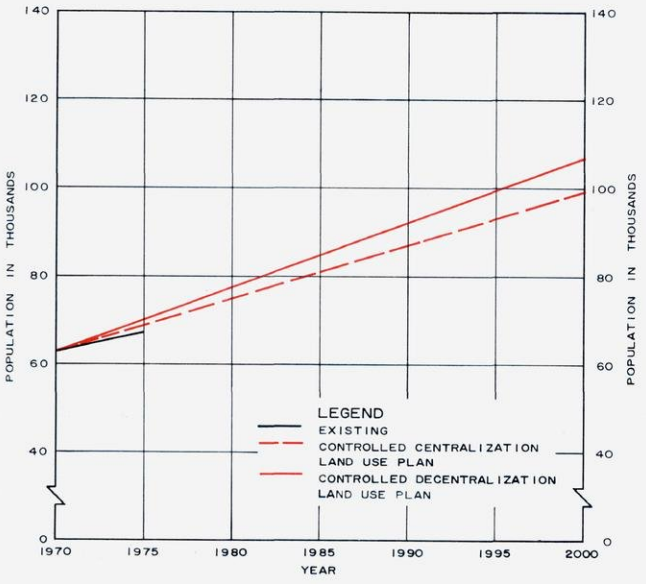
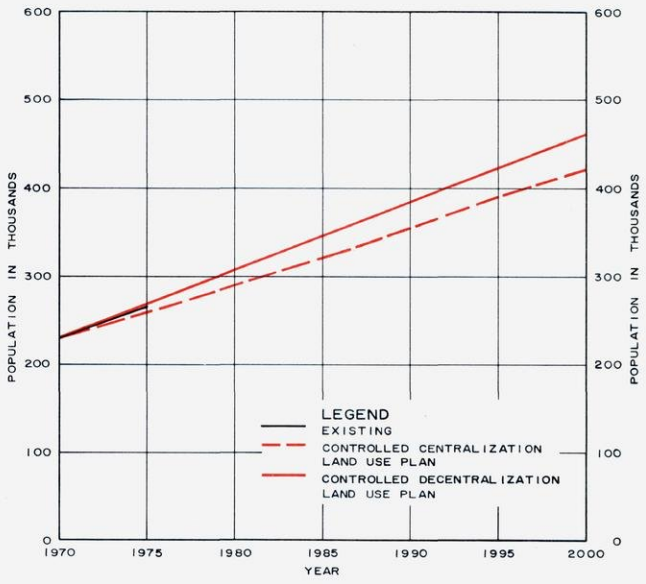


Figure 39 (continued)

Walworth County

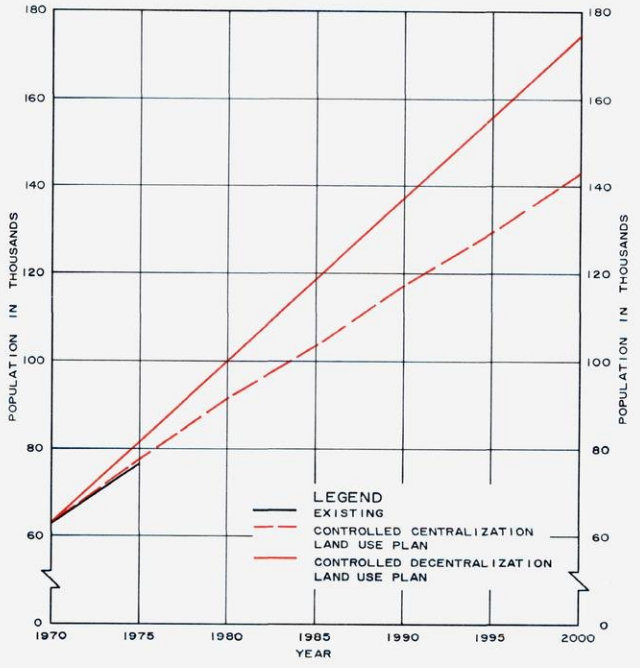


Waukesha County



Source: SEWRPC.

Washington County



within the Region, with urban development proposed to continue to occur in largely concentric rings along the full periphery of, and outward from, existing urban centers. While the plan places heavy emphasis on the continued effect of the urban land market in determining the location, intensity, and character of future urban development, the plan proposes to regulate to a greater degree than in the past the effect of this market on development in order to ensure that new urban development occurs at densities consonant with the provision of public centralized sanitary sewer and water supply facilities and in locations where such facilities can be readily extended or obtained. In so doing, the plan would seek to provide a more orderly and economic development pattern and an abatement of areawide developmental and environmental problems within the Region, thereby channeling the results of market forces into better conformance with the established regional development objectives.

Under this plan, historic growth trends within the Region would continue to be altered by encouraging intensive urban development to occur in those areas of the Region having both soils suitable for such development and sanitary sewer, public water supply, and other essential urban services readily available. As in the adopted 1990 regional land use plan, the most basic regional development objectives would be achieved by protecting from further urban development the floodlands of the perennial streams, by protecting from development the best remaining woodlands and wetlands, and by developing an integrated system of park and open space areas centered

on the primary environmental corridors. Under this alternative plan, the allocation of future land use within each county of the Region is such as to approximate the forecast county population levels set forth in Chapter III and, to the extent possible, the proposals contained in local community development plans and zoning documents. An understanding of the regional growth pattern proposed by this alternative can be obtained from a review of the graphic representation of the plan shown on Map 3 and of the statistical presentations set forth in Tables 55 through 78 and Appendix Tables G-3 through G-10.[1]

Residential Development

The controlled centralization plan would accommodate the regional population increase of 463,000 persons expected by the year 2000 primarily through an outward

[1] *Land use data presented in the tables set forth in this Chapter are shown to the nearest one-hundreth of an acre in order to facilitate computer processing of data. These data should be interpreted by the reader to the nearest whole acre.*

Table 55

EXISTING AND PROPOSED LAND USE IN THE REGION
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High-Density	24,388.89	7.4	996.36	4.1	25,385.25	6.5
Urban Medium-Density	37,092.51	11.3	43,753.83	118.0	80,846.34	20.6
Urban Low-Density	72,700.78	22.2	- 2,333.16	- 3.2	70,367.62	18.0
Suburban	22,084.21	6.7	- 9,524.44	- 43.1	12,559,77	3.2
Subtotal	156,266.39	47.6	32,892.59	21.0	189,158.98	48.3
Commercial	6,516.85	2.0	996.65	15.3	7,513.50	1.9
Industrial	10,038.61	3.1	3,654.40	36.4	13,693.01	3.5
Governmental[a]	16,617.57	5.1	2,640.91	15.9	19,258.48	4.9
Transportation[b]	109,406.82	33.4	18,007.28	16.5	127,414.10	32.5
Recreation	28,996.10[c]	8.8	5,825.13[d]	20.1	34,821.23	8.9
Urban Land Use Subtotal	327,842.34	100.0	64,016.96	19.5	391,859.30	100.0
Rural Land Use						
Residential	--[e]	--	--	--	--	--
Agriculture	1,040,121.46	74.7	- 50,611.02	- 4.9	989,510.44	74.4
Other Open Lands[f]	353,136.03	25.3	- 13,405.75	- 3.8	339,730.28	25.6
Rural Land Use Subtotal	1,393,257.49	100.0	- 64,016.77	- 4.6	1,329,240.72	100.0
Total	1,721,099.83	--	--	--	1,721,100.02	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and offstreet parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

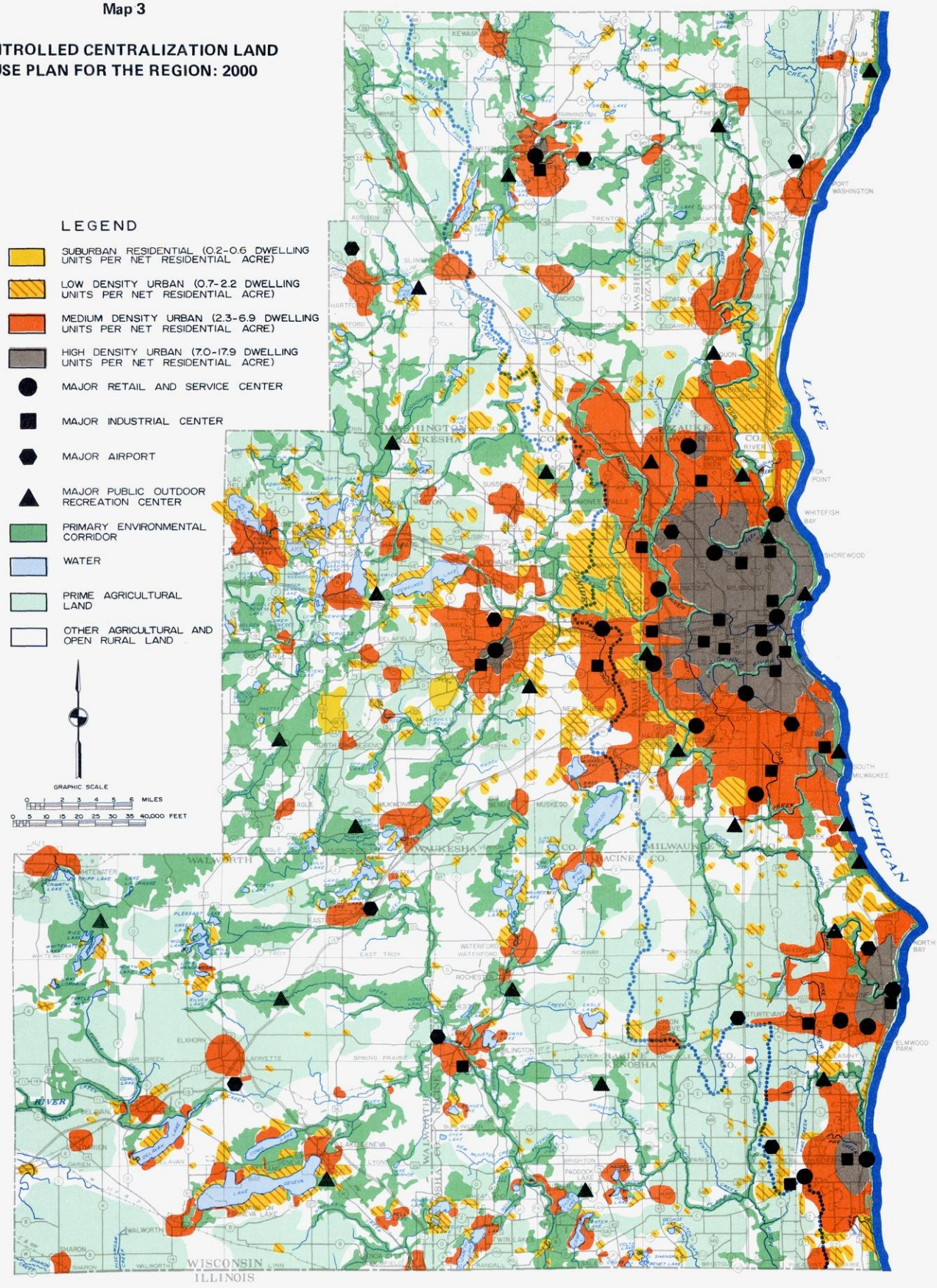
[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Map 3

CONTROLLED CENTRALIZATION LAND USE PLAN FOR THE REGION: 2000



The controlled centralization land use plan alternative represents a continuation of historic development trends within the Region, with urban development proposed to continue to occur largely in concentric rings along the full periphery of, and outward from, existing urban centers, and at densities consonant with the provision of centralized public sanitary sewer, public water supply, and mass transit facilities under the controlled centralization land use plan by the year 2000, 58 percent of the total urban residential land and 69 percent of the total population would be located within a distance of 20 miles from the central business district of Milwaukee. In addition, 92 percent of the total urban land and 94 percent of the total population would be served by public sanitary sewer and water supply facilities. As in the adopted 1990 regional land use plan, the primary environmental corridors would be protected from further urban development and conversion of prime agricultural lands to urban uses would be minimized.

Source: SEWRPC.

expansion of existing urban areas. The future intensity and distribution of residential development would be established largely through the operation of the urban land market, guided in the public interest, however, by the required adaptation to certain physiographic and cultural features of the Region, particularly the primary environmental corridors and the sanitary sewer service areas identified in the adopted regional sanitary sewerage system plan. The controlled centralization plan would seek to discourage leap-frog urban development in outlying areas of the Region, both through maintenance of rural development densities in these areas—that is, average lot sizes of at least five acres for single family housing development—and through encouragement of higher density development in those areas of the Region that can be most readily served by essential urban services. Under this plan, about 62 percent of all new urban residential development within the Region would be located within 20 miles of the central business district of Milwaukee. Future residential development within the Region would occur primarily at medium densities, and new urban residential development would consist of a mix of single and multiple family housing located primarily in planned residential development units.

As indicated in Table 56, nearly 33,000 acres, or nearly 52 square miles, of new residential development would be added to the existing stock of residential land within the Region. More than one-half of this increment would be developed in Milwaukee and Waukesha Counties. Nearly all of this additional residential acreage would be developed at medium densities, with a typical single

Table 56

EXISTING AND PROPOSED RESIDENTIAL LAND USE IN THE REGION BY COUNTY 1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	Residential Land Use in Acres											
	Urban High-Density				Urban Medium-Density				Urban Low-Density			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	1,375.70	237.00	1,612.70	17.2	3,499.02	5,140.29	8,639.31	146.9	7,099.74	- 1,486.48	5,613.26	- 20.9
Milwaukee	20,177.88	562.83	20,740.71	2.8	13,663.23	8,626.88	22,290.11	63.1	9,290.54	- 2,104.93	7,185.61	- 22.7
Ozaukee	53.39	- 44.26	9.13	- 82.9	2,297.41	3,314.62	5,612.03	144.3	6,237.32	2,957.46	9,194.78	47.4
Racine	2,031.03	55.62	2,086.65	2.7	4,254.75	4,223.61	8,478.36	99.3	8,970.09	- 1,140.49	7,829.60	- 12.7
Walworth	29.03	19.91	48.94	68.6	3,082.85	4,020.35	7,103.20	130.4	7,223.40	104.64	7,328.04	1.4
Washington	98.77	84.23	183.00	85.3	2,999.42	5,063.94	8,063.36	168.8	6,983.67	83.11	7,066.78	1.2
Waukesha	623.09	81.03	704.12	13.0	7,295.83	13,364.14	20,659.97	183.2	26,896.02	- 746.47	26,149.55	- 2.8
Total	24,388.89	996.36	25,385.25	4.1	37,092.51	43,753.83	80,846.34	118.0	72,700.78	- 2,333.16	70,367.62	- 3.2

County	Residential Land Use in Acres											
	Suburban				Rural				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970[a]	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	1,502.97	- 993.31	509.66	- 66.1	--	--	--	--	13,477.43	2,897.50	16,374.93	21.5
Milwaukee	2,500.65	- 375.87	2,124.78	- 15.0	--	--	--	--	45,632.30	6,708.91	52,341.21	14.7
Ozaukee	3,732.72	- 2,053.97	1,678.75	- 55.0	--	--	--	--	12,320.84	4,173.85	16,494.69	33.9
Racine	1,368.75	- 843.63	525.12	- 61.6	--	--	--	--	16,624.62	2,295.11	18,919.73	13.8
Walworth	3,072.87	- 2,098.51	974.36	- 68.3	--	--	--	--	13,408.15	2,046.39	15,454.54	15.3
Washington	1,443.64	- 759.57	684.07	- 52.6	--	--	--	--	11,525.50	4,471.71	15,997.21	38.8
Waukesha	8,462.61	- 2,399.58	6,063.03	- 28.4	--	--	--	--	43,277.55	10,299.12	53,576.67	23.8
Total	22,084.21	- 9,524.44	12,559.77	- 43.1	--	--	--	--	156,266.39	32,892.59	189,158.98	21.0

[a] *Included in land use inventory as part of urban residential land use.*

Source: SEWRPC.

family lot size of one-quarter acre and typical multiple family development averaging about 10 dwelling units per net acre. Minor amounts of new urban high-density development would occur in Kenosha, Milwaukee, Racine, Walworth, Washington, and Waukesha Counties, with additional minor amounts of urban low-density development occurring in Ozaukee, Walworth, Washington, and Waukesha Counties.

Commercial and Industrial Development

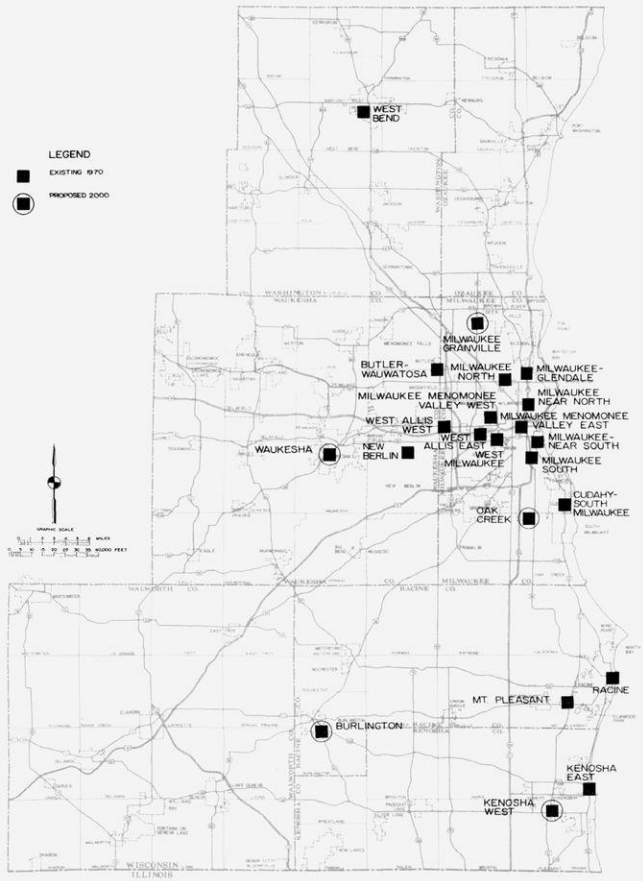
As indicated in Chapter III, employment within the Region is forecast to increase by about 267,000 jobs between 1972 and 2000; and about 85 percent of this increase is anticipated to occur in the commercial and industrial employment groups. Many of these new employment opportunities will be located in existing employment centers within the Region, while others will be located in new employment centers.

Under the controlled centralization plan, a total of 22 major industrial centers and 17 major multipurpose commercial centers are proposed. In total, these two types of centers would employ about 235,000 and 115,000 persons, respectively, or a total of about 42 percent of the forecast employment in the commercial and industrial employment groups. The other 58 percent, or approximately 482,000 jobs, would be located in smaller community and local employment centers included in the local development areas. Of the 22 planned major industrial centers, 17 existed in 1970, and five are proposed new centers (see Tables 57 and 58 and Map 4. These five proposed new centers are: Kenosha-West, Milwaukee-Granville, Oak Creek, Burlington, and Waukesha. Of the 17 planned major retail and service centers, 11 existed in 1970 and six are proposed new centers (see Tables 59 and 60 and Map 5). These six new centers are proposed to be located in or near the Cities of Kenosha, Milwaukee, Oak Creek, Racine, West Bend, and Waukesha. Of these new major centers, one—Northridge in the City of Milwaukee—has already been developed since the base year 1970 inventory. In addition one existing major center—Elmwood Plaza—would be replaced by the proposed major center in the City of Racine.

The commercial and industrial land use changes proposed under the controlled centralization plan are further detailed in Tables 61 and 62. Nearly 1,000 acres of commercial land use development and about 3,600 acres of industrial land use development would be added to the existing stock of these land use categories. These land use development requirements are exclusive of any development area required for off street parking, access roads, and yards and open spaces. Milwaukee and Waukesha Counties would account for the largest acreage increases in both categories. In the commercial land use category, the greatest percentage increase would occur in Washington County, where a gain of 142 commercial acres, or about 47 percent, is proposed. Washington County would also account for the greatest percentage increase in the industrial land use category, where a gain of about 450 industrial acres, or nearly 104 percent, is proposed.

Map 4

MAJOR INDUSTRIAL CENTERS IN THE REGION
2000 CONTROLLED CENTRALIZATION LAND USE PLAN



The controlled centralization land use plan alternative envisions that 22 major industrial centers will be provided within the Region through the year 2000. Seventeen of these existed in 1970 and were to be retained and enlarged while five are proposed new centers. The five proposed new centers, each having a minimum gross site area of 320 acres, are Kenosha-West, Milwaukee-Granville, Oak Creek, Burlington, and Waukesha.

Source: SEWRPC.

Governmental and Institutional Land Use

As indicated in Table 63, the controlled centralization plan would add about 2,600 acres of governmental and institutional land uses to the existing governmental and institutional land use stock. This represents about a 16 percent increase. The largest absolute increase would occur in Waukesha County where about 827 acres of governmental and institutional land use would be added, while the largest percentage increase would occur in Washington County where about 375 acres of governmental and institutional land use would be added, representing a gain of about 41 percent.

Table 57

SELECTED CHARACTERISTICS OF PLANNED MAJOR INDUSTRIAL CENTERS IN THE REGION 1970, 1972, AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Major Industrial Center[a]	Land Use in Acres						Employment		
	Gross[b]			Net[c]					
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1972	Planned Increment	Total 2000
Existing									
Kenosha-East	234	--	234	214	--	214	11,600	300	11,900
Cudahy-South Milwaukee	294	--	294	256	--	256	7,300	300	7,600
Milwaukee-Glendale	446	--	446	358	--	358	17,800	500	18,300
Milwaukee-Menomonee Valley East	447	--	447	398	--	398	18,600	600	19,200
Milwaukee-Menomonee Valley West	134	--	134	120	--	120	5,300	200	5,500
Milwaukee-Near North	155	--	155	123	--	123	15,000	200	15,200
Milwaukee-Near South	307	--	307	280	--	280	12,600	400	13,000
Milwaukee-North	391	--	391	342	--	342	20,800	500	21,300
Milwaukee-South	111	--	111	89	--	89	4,100	200	4,300
West Allis-East	252	--	252	220	--	220	9,300	300	9,600
West Allis-West	160	--	160	129	--	129	3,600	200	3,800
West Milwaukee	472	--	472	408	--	408	15,400	600	16,000
Racine	340	--	340	273	--	273	12,500	400	12,900
Butler-Wauwatosa	474	--	474	375	--	375	14,600	500	15,100
Mt. Pleasant	176	198	374	162	168	330	3,500	5,300	8,800
West Bend	110	232	342	83	197	280	3,800	5,000	8,800
New Berlin	198	460	658	174	200	374	3,500	4,100	7,600
Subtotal	4,701	890	5,591	4,004	565	4,569	179,300	19,600	198,900
Proposed									
Kenosha-West	--	347	347	--	294	294	--	6,000	6,000
Milwaukee-Granville	--	842	842	--	690	690	--	8,000	8,000
Oak Creek	--	602	602	--	500	500	--	7,700	7,700
Burlington	--	224	224	--	188	188	--	4,300	4,300
Waukesha	--	457	457	--	377	377	--	10,600	10,600
Subtotal	--	2,472	2,472	--	2,049	2,049	--	36,600	36,600
Total	4,701	3,362	8,063	4,004	2,614	6,618	179,300	56,200	235,500

[a] *See Map 4.*

[b] *Includes land actually used for industrial purposes together with associated off street parking and road facilities, loading areas, and landscaped areas.*

[c] *Includes only that land actually used for industrial purposes.*

Source: SEWRPC.

Table 58

EXISTING AND PROPOSED INDUSTRIAL EMPLOYMENT DISTRIBUTION BY TYPE OF INDUSTRIAL AREA 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Type of Industrial Area	Industrial Employment[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Major Industrial						
Existing	179,300	59.7	19,600	10.9	198,900	49.8
Proposed	--	--	36,600	--	36,600	9.2
Subtotal	179,300	59.7	56,200	31.3	235,500	59.0
Local and Other	120,900	40.3	43,000	35.6	163,900	41.0
Total	300,200	100.0	99,200	33.0	399,400	100.0

[a] *Includes manufacturing and wholesaling industries.*

Source: SEWRPC.

Table 59

SELECTED CHARACTERISTICS OF PLANNED MAJOR RETAIL AND SERVICE CENTERS IN THE REGION 1970, 1972, AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Major Retail and Service Center	Land Use Area in Acres						Employment		
	Gross[a]			Net[b]					
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1972	Planned Increment	Total 2000
Existing									
Kenosha CBD[c]	45	--	45	29	--	29	2,400	200	2,600
Bayshore	79	--	79	28	--	28	5,600	100	5,700
Capitol Court	79	--	79	28	--	28	3,000	200	3,200
Mayfair	109	10	119	21	10	31	3,600	100	3,700
Milwaukee CBD	208	--	208	97	--	97	65,900	400	66,300
Mitchell Street	50	--	50	20	--	20	4,400	100	4,500
West Allis West	58	15	73	21	5	26	1,500	600	2,100
Elmwood Plaza[d]	52	- 52	--	18	- 18	--	1,700	- 1,700	--
Southgate	91	--	91	28	--	28	2,400	100	2,500
Southridge	55	54	109	25	18	43	2,700	2,000	4,700
Racine CBD	62	--	62	31	--	31	4,100	300	4,400
Brookfield Square	101	--	101	44	--	44	1,900	200	2,100
Subtotal	989	27	1,016	390	15	405	99,200	2,600	101,800
Proposed									
Kenosha-West	--	70	70	--	25	25	--	2,000	2,000
Northridge	--	125	125	--	42	42	--	3,400	3,400
Oak Creek	--	80	80	--	28	28	--	2,200	2,200
Racine-West	--	75	75	--	26	26	--	2,200	2,200
West Bend CBD	--	68	68	--	43	43	--	1,000	1,000
Waukesha CBD	--	69	69	--	44	44	--	2,800	2,800
Subtotal	--	487	487	--	208	208	--	13,600	13,600
Total	989	514	1,503	390	223	613	99,200	16,200	115,400

[a] *Includes land actually used for retail and service purposes together with associated offstreet parking and road facilities, loading areas, and landscaped areas.*

[b] *Includes only that land actually used for retail and service purposes.*

[c] *Central Business District.*

[d] *This center would be replaced by a proposed new center at the intersection of STH 11 and STH 31. Elmwood Plaza would remain as a community level retail and service center.*

Source: SEWRPC.

Table 60

EXISTING AND PROPOSED COMMERCIAL EMPLOYMENT DISTRIBUTION BY TYPE OF COMMERCIAL AREA 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

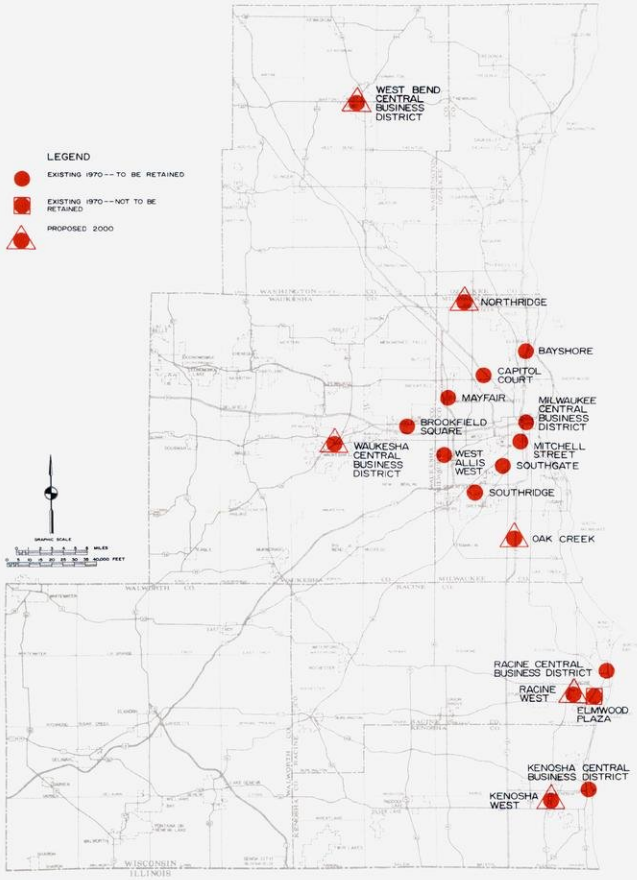
Type of Commercial Area	Commercial Employment[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Major Retail and Service						
Existing	99,200	32.5	2,600	2.6	101,800	23.5
Proposed	--	--	13,600	--	13,600	3.1
Subtotal	99,200	32.5	16,200	16.3	115,400	26.6
Local and Other	205,900	67.5	112,400	54.6	318,300	73.4
Total	305,100	100.0	128,600	42.2	433,700	100.0

[a] *Includes retail and service industries; excludes government and transportation and communication industries.*

Source: SEWRPC.

Map 5

MAJOR RETAIL AND SERVICE CENTERS IN THE REGION 2000 CONTROLLED CENTRALIZATION LAND USE PLAN



The controlled centralization land use plan alternative recommends that 17 major retail land service centers be provided to serve the needs of the Region through 2000. Twelve of these centers existed in 1970, and 11 of them are to be retained. Six are proposed new centers. The proposed new centers have a minimum gross site area of 70 acres each and are to be located in or near the Cities of Kenosha, Milwaukee, Oak Creek, Racine, West Bend, and Waukesha.

Source: SEWRPC.

Transportation Land Use

As indicated in Table 64, the controlled centralization plan would add about 18,000 acres of transportation land uses to the existing regional stock in this category. It should be noted that this category includes all communication and utility uses; harbor, railroad, and airport uses; truck terminals; and offstreet parking associated with other land use development; as well as streets and highways. This represents a 16 percent increase in the existing stock in this land use category. The largest absolute and relative increase in this land use category would occur in Waukesha County where about 5,400 acres of land would be converted to transportation and related land uses, representing an increase of about 25 percent.

Open Space—Recreational Land Use

Under the controlled centralization plan, about 4,200 acres of land would be added to the existing stock of gross recreational land use (see Table 65). This represents an increase of nearly 8 percent over the 1970 acreage. It should be noted that this additional recreational land represents only the recommended increase in land devoted to public recreation use.

Included in these 4,200 acres are two new major public park and outdoor recreation centers—Sugar Creek in the Town of LaFayette, Walworth County, and Paradise Valley in the Town of West Bend, Washington County—as well as additional land acquisition at one existing, undeveloped major public park site—Monches in the Town of Merton, Waukesha County (see Map 6). Land acquisition at these three proposed major park sites would total nearly 1,400 acres. This rather small increment in recreational land of regional significance is due to the significant progress made since adoption of the initial regional land use plan toward the acquisition of the 12 proposed regional park sites identified in that plan. Further development also is proposed at several of the existing major park sites (see Table 66).

As indicated in Table 65, the largest absolute increase in land devoted to public recreation use would occur in Walworth County where about 1,100 acres would be added, an increase of nearly 12 percent. The greatest percentage increase would occur in Ozaukee County where a gain of 12 percent, or nearly 400 acres, would be realized.

As shown in Table 67, there were in 1973 about 16.3 acres of public park and outdoor recreation land per 1,000 population in the Region. The proposed increment of about 4,200 acres of public park land would be needed to serve the expanded regional population, and would result in a slight decrease in the number of acres of public park land per thousand population by the year 2000 to 15.0, the amount required to meet the agreed upon standard for this use.

Open Space—Primary Environmental Corridors

As defined in previous Commission studies and as reiterated in Volume One of this report, primary environmental corridors consist of elongated areas which encompass the most important and highest quality elements of the regional natural resource base, including the best remaining surface waters and associated undeveloped floodlands and shorelands, woodlands, wetlands, wildlife habitat, groundwater recharge areas, and scenic, historic, scientific, and cultural sites. The linear pattern which these corridors form in the Region is shown on Map 3 and the area of these corridors lying within each county in the Region is set forth in Table 68. About 347,000 acres, or approximately 20 percent of the total land and water acreage in the Region, are encompassed within the

Table 61

EXISTING AND PROPOSED COMMERCIAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	Commercial Land Use in Acres											
	Major				Local and Other				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	29	25	54	86.2	475	68	543	14.3	504	93	597	18.5
Milwaukee . . .	268	103	371	38.4	2,607	186	2,793	7.1	2,875	289	3,164	10.1
Ozaukee	--	--	--	--	330	74	404	22.4	330	74	404	22.4
Racine	49	8	57	16.3	526	73	599	13.9	575	81	656	14.1
Walworth. . . .	--	--	--	--	593	48	641	8.1	593	48	641	8.1
Washington . .	--	43	43	--	299	99	398	33.1	299	142	441	47.5
Waukesha . . .	44	44	88	100.0	1,297	226	1,523	17.4	1,341	270	1,611	20.1
Total	390	223	613	57.2	6,127	774	6,901	12.6	6,517	997	7,514	15.3

Source: SEWRPC.

Table 62

EXISTING AND PROPOSED INDUSTRIAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	Industrial Land Use in Acres											
	Major				Local and Other				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	214	294	508	137.4	597	52	649	8.7	811	346	1,157	42.7
Milwaukee . . .	2,944	1,190	4,134	40.4	1,955	192	2,147	9.8	4,899	1,382	6,281	28.2
Ozaukee	--	--	--	--	444	103	547	23.2	444	103	547	23.2
Racine	435	356	791	81.8	664	141	805	21.2	1,099	497	1,596	45.2
Walworth. . . .	--	--	--	--	827	71	898	8.6	827	71	898	8.6
Washington . .	83	197	280	237.3	351	253	604	72.1	434	450	884	103.7
Waukesha . . .	328	577	905	175.9	1,197	228	1,425	19.0	1,525	805	2,330	52.8
Total	4,004	2,614	6,618	65.3	6,035	1,040	7,075	17.2	10,039	3,654	13,693	36.4

Source: SEWRPC.

Table 63

EXISTING AND PROPOSED GOVERNMENTAL AND INSTITUTIONAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	Governmental and Institutional Land Use in Acres			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	1,323.90	240.48	1,564.38	18.2
Milwaukee	7,489.97	567.76	8,057.73	7.6
Ozaukee	939.18	269.16	1,208.34	28.7
Racine.	1,744.39	190.67	1,935.06	10.9
Walworth	1,192.13	170.06	1,362.19	14.3
Washington	919.03	375.19	1,294.22	40.8
Waukesha.	3,008.97	827.59	3,836.56	27.5
Total	16,617.57	2,640.91	19,258.48	15.9

Source: SEWRPC.

Table 64

EXISTING AND PROPOSED TRANSPORTATION LAND USE IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	Transportation Land Use in Acres[a]			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	8,927.35	1,649.17	10,576.52	18.5
Milwaukee	35,430.62	3,952.96	39,383.58	11.2
Ozaukee	8,053.84	1,894.69	9,948.53	23.5
Racine	12,442.46	1,374.36	13,816.82	11.0
Walworth	12,019.97	1,189.21	13,209.18	9.9
Washington	11,286.02	2,544.74	13,830.76	22.5
Waukesha	21,246.56	5,402.15	26,648.71	25.4
Total	109,406.82	18,007.28	127,414.10	16.5

[a] *Includes communication and utility uses; harbor, railroad, and airport uses; truck terminals; and offstreet parking associated with other land use development, as well as streets and highways.*

Source: SEWRPC.

Table 65

EXISTING AND PROPOSED RECREATIONAL LAND USE IN THE REGION BY COUNTY
1970, 1973, AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	Recreational Land Use in Acres							
	Gross[a]				Net[b]			
	Existing 1973	Planned Increment[c]	Total 2000	Percent Change 1973-2000	Existing 1970	Planned Increment[c]	Total 2000	Percent Change 1970-2000
Kenosha	5,490	520	6,010	9.5	2,671.91	703.46	3,375.37	26.3
Milwaukee	16,414	214	16,628	1.3	9,924.02	421.32	10,345.34	4.2
Ozaukee	3,261	392	3,653	12.0	1,657.44	704.24	2,361.68	42.5
Racine	4,435	329	4,764	7.4	2,585.47	598.14	3,183.61	23.1
Walworth	9,979	1,154	11,133	11.6	4,274.76	1,331.34	5,606.10	31.1
Washington	6,019	650	6,669	10.8	1,663.71	1,108.87	2,772.58	66.7
Waukesha	10,056	956	11,012	9.5	6,218.79	957.76	7,176.55	15.4
Total	55,654	4,215	59,869	7.6	28,996.10	5,825.13	34,821.23	20.1

[a] *Includes entire site area of public and nonpublic recreational uses.*

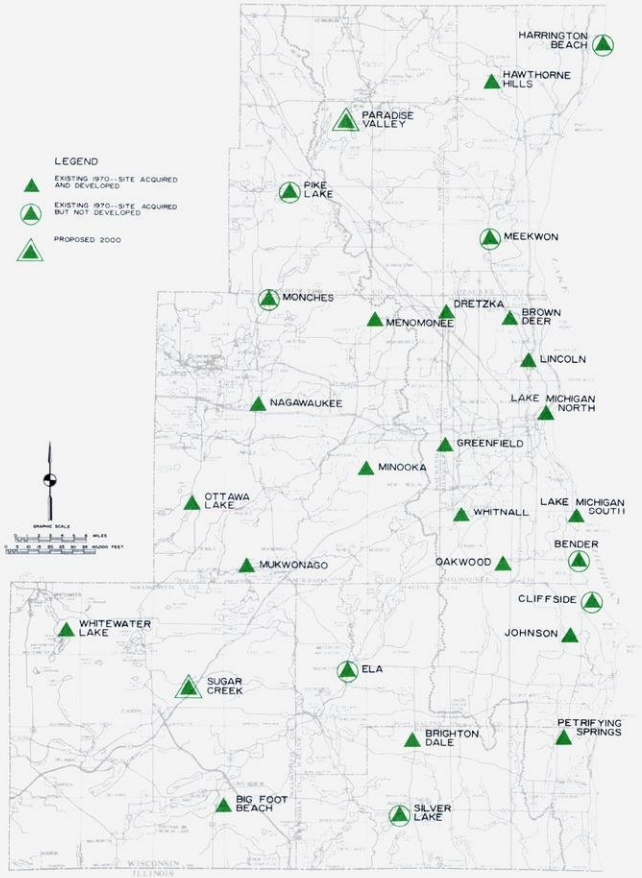
[b] *Includes only that land intensively used for recreation purposes.*

[c] *Includes only that increment which is for public recreational use.*

Source: SEWRPC.

Map 6

MAJOR PUBLIC OUTDOOR RECREATION CENTERS IN THE REGION: 2000 CONTROLLED CENTRALIZATION AND DECENTRALIZATION LAND USE PLANS



Under both the controlled centralization and controlled decentralization land use plan alternatives, a total of 29 major outdoor recreation sites are proposed to serve the needs of the Region by 2000. Of these 29 sites, 19 were in public ownership and use in 1970 and are to be retained. Eight sites—Silver Lake, Bender, Meekwon, Cliffside, Ela, Monches, Pike Lake, and Harrington Beach—were in public ownership but had not yet been developed and two sites, namely Sugar Creek and Paradise Valley, were not yet in public ownership.

Source: SEWRPC.

primary environmental corridors. Waukesha County contains over 94,000 acres, or about 27 percent of the corridor acreage, while Walworth County, with about 88,000 acres, contains nearly 26 percent. Highly urbanized Milwaukee County contains about 18,000 acres, or about 5 percent of the corridor acreage within the Region.

The acreage of each land use within the net corridor area in each county is identified in Table 69, while a regional summary of net and gross corridor is set forth in Table 70. Net corridor, including water, wetlands, woodlands, agricultural lands, recreational lands, and other open lands comprises nearly 93 percent of the gross corridor area. Urban development within the corridor constitutes nearly 25,000 acres, or the remaining 7 percent. About 41 percent of the net corridor area, or nearly 133,000 acres, is in water and wetland uses; about 32 percent, representing about 104,000 acres, is in agricultural and other open land uses; while about 20 percent, or over 64,000 acres, is in woodland use. The remaining 6 percent, representing about 19,000 acres, is devoted to active recreational land uses.

The controlled centralization plan would propose to develop none of the net corridor area except to accommodate compatible park and outdoor recreational land uses, since maintenance of essential land uses in the net corridor is vital to the protection of the natural resource base and to maintenance of the overall quality of the regional environment. Of the total net corridor area of over 322,000 acres, over 42,000 acres, or about 13 percent, are covered by surface water, leaving the remaining 280,000 acres, or nearly 16 percent of the total land area of the Region, as corridor area requiring protection through appropriate public actions; that is, public acquisition or protection through appropriate land use controls, including accommodation as appropriate of rural estate residential development.

Open Space—Agricultural and Other Open Land Use

Under the controlled centralization plan, the expansion of urban activities into presently rural areas of the Region would result in the conversion of about 64,000 acres, or about 100 square miles of rural land uses to urban land uses between 1970 and 2000. This would be equivalent to an average annual rate of conversion of about 2,130 acres, or 3 square miles. The rural land uses to be converted presently serve at least two important functions within the Region. As a land use, they provide open areas that serve to lend form and shape to urban development; provide invaluable opportunities for passive recreation; and serve to preserve, protect, and in some cases enhance certain elements of the natural resource base. As an economic activity, these lands provide employment opportunities and a source of income in the regional economy, as well as providing the urban areas of the Region with certain necessary agricultural, forest, and mineral products. It should be noted that, in addition to being subject to conversion to urban uses, rural lands are often subject to conversion from one rural use to another as, for example, the drainage of wetlands for conversion to agricultural use.

As indicated in Table 71, much of the urban expansion—nearly 51,000 acres—would take place on lands that are now in agricultural uses and would result in a decrease of about 5 percent in the existing stock of agricultural land within the Region. New urban development in Waukesha County alone would require the conversion of about

Table 66

SELECTED CHARACTERISTICS OF EXISTING AND PROPOSED MAJOR PUBLIC PARK AND OUTDOOR RECREATION AREAS IN THE REGION: 1970, 1973, AND 2000 CONTROLLED CENTRALIZATION AND DECENTRALIZATION LAND USE PLANS

Major Public Park and Outdoor Recreation Area[c]	Land Use Area in Acres					
	Gross[a]			Net[b]		
	Existing 1973	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Existing—Site Acquired and Developed						
Petrifying Springs	353	--	353	253	--	253
Brighton Dale	358	--	358	329	--	329
Brown Deer	363	--	363	347	--	347
Greenfield	284	--	284	284	--	284
Lake Michigan-North	381	--	381	268	--	268
Lake Michigan-South	690	--	690	673	--	673
Lincoln	271	--	271	230	--	230
Whitnall	641	--	641	591	--	591
Dretzka	306	--	306	306	--	306
Hawthorne Hills	280	--	280	278	--	278
Johnson	357	--	357	308	--	308
Big Foot Beach	264	--	264	142	90	232
Whitewater Lake	247	--	247	173	280	453
Menomonee	392	--	392	299	--	299
Minooka	307	--	307	50	239	289
Mukwonago	232	--	232	171	--	171
Nagawaukee	489	--	489	406	--	406
Ottawa Lake	245	--	245	75	166	241
Oakwood	271	--	271	247	--	247
Subtotal	6,731	--	6,731	5,430	775	6,205
Existing—Site Acquired But Not Developed						
Silver Lake	243	--	243	--	207	207
Bender	323	--	323	--	250	250
Meekwon	235	--	235	--	200	200
Cliffside	250	--	250	--	213	213
Ela	238	--	238	--	202	202
Monches	196	264	460	--	395	395
Pike Lake	672	--	672	--	571	571
Harrington Beach	632	--	632	--	430	430
Subtotal	2,789	264	3,053	--	2,468	2,468
Proposed						
Sugar Creek	--	770	770	--	654	654
Paradise Valley	--	350	350	--	298	298
Subtotal	--	1,120	1,120	--	952	952
Total	9,520	1,384	10,904	5,430	4,195	9,625

[a] *Includes entire site area.*

[b] *Includes only that land intensively used for recreation purposes.*

[c] *See Map 6.*

Source: SEWRPC.

Table 67

EXISTING AND PROPOSED PUBLIC PARK AND OUTDOOR RECREATION LANDS IN THE REGION PER THOUSAND POPULATION 1973 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Type of Public Park and Outdoor Recreation Land	Existing 1973		Planned Increment			Total 2000	
	Acres[a]	Acres Per Thousand Population	Acres[a]	Acres Per Thousand Population	Percent Change	Acres[a]	Acres Per Thousand Population
Major Public Parks							
Existing	9,520	--	264	--	--	9,784	--
Proposed	--	--	1,120	--	--	1,120	--
Subtotal	9,520	5.3	1,384	3.0	14.5	10,904	4.9
Local and Other	19,620	11.0	2,831	6.1	14.4	22,451	10.1
Total	29,140	16.3	4,215	9.1	14.5	33,355	15.0

[a] *Represents gross recreation land; entire public site area.*

Source: SEWRPC.

Table 68

PRIMARY ENVIRONMENTAL CORRIDOR AREA IN THE REGION BY COUNTY 2000 CONTROLLED CENTRALIZATION AND DECENTRALIZATION LAND USE PLANS

County	Gross Corridor Area[a]		Urban Development Within Corridor[b]		Net Corridor Area[c]	
	Acres	Percent of Total	Acres	Percent of Gross Corridor	Acres	Percent of Gross Corridor
Kenosha	30,663	8.8	2,542	8.3	28,121	91.7
Milwaukee	18,111	5.2	3,928	21.7	14,183	78.3
Ozaukee	25,135	7.3	2,841	11.3	22,294	88.7
Racine	34,277	9.9	2,461	7.2	31,816	92.8
Walworth	88,527	25.5	4,543	5.1	83,984	94.9
Washington	56,285	16.2	2,685	4.8	53,600	95.2
Waukesha	94,110	27.1	5,882	6.3	88,228	93.7
Total	347,108	100.0	24,882	7.2	322,226	92.8

[a] *These figures differ slightly from those presented in Volume One of this report because of a subsequent refinement in the corridor delineation.*

[b] *Includes residential, commercial, industrial, governmental, institutional, and transportation uses.*

[c] *Includes water and wetlands, woodlands, recreational, agricultural lands, quarries, and other generally open or unused lands, except those contained within the major park lands.*

Source: SEWRPC.

Table 69

LAND USE WITHIN THE NET PRIMARY ENVIRONMENTAL CORRIDOR AREA IN THE REGION BY COUNTY
2000 CONTROLLED CENTRALIZATION AND DECENTRALIZATION LAND USE PLANS

County	Net Corridor Area		Recreational Lands		Water		Wetlands		Woodlands		Agriculture and Related		Other Open Lands[a]	
	Acres	Percent of Total	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor
Kenosha	28,121	8.7	1,770	6.3	3,577	12.7	8,727	31.0	2,673	9.5	9,864	35.1	1,510	5.4
Milwaukee	14,183	4.4	6,638	46.8	918	6.5	1,461	10.3	1,193	8.4	2,209	15.6	1,764	12.4
Ozaukee	22,294	6.9	952	4.3	1,541	6.9	8,783	39.4	3,721	16.7	6,307	28.3	990	4.4
Racine	31,816	9.9	1,167	3.7	3,976	12.5	7,188	22.6	4,943	15.5	13,254	41.7	1,288	4.0
Walworth	83,984	26.1	4,030	4.8	13,747	16.4	17,037	20.3	20,779	24.7	25,952	30.9	2,439	2.9
Washington	53,600	16.6	803	1.5	3,450	6.4	21,423	40.0	12,574	23.5	14,251	26.6	1,099	2.0
Waukesha	88,228	27.4	4,224	4.8	15,320	17.4	26,065	29.5	19,037	21.6	20,924	23.7	2,658	3.0
Total	322,226	100.0	19,584	6.1	42,529	13.2	90,684	28.1	64,920	20.1	92,761	28.8	11,748	3.7

[a] *Includes quarries, landfill sites, and unused lands.*

Source: SEWRPC.

Table 70

PRIMARY ENVIRONMENTAL CORRIDOR AREA
IN THE REGION: 2000 CONTROLLED CENTRALIZATION
AND DECENTRALIZATION LAND USE PLANS

Selected Corridor Characteristics	Acres	Percent of Gross Corridor	Percent of Net Corridor
Gross Corridor	347,108	100.0	--
Urban Development Within Corridor	24,882	7.2	--
Net Corridor	322,226	92.8	100.0
Water	42,529	--	13.2
Wetlands	90,684	--	28.2
Woodlands	64,920	--	20.1
Agriculture	92,761	--	28.8
Other Open Lands[a]	11,748	--	3.6
Recreational Lands	19,584	--	6.1

[a] *Includes quarries, landfill sites, and unused lands.*

Source: SEWRPC.

15,000 acres, or nearly 8 percent of the 1970 agricultural acreage within that county. In Milwaukee County such development would require the conversion of about 9,200 acres, or about one-third of the remaining agricultural acreage, to urban use by 2000.

The other major open land category, consisting of woodlands, wetlands, water, quarries, and unused lands, would be reduced within the Region as a whole by about 13,000 acres, or nearly 4 percent, by 2000 (see Table 72). The predominant land use in this category which would be subject to urban development is that of woodlands, since woodlands provide a particularly desirable setting for urban residential development.

As discussed in Volume One of this report, areas particularly well suited for highly productive agricultural use within the Region—termed prime agricultural areas—were delineated in the initial regional land use-transportation study on the basis of the results of the detailed soil surveys and ratings by agri-business specialists. On a net basis, that is, not including existing urban development located within such areas, these areas totaled about 405,000 acres in 1970, or about 39 percent of the total land in agricultural use within the Region. As shown in Table 71, the controlled centralization plan would propose to convert about 6,000 acres, or only about 1.5 percent, of these remaining prime agricultural lands from agricultural to urban use. The largest conversion would occur in Kenosha County where about 1,500 acres, or about 2 percent of the remaining prime agricultural acres, would be converted (see Map 7).

Table 71

EXISTING AND PROPOSED AGRICULTURAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	Agricultural Land Use in Acres							
	Total				Net Prime[a]			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	113,929.89	- 4,386.81	109,543.08	- 3.9	66,054.65	- 1,506.84	64,547.81	- 2.3
Milwaukee . . .	28,607.65	- 9,210.07	19,397.58	- 32.2	7,164.83	- 1,153.39	6,011.44	- 16.1
Ozaukee	100,491.37	- 6,432.66	94,058.71	- 6.4	37,112.23	- 7.96	37,104.27	- ..[b]
Racine.	147,206.95	- 4,132.04	143,074.91	- 2.8	69,128.85	- 1,103.04	68,025.81	- 1.6
Walworth. . . .	261,743.76	- 3,399.51	258,344.25	- 1.3	112,462.66	- 356.55	112,106.11	- 0.3
Washington . .	186,465.75	- 7,864.33	178,601.42	- 4.2	49,537.08	- 611.16	48,925.92	- 1.2
Waukesha. . . .	201,676.09	- 15,185.60	186,490.49	- 7.5	63,743.55	- 1,296.63	62,446.92	- 2.0
Total	1,040,121.46	- 50,611.02	989,510.44	- 4.9	405,203.85	- 6,035.57	399,168.28	- 1.5

[a] *Net prime agricultural lands are defined as those areas which 1) contain soils rated in the regional detailed operational soil survey as very good or good for agriculture, and 2) occur in concentrated areas over five square miles in extent and which have been designated as exceptionally good for agricultural production by agricultural specialists.*

[b] *Less than 0.05 percent.*

Source: SEWRPC.

Table 72

EXISTING AND PROPOSED OPEN LAND USES IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

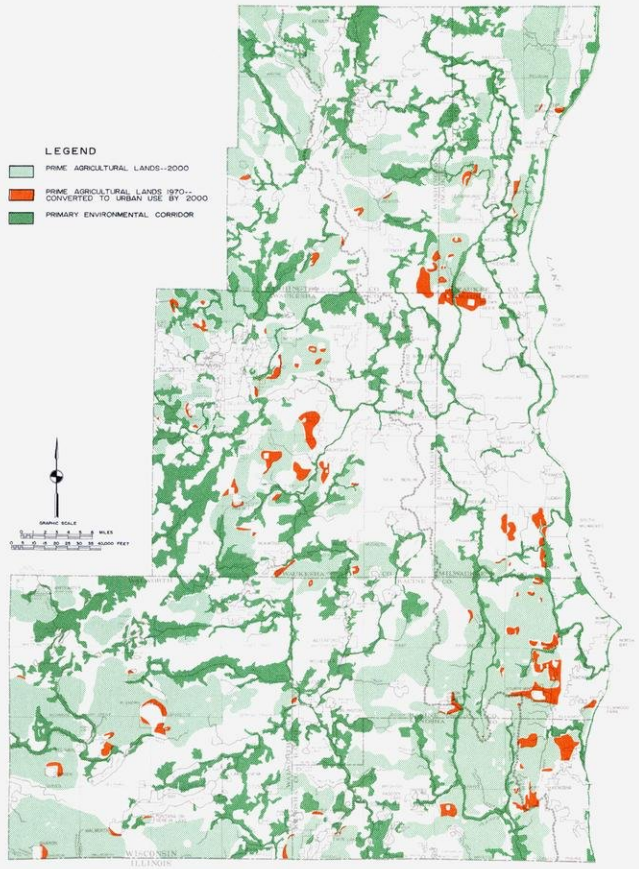
County	Open Land Uses in Acres[a]			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	36,454.39	- 1,542.18	34,912.21	- 4.2
Milwaukee	20,206.65	- 4,112.59	16,094.06	- 20.4
Ozaukee	25,775.67	- 785.66	24,990.01	- 3.0
Racine.	35,284.69	- 903.99	34,380.70	- 2.6
Walworth.	75,922.47	- 1,457.00	74,465.47	- 1.9
Washington	66,140.69	- 1,228.44	64,912.25	- 1.9
Waukesha.	93,351.47	- 3,375.89	89,975.58	- 3.6
Total	353,136.03	- 13,405.75	339,730.28	3.8

[a] *Includes woodlands, wetlands, water, quarries, and unused lands.*

Source: SEWRPC.

Map 7

PRIME AGRICULTURAL LANDS IN THE REGION 2000 CONTROLLED CENTRALIZATION LAND USE PLAN



In accordance with the regional development objectives, the controlled centralization land use plan alternative proposes to preserve 399,200 acres of net prime agricultural lands for permanent agricultural use. Because agricultural land within the Region serves as a land reserve for urban expansion—and because of proximity to existing development and prior commitment of capital investments in utility extensions—approximately 6,000 acres, or 1.5 percent, of the total net prime agricultural lands would be converted to urban uses by the year 2000 under the plan.

Source: SEWRPC.

Population Distribution

The 1970 resident population of the Region was estimated at about 1,756,100 persons; and population forecasts presented in Chapter III of this Volume indicate that approximately 463,000 additional persons may be expected to be added to the regional population by the year 2000. According to the forecasts, this population growth would be distributed by county as indicated in Table 73. The land use pattern proposed by the controlled centralization plan would accommodate these forecast regional and county population levels. The absolute changes in county population levels would range from an increase of nearly 190,000 persons in Waukesha County to a decrease of nearly 5,000 persons in Milwaukee County, while the relative changes would range from a gain of 124 percent in Washington County to a loss of about one-half of 1 percent in Milwaukee County. The proposed increase in the amount of land devoted to urban use within each county is compared to the proposed population change within each county in Table 74. In total, the controlled centralization plan would accommodate an approximate 26 percent increase in regional population with an approximate 20 percent increase in urban land area.

As indicated in Table 75, the population density within the developed urban area of the Region under the controlled centralization plan would continue to decline over the planning period from the 1970 level of about 4,300 persons per square mile to a 2000 level of about 3,200 persons per square mile, thus continuing the trend toward declining densities evident in the Region since 1920. The rate of decline would be reduced, however, by implementation of the proposals in the controlled centralization plan to develop the majority of new residential land uses within the Region at medium instead of low densities and to provide such development with public sanitary sewer and water supply services.

Employment Distribution

In 1972 the total number of jobs within the Region was estimated at nearly 749,000, and the economic forecast prepared by the Commission and presented in Chapter III of this Volume indicates that by the year 2000 total regional employment should increase to slightly over one million jobs. As shown in Table 76, the controlled centralization plan would result in employment increases for each county in the Region, ranging from an additional 13,300 jobs in Walworth County to an additional 90,200 jobs in Milwaukee County. The proportion of total regional employment in Milwaukee County would, however, continue to decline from 68 percent in 1972 to 59 percent in 2000.

Public Sanitary Sewer and Water Supply Service

Under the controlled centralization plan, all of the proposed new urban development within the Region would be served by public sanitary sewer and water supply facilities. As indicated in Tables 77 and 78 and as shown on Map 8, about 630 square miles, or nearly 92 percent of the total developed area of the Region, and about 2.09 million persons, or about 94 percent of the resident population of the Region, would be served by public sanitary sewer and water supply services by the year 2000 under this alternative plan. In 1970 about 301 square miles, or about 76 percent of the developed area of the Region, and about 1.49 million persons, or about 85 percent of the resident population of the Region, were served by public sanitary sewer facilities. About 259 square miles, or about 65 percent of the developed area of the Region, and about 1.39 million persons, or about 79 percent of the resident popu-

Table 73

EXISTING AND PROPOSED POPULATION DISTRIBUTION IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	1970 Population		Planned Increment		2000 Population	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha	117,917	6.7	56,883	48.2	174,800	7.9
Milwaukee	1,054,249	60.0	-4,649	-0.4	1,049,600	47.3
Ozaukee	54,461	3.1	59,539	109.3	114,000	5.1
Racine	170,838	9.7	46,862	27.4	217,700	9.8
Walworth	63,444	3.6	36,156	57.0	99,600	4.5
Washington	63,839	3.7	79,161	124.0	143,000	6.4
Waukesha	231,338	13.2	189,262	81.8	420,600	19.0
Total	1,756,086	100.0	463,214	26.4	2,219,300	100.0

Source: SEWRPC.

Table 74

URBAN LAND AREA AND POPULATION
INCREMENT IN THE REGION BY COUNTY: 1970-2000
CONTROLLED CENTRALIZATION LAND USE PLAN

County	Increment 1970-2000			
	Urban Land Area		Population	
	Acres	Percent	Number	Percent
Kenosha	5,929.00	21.4	56,883	48.2
Milwaukee	13,322.70	12.5	-4,649	-0.4
Ozaukee	7,218.38	30.4	59,539	109.3
Racine	5,036.03	14.4	46,862	27.4
Walworth	4,856.53	15.0	36,156	57.0
Washington	9,092.78	34.8	79,161	124.0
Waukesha	18,561.54	24.2	189,262	81.8
Total	64,016.96	19.5	463,214	26.4

Source: SEWRPC.

lation of the Region, were served by public water supply facilities in 1970. On a county basis, the percent of developed area served by sanitary sewer and water supply services by 2000 under the controlled centralization plan would range from a low of about 77 percent in Walworth County to a high of 100 percent in Milwaukee County, while the percent of total resident population so served would similarly range from a low of 77 percent in Walworth County to a high of 100 percent in Milwaukee County.

CONTROLLED DECENTRALIZATION LAND USE PLAN DESCRIPTION

The controlled decentralization alternative plan for 2000 also represents a conscious continuation of historic development trends within the Region, emphasizing, however, the most recent development trends observed

Table 75

POPULATION DENSITY IN THE REGION: SELECTED YEARS
1850-1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Year	Population					Area (Square Miles)		Persons Per Square Mile	
	Urban		Rural		Total	Urban	Total	Urban	Total
	Number	Percent of Total	Number	Percent of Total					
1850	28,623	25.2	84,766	74.8	113,389	4	2,689	7,155.8	42.2
1880	139,509	50.3	137,610	49.7	277,119	18	2,689	7,750.5	103.1
1900	354,082	70.6	147,726	29.4	501,808	37	2,689	9,569.8	186.6
1920	635,376	81.1	148,305	18.9	783,681	56	2,689	11,346.0	291.4
1940	991,535	92.9	76,164	7.1	1,067,699	90	2,689	11,017.1	397.1
1950	1,179,084	95.0	61,534	5.0	1,240,618	138	2,689	8,544.1	461.4
1963	1,634,200	97.6	40,100	2.4	1,674,300	340	2,689	4,806.5	622.6
1970	1,728,949	98.5	27,137	1.5	1,756,086	397	2,689	4,355.0	653.1
2000	2,201,100	99.2	18,200	0.8	2,219,300	688	2,689	3,199.3	601.6

Source: SEWRPC.

Table 76

EXISTING AND PROPOSED EMPLOYMENT IN THE REGION BY COUNTY
1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	1972 Employment		Planned Increment 1972-2000		2000 Employment	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha	40,600	5	24,100	59	64,700	6
Milwaukee	508,500	68	90,200	18	598,700	59
Ozaukee	19,300	3	16,200	84	35,500	3
Racine	63,600	8	25,500	40	89,100	9
Walworth	24,100	3	13,300	55	37,400	4
Washington	21,200	3	31,400	148	52,600	5
Waukesha	71,500	10	66,500	93	138,000	14
Total	748,800	100	267,200	36	1,016,000	100

Source: SEWRPC.

Table 77

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED
BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN THE REGION
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Area and Population	Existing Service 1970		Planned Service Increment		Total Service 2000	
	Public Sanitary Sewer	Public Water Supply	Public Sanitary Sewer	Public Water Supply	Public Sanitary Sewer	Public Water Supply
Developed Area						
Total Square Miles	396.9	396.9	291.5	291.5	688.4	688.4
Square Miles Served	301.0[a]	259.4	329.5	371.1	630.5	630.5
Percent of Total Served	75.8	65.3	--	--	91.6	91.6
Population						
Total Population	1,756,100	1,756,100	463,200	463,200	2,219,300	2,219,300
Population Served	1,488,700	1,390,000	604,800	703,500	2,093,500	2,093,500
Percent of Total Served	84.8	79.2	--	--	94.3	94.3

[a] *Does not include about four square miles located beyond the delineated urban growth ring for 1970.*

Source: SEWRPC.

over the period from 1963 to 1970. The controlled decentralization plan places somewhat greater emphasis on the continued effect of the urban land market in determining the location, intensity, and character of future urban development within the Region than the controlled centralization plan, and does so through a lesser degree of proposed land use regulation.

Under this plan, the historic growth trends would be altered only by protecting from further urban development the floodlands of the perennial streams, by protecting from development the best remaining woodlands and wetlands, and by developing an integrated system of park and open space areas centered on the primary environmental corridors. Unlike the controlled centraliza-

Table 78

EXISTING AND PLANNED DEVELOPED AREA AND POPULATION BY PUBLIC SANITARY SEWER AND WATER SUPPLY IN THE REGION BY COUNTY 1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

County	Total Area (Square Miles)	Developed Area[a] (Square Miles)	Existing 1970								Planned 2000				
			Public Sewer Service				Public Water Supply Service				Developed Area (Square Miles)	Public Sewer and Water Supply Service[b]			
			Developed Area Served		Population Served		Developed Area Served		Population Served			Developed Area Served		Population Served	
			Square Miles	Percent of County	Number	Percent of County	Square Miles	Percent of County	Number	Percent of County		Square Miles	Percent of County	Number	Percent of County
Kenosha	278.3	32.5	23.83	73.3	94,000	79.7	16.44	50.6	81,000	68.7	55.4	50.8	91.7	163,100	93.3
Milwaukee	242.3	174.6	170.60	97.7	1,034,700	98.1	165.16	94.6	1,013,400	96.1	215.4	215.4	100.0	1,049,600	100.0
Ozaukee	234.4	19.8	17.28	87.3	36,300	66.7	7.17	36.2	25,700	47.2	54.5	49.8	91.4	101,400	88.9
Racine	339.9	46.4	29.49	63.6	135,900	79.5	25.23	54.4	120,900	70.8	74.0	68.1	92.0	198,100	91.0
Walworth	578.1	28.9	11.84	41.0	35,500	56.0	12.67	43.8	36,300	57.2	55.8	42.8	76.7	77,100	77.4
Washington	435.5	16.3	9.42	57.8	30,200	47.3	8.09	49.6	28,300	44.3	52.5	41.4	78.9	113,600	79.4
Waukesha	580.7	78.4	38.51	49.1	122,100	52.8	24.61	31.4	84,400	36.5	180.8	162.2	89.7	390,600	92.9
Total	2,689.2	396.9	300.97	75.8	1,488.700	84.8	259.37	65.3	1,390,000	79.2	688.4	630.5	91.6	2,093,500	94.3

[a] *Based on historic urban growth analysis. See Table 61, page 122, Volume One of this report.*

[b] *Public sewer service based on adopted regional sanitary sewerage system plan. It was assumed that public water supply served would be extended to all areas served by public sewers.*

Source: SEWRPC.

tion plan, new urban development under the controlled decentralization plan would take place both in those areas where sanitary sewer service can be readily provided and, following the trends in land use development over the 1963 to 1970 period, in those areas beyond the existing and planned future sewer service areas where soils are considered suitable for permanent reliance on onsite septic tank sewage disposal systems. New urban development would not, however, be placed in primary environmental corridors. The plan further allocates such unsewered urban development first to nonprime agricultural and open space lands within each planning analysis area and, only as necessary to fully meet the forecast land use demand, to the prime agricultural lands. This plan does thus attempt to mitigate the effect of urban development upon the remaining prime agricultural land base of the Region.

Under this alternative plan, the allocation of future land use within each county of the Region approximates the alternative forecast county population levels set forth in Figure 39 and, to a somewhat greater extent than the controlled centralization plan, approximates land development proposals contained in local community development plans and zoning documents. An understanding of the regional growth pattern proposed by this alternative can be obtained from reviews of the graphic representation of the plan shown on Map 9, the statistical presentation set forth in Table 79 and Appendix Tables G-11 through G-18.

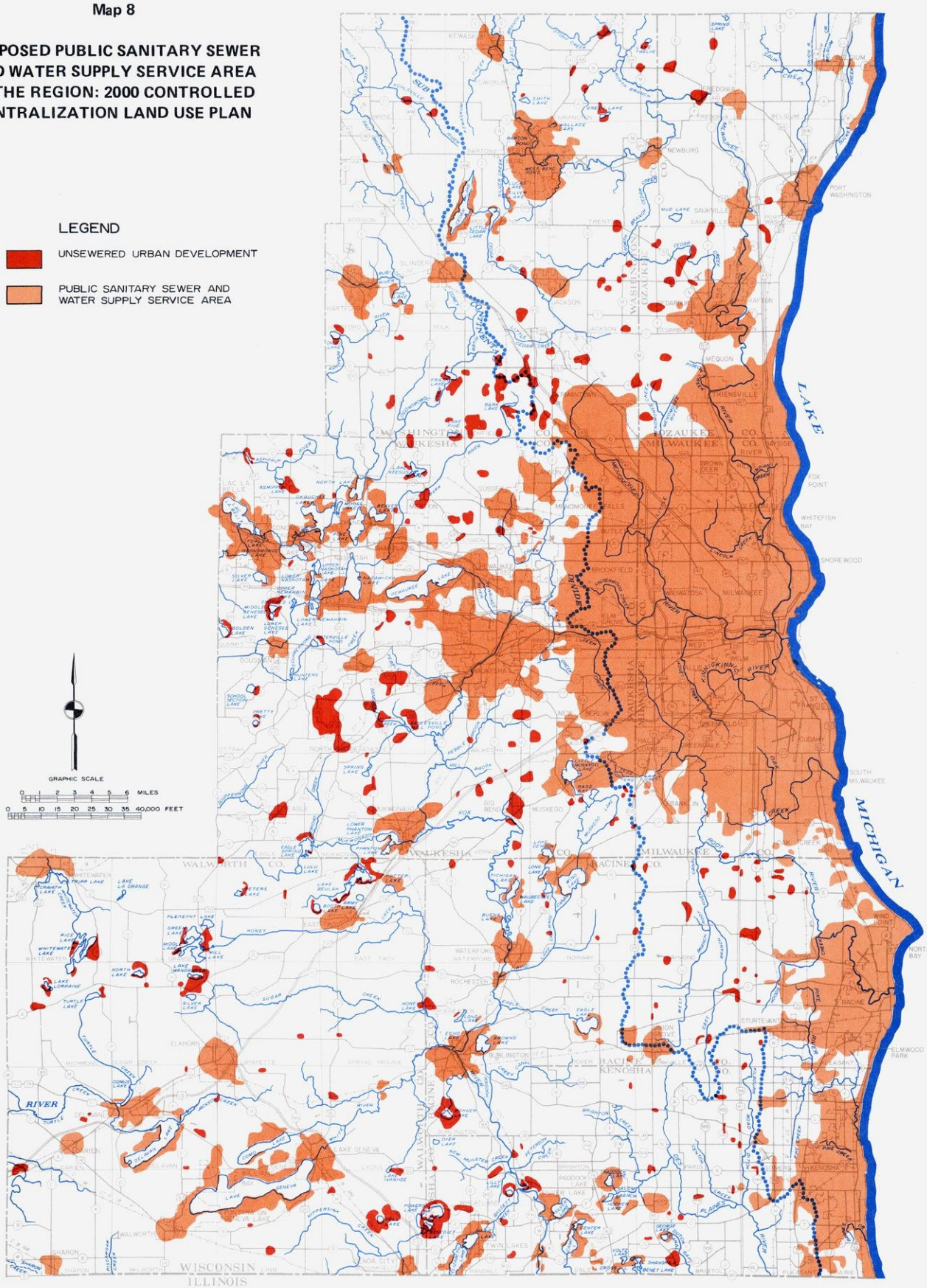
Residential Development

The controlled decentralization plan would accommodate the regional population increase of 463,000 persons anticipated by the year 2000, as well as the redistribution of about 150,000 persons from Milwaukee County, both through an outward expansion of existing urban areas and through the development at suburban densities of certain planning analysis areas lying beyond existing and planned sanitary sewer service areas, particularly in Ozaukee, Washington, and Waukesha Counties. The future intensity and distribution of residential development would be established almost exclusively through the operation of the urban land market, constrained in the public interest only to the extent necessary to ensure that urban development does not intrude upon the primary environmental corridors of the Region; to ensure that such development occurs first on agricultural and open space lands not identified as prime in the regional land use inventory; and to ensure that such development occurs only on soils suitable for the absorption of septic tank effluent. Unlike the controlled centralization plan, the controlled decentralization plan would not tend to discourage leap-frog urban development in outlying areas of the Region, but would accommodate such development.

Under this plan about 27 percent of all new urban residential development in the Region would be located within 20 miles of the central business district of Milwaukee. As for that portion of the development to be provided with centralized sanitary sewer and water supply services and to be accommodated in planned residential development units, nearly all would be developed at medium densities much as proposed in the controlled centralization plan. As for that portion of the new development not planned to be served with centralized sanitary sewer and water supply services and not planned to be accommodated in neighborhood development units, most would occur at the suburban residential density with a net lot area per dwelling unit averaging nearly two acres.

Map 8

PROPOSED PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE AREA IN THE REGION: 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

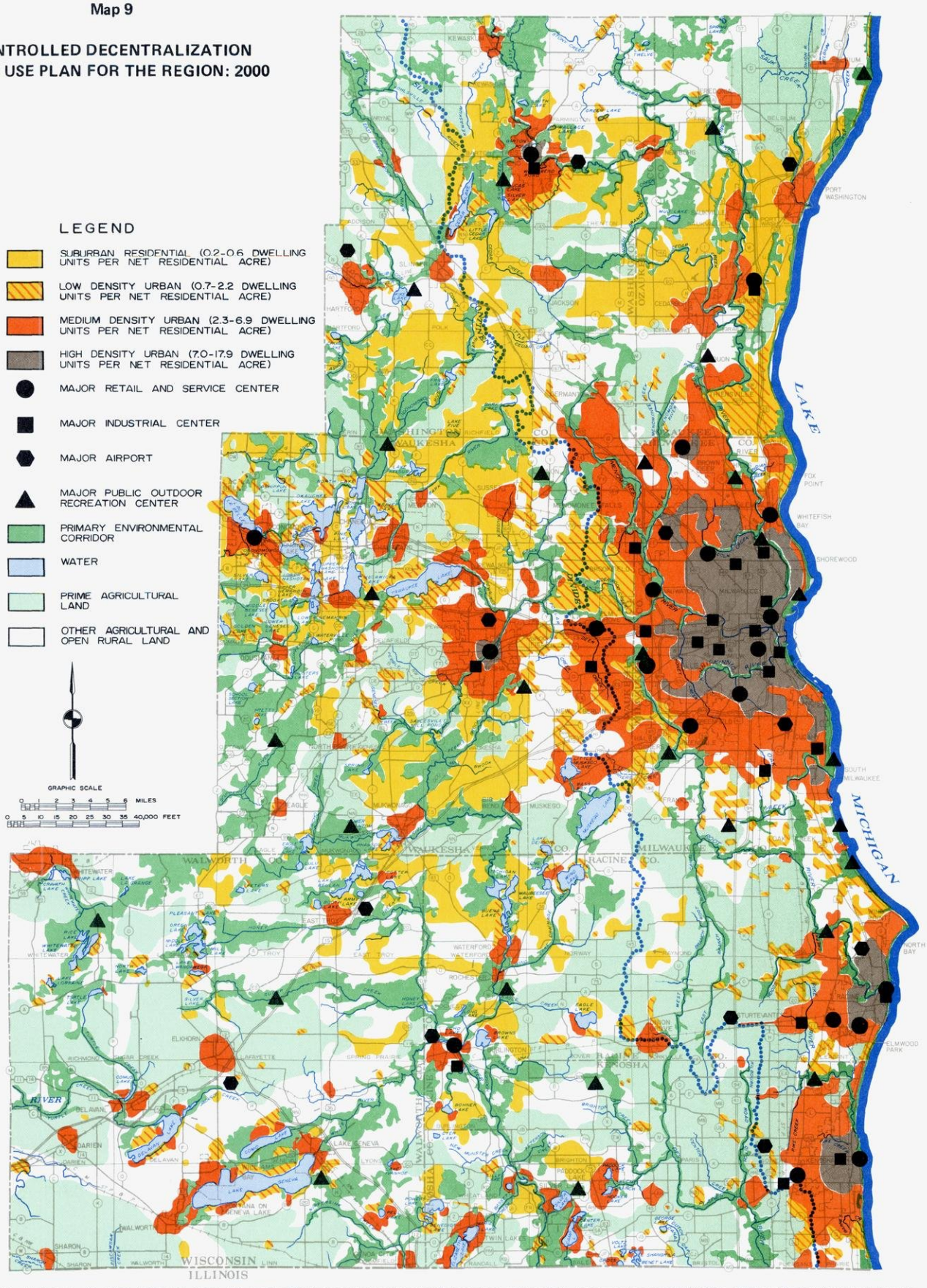


Under the controlled centralization land use plan alternative, essentially all proposed new urban development within the Region would be served by public sanitary sewer and water supply facilities. Approximately 630 square miles, or nearly 92 percent of the total urban land area of the Region, and about 2.1 million persons, or 94 percent of the total population, would be served by the year 2000.

Source: SEWRPC.

Map 9

CONTROLLED DECENTRALIZATION LAND USE PLAN FOR THE REGION: 2000



Like the controlled centralization land use plan, the controlled decentralization land use plan alternative represents a continuation of historic development trends within the Region. Unlike the controlled centralization land use plan alternative, however, the latter emphasizes the development trends observed within the Region over the period from 1963 to 1970. New urban development would take place both in those areas where sanitary sewer service can be readily provided and in those areas beyond the existing and planned future sewer service areas where soils are suitable for utilization of onsite septic tank sewage disposal systems. Under the controlled decentralization land use plan, by the year 2000 only 45 percent of the total urban residential land and 63 percent of the total population would be within a distance of 20 miles from the central business district of Milwaukee. About 63 percent of the total urban land and 89 percent of the total population would be served by public sanitary sewer and water supply facilities. New urban development would not, however, be placed in the primary environmental corridor and conversion of prime agricultural lands to urban uses would be minimized.

Source: SEWRPC.

Table 79

EXISTING AND PROPOSED LAND USE IN THE REGION
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High-Density	24,388.89	7.4	- 2,548.00	- 10.4	21,840.89	4.6
Urban Medium-Density	37,092.51	11.3	43,887.96	118.3	80,980.47	16.9
Urban Low-Density	72,700.78	22.2	- 2,423.63	- 3.3	70,277.15	14.7
Suburban	22,084.21	6.7	64,889.35	293.8	86,973.56	18.2
Subtotal	156,266.39	47.6	103,805.68	66.4	260,072.07	54.4
Commercial	6,516.85	2.0	384.48	5.9	6,901.33	1.4
Industrial	10,038.61	3.1	3,847.09	38.3	13,885.70	2.9
Governmental[a]	16,617.57	5.1	2,735.41	16.5	19,352.98	4.0
Transportation[b]	109,406.82	33.4	33,788.16	30.9	143,194.98	30.0
Recreation	28,996.10[c]	8.8	5,738.07[d]	19.8	34,734.17	7.3
Urban Land Use Subtotal	327,842.34	100.0	150,298.89	45.8	478,141.23	100.0
Rural Land Use						
Residential	--[e]	--	4,782.54	--	4,782.54	0.4
Agriculture	1,040,121.46	74.7	- 141,070.57	- 13.6	899,050.89	72.3
Other Open Lands[f]	353,136.03	25.3	- 14,010.67	- 4.0	339,125.36	27.3
Rural Land Use Subtotal	1,393,257.49	100.0	- 150,298.70	- 10.8	1,242,958.79	100.0
Total	1,721,099.83	--	--	--	1,721,100.02	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and offstreet parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

As indicated in Table 80, nearly 109,000 acres, or about 170 square miles, of new residential development would be added to the existing stock of residential land within the Region. Most of this new development would occur in Ozaukee, Washington, and Waukesha Counties, and primarily at suburban residential densities. Importantly, it should be noted that the controlled decentralization plan proposes to accommodate nearly 5,000 acres of rural residential uses in the form of rural estates on lands located within the primary environmental corridors. Such rural estates would have a net lot area exceeding five acres and, if properly located and designed, would not destroy the important natural resource base features found in the corridors.

Commercial and Industrial Development

Under the controlled decentralization plan, a total of 22 major industrial centers and 19 major multipurpose commercial centers are proposed. In total, these types of centers would employ about 234,500 and 120,500,

Table 80

EXISTING AND PROPOSED RESIDENTIAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Residential Land Use in Acres											
	Urban High-Density				Urban Medium-Density				Urban Low-Density			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	1,375.70	237.00	1,612.70	17.2	3,499.02	7,262.90	10,761.92	207.6	7,099.74	- 1,668.20	5,431.54	- 23.5
Milwaukee	20,177.88	- 2,992.03	17,185.85	- 14.8	13,663.23	6,977.96	20,641.19	51.1	9,290.54	- 1,311.68	7,978.86	- 14.1
Ozaukee	53.39	- 44.49	8.90	- 83.3	2,297.41	3,845.07	6,142.48	167.4	6,237.32	2,430.32	8,667.64	39.0
Racine	2,031.03	59.41	2,090.44	2.9	4,254.75	3,954.85	8,209.60	93.0	8,970.09	- 1,245.78	7,724.31	- 13.9
Walworth	29.03	19.91	48.94	68.6	3,082.85	3,794.82	6,877.67	123.1	7,223.40	199.91	7,423.31	2.8
Washington	98.77	91.17	189.94	92.3	2,999.42	4,283.75	7,283.17	142.8	6,983.67	782.86	7,766.53	11.2
Waukesha	623.09	81.03	704.12	13.0	7,295.83	13,768.61	21,064.44	188.7	26,896.02	- 1,611.06	25,284.96	- 6.0
Total	24,388.89	- 2,548.00	21,840.89	- 10.4	37,092.51	43,887.96	80,980.47	118.3	72,700.78	- 2,423.63	70,277.15	- 3.3

County	Residential Land Use in Acres											
	Suburban				Rural				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970[a]	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	1,502.97	1,264.03	2,767.00	84.1	--	54.30	54.30	--	13,477.43	7,150.03	20,627.46	53.1
Milwaukee	2,500.65	- 757.10	1,743.55	- 30.3	--	446.29	446.29	--	45,632.30	2,363.44	47,995.74	5.2
Ozaukee	3,732.72	14,070.80	17,803.52	377.0	--	319.49	319.49	--	12,320.84	20,621.19	32,942.03	167.4
Racine	1,368.75	5,756.01	7,124.76	420.5	--	48.62	48.62	--	16,624.62	8,573.11	25,197.73	51.6
Walworth	3,072.87	3,770.88	6,843.75	122.7	--	33.27	33.27	--	13,408.15	7,818.79	21,226.94	58.3
Washington	1,443.64	21,154.33	22,597.97	1,465.3	--	168.59	168.59	--	11,525.50	26,480.70	38,006.20	229.8
Waukesha	8,462.61	19,630.40	28,093.01	232.0	--	3,711.98	3,711.98	--	43,277.55	35,580.96	78,858.51	82.2
Total	22,084.21	64,889.35	86,973.56	293.8	--	4,782.54	4,782.54	--	156,266.39	108,588.22	264,854.61	69.5

[a] *Included in land use inventory as part of urban residential land use.*

Source: SEWRPC.

respectively, for a total of 43 percent of the forecast employment in the commercial and industrial groups. The other 57 percent, or approximately 478,000 jobs, would be located in smaller community and local employment centers included in the local development areas. Of the 22 planned major industrial centers, 17 existed in 1970 and five are proposed new centers (see Tables 81 and 82 and Map 10). These five new centers are Kenosha-West, Cedarburg-Grafton, Oak Creek, Burlington, and Waukesha. Unlike the controlled centralization plan, the controlled decentralization plan does not propose to expand the developing industrial center identified as Milwaukee-Granville, and that center would not develop into a major regional employment center.

Of the 19 planned major retail and service centers, 11 existed in 1970 and eight are proposed centers. The eight proposed centers are to be located in or near the Cities of Kenosha, Milwaukee, Cedarburg-Grafton, and Racine and also include the West Bend Central Business District (CBD), Waukesha CBD, Burlington CBD, and Oconomowoc CBD. Of these new major centers, one—Northridge in the City of Milwaukee—has already been developed since the base year 1970 inventory (see Tables 83 and 84 and Map 11). In addition one existing major center—Elmwood Plaza—would be replaced by the proposed major center in the City of Racine.

The commercial and industrial land use changes proposed under the controlled decentralization plan are further detailed in Tables 85 and 86. An increase of nearly 400 acres of commercial land use development and about 3,800 acres of industrial land use development would be added to the existing stock of these land use categories. These land use development requirements are exclusive of any development area required for offstreet parking, access roads, and yards and open spaces. In the commercial land use category, Washington and Waukesha

Table 81

SELECTED CHARACTERISTICS OF EXISTING AND PROPOSED MAJOR INDUSTRIAL CENTERS IN THE REGION
1970, 1972, AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Major Industrial Center[a]	Land Use in Acres						Employment		
	Gross[b]			Net[c]					
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1972	Planned Increment	Total 2000
Existing									
Kenosha-East	234	--	234	214	--	214	11,600	300	11,900
Cudahy-South Milwaukee	294	--	294	256	--	256	7,300	300	7,600
Milwaukee-Glendale	446	--	446	358	--	358	17,800	500	18,300
Milwaukee-Menomonee Valley East	447	--	447	398	--	398	18,600	600	19,200
Milwaukee-Menomonee Valley West	134	--	134	120	--	120	5,300	100	5,400
Milwaukee Near North	155	--	155	123	--	123	15,000	600	15,600
Milwaukee Near South	307	--	307	280	--	280	12,600	400	13,000
Milwaukee-North	391	--	391	342	--	342	20,800	600	21,400
Milwaukee-South	111	--	111	89	--	89	4,100	700	4,800
Wsst Allis-East	252	--	252	220	--	220	9,300	300	9,600
West Allis-West	160	--	160	129	--	129	3,600	200	3,800
West Milwaukee	472	--	472	408	--	408	15,400	600	16,000
Racine	340	--	340	273	--	273	12,500	400	12,900
Butler-Wauwatosa	474	--	474	375	--	375	14,600	600	15,200
West Bend	110	232	342	83	197	280	3,800	5,100	8,900
New Berlin	198	460	658	174	200	374	3,500	4,200	7,700
Mt. Pleasant	176	198	374	162	168	330	3,500	5,300	8,800
Subtotal	4,701	890	5,591	4,004	565	4,569	179,300	20,800	200,100
Proposed									
Kenosha-West	--	347	347	--	294	294	--	6,000	6,000
Cedarburg-Grafton	--	241	241	--	198	198	--	5,700	5,700
Oak Creek	--	602	602	--	500	500	--	7,700	7,700
Burlington	--	224	224	--	188	188	--	4,400	4,400
Waukesha	--	457	457	--	377	377	--	10,600	10,600
Subtotal	--	1,871	1,871	--	1,557	1,557	--	34,400	34,400
Total	4,701	2,761	7,462	4,004	2,122	6,126	179,300	55,200	234,500

[a] *See Map 10.*

[b] *Includes land actually used for industrial purposes together with associated offstreet parking and road facilities, loading areas, and landscaped areas.*

[c] *Includes only that land actually used for industrial purposes.*

Source: SEWRPC.

Table 82

EXISTING AND PROPOSED INDUSTRIAL EMPLOYMENT DISTRIBUTION BY TYPE OF INDUSTRIAL AREA
1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Type of Industrial Area	Industrial Employment[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Major Industrial						
Existing	179,300	59.7	20,800	11.6	200,100	50.1
Proposed	--	--	34,400	--	34,400	8.6
Subtotal	179,300	59.7	55,200	30.8	234,500	58.7
Local and Other	120,900	40.3	44,000	36.4	164,900	41.3
Total	300,200	100.0	99,200	33.0	399,400	100.0

[a] *Includes manufacturing and wholesaling industries.*

Source: SEWRPC.

Counties would account for the largest acreage increases, while Milwaukee County would lose land in this category because of declining commercial use and employment in several planning analysis areas in the City of Milwaukee. Also in the commercial category, the greatest percentage increase would occur in Washington County where a gain of 149 commercial acres, or nearly 50 percent, is proposed. In the industrial land use category, Milwaukee and Waukesha Counties would account for the largest acreage increases. The largest percentage increase would occur in Washington County, where a gain of nearly 470 industrial acres, or about 108 percent, is proposed.

Governmental and Institutional Land Use

As indicated in Table 87, the controlled decentralization plan would add about 2,700 acres of governmental and institutional land uses to the existing governmental and institutional land use stock. This represents about a 16 percent increase. The largest absolute increase would occur in Waukesha County where about 937 governmental and institutional land use acres would be added, while the largest percentage increase would occur in Washington County where nearly 400 governmental and institutional land use acres would be added, representing a gain of about 43 percent.

Transportation Land Use

As indicated in Table 88, the controlled decentralization plan would add nearly 34,000 acres of transportation land uses to the existing regional stock in this category. It should be noted that this category includes all communication and utility uses; harbor, railroad, and airport uses; truck terminals; and offstreet parking associated with other land use development; as well as streets and highways. This represents nearly a 31 percent increase in the existing stock in this land use category. The largest absolute increase would occur in Waukesha County where nearly 11,000 acres of land would be converted to transportation and related land uses, representing an increase of about 51 percent. The largest relative increase would occur in Ozaukee County where about 5,700 acres of land would be converted to transportation and related land uses, representing an increase of about 71 percent.

Open Space—Recreational Land Use

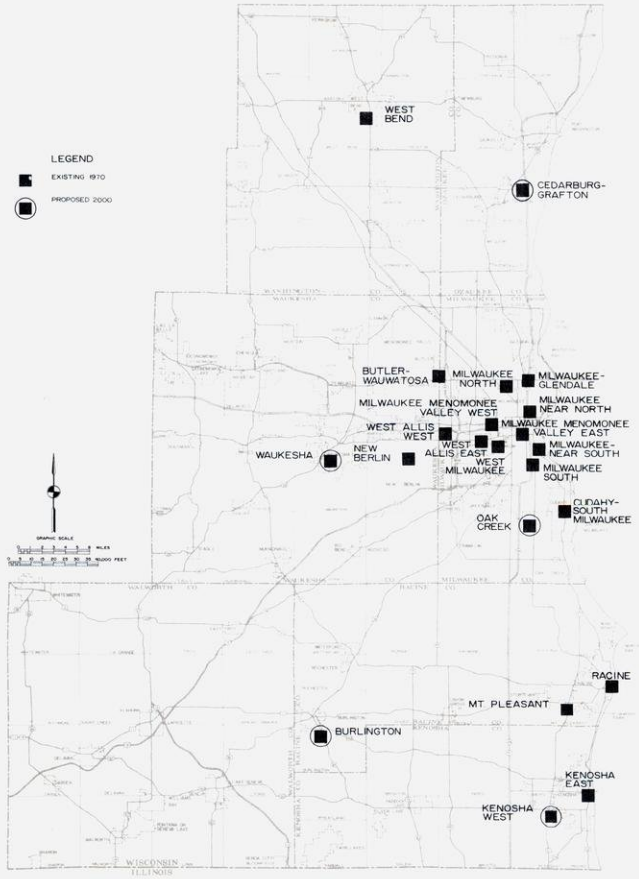
Under the controlled decentralization plan, about 4,300 acres of land would be added to the existing stock of gross recreational land use (see Table 89). This represents an increase of nearly 8 percent over the 1970 acreage. This additional recreational land, however, represents only an increase in land devoted to public recreation use.

For the category of major regional outdoor recreation centers, the controlled decentralization plan is identical to the controlled centralization plan discussed above. Two new major public park and outdoor recreation centers would be created—Sugar Creek in the Town of LaFayette, Walworth County, and Paradise Valley in the Town of West Bend, Washington County—and one existing major center would undergo a major expansion—Monches in the Town of Merton, Waukesha County (see Map 6). Land acquisition at these proposed major park sites would total nearly 1,400 acres.

As shown in Table 89, the largest absolute increase in land devoted to public recreation use under the controlled decentralization plan would occur in Walworth County where about 1,100 acres would be added, an increase

Map 10

MAJOR INDUSTRIAL CENTERS IN THE REGION
2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

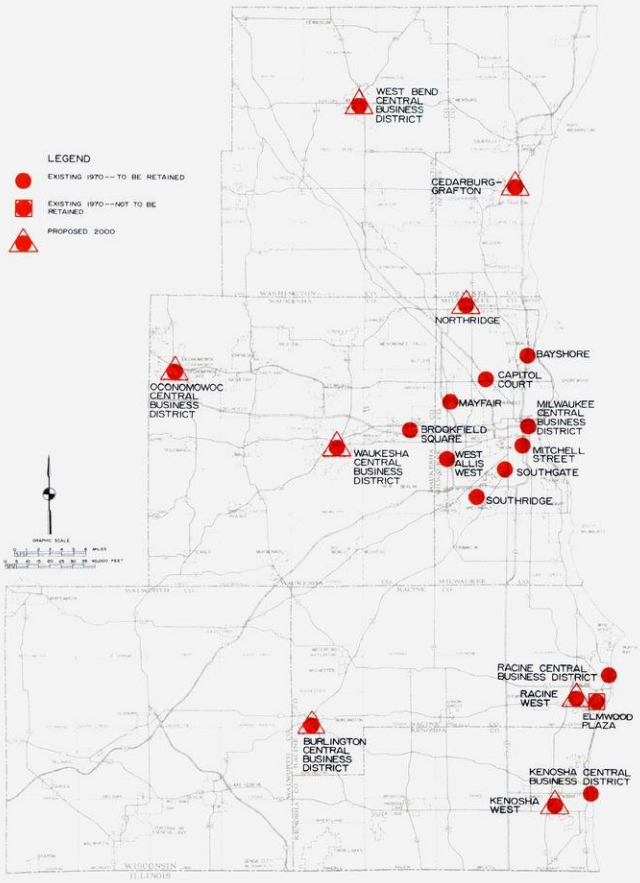


Under the controlled decentralization land use plan alternative a total of 22 major industrial centers would be provided within the Region by the year 2000. Of the 22 planned major industrial centers, 17 existed in 1970 and five are proposed new centers. The five proposed new sites, each having a minimum nonsite area of 320 acres, consist of Kenosha-West, Cedarburg-Grafton, Oak Creek, Burlington, and Waukesha.

Source: SEWRPC.

Map 11

MAJOR RETAIL AND SERVICE CENTERS IN THE REGION
2000 CONTROLLED DECENTRALIZATION LAND USE PLAN



The controlled decentralization land use plan alternative recommends that 19 major retail and service centers be provided to serve the needs of the Region by 2000. Of the 19 planned major retail and service centers, 12 existed in 1970 and 11 of these are to be retained and one not to be retained. Eight are proposed new centers. The eight proposed new centers, each having a minimum gross site area of 70 acres, are to be located in or near the Cities of Kenosha, Milwaukee, Cedarburg-Grafton, and Racine and also include the West Bend, Waukesha, Burlington, and Oconomowoc central business districts.

Source: SEWRPC.

of nearly 12 percent. The greatest percentage increase would occur in Ozaukee County where a gain of nearly 13 percent, or about 420 acres, would be realized.

As shown in Table 90, there were in 1973 about 16.3 acres of public park and outdoor recreation land per thousand population in the Region. The proposed increment of about 4,300 acres of public park land would be needed to serve the expanded and redistributed regional population, and would result in a slight decrease in the number of acres of public park land per thousand population by the year 2000 to 15.1.

Open Space—Primary Environmental Corridors

Under the controlled decentralization plan, the primary environmental corridors, which contain the highest quality elements of the natural resource base, would be preserved and protected from development. The

Table 83

SELECTED CHARACTERISTICS OF EXISTING AND PROPOSED MAJOR RETAIL AND SERVICE CENTERS IN THE REGION 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Major Retail and Service Center	Land Use in Acres						Employment		
	Gross[a]			Net[b]					
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1972	Planned Increment	Total 2000
Existing									
Kenosha CBD[c]	45	--	45	29	--	29	2,400	- 200	2,200
Bayshore	79	--	79	28	--	28	5,600	- 100	5,500
Capitol Court	79	--	79	28	--	28	3,000	--	3,000
Mayfair	109	10	119	21	10	31	3,600	100	3,700
Milwaukee CBD	208	--	208	97	--	97	65,900	- 500	65,400
Mitchell Street	50	--	50	20	--	20	4,400	- 300	4,100
Southgate	91	--	91	28	--	28	2,400	- 100	2,300
West Allis-West	58	15	73	21	5	26	1,500	600	2,100
Elmwood Plaza[d]	52	- 52	--	18	- 18	--	1,700	- 1,700	--
Southridge	55	54	109	25	18	43	2,700	2,000	4,700
Racine CBD	62	--	62	31	--	31	4,100	300	4,400
Brookfield Square	101	--	101	44	--	44	1,900	300	2,200
Subtotal	989	27	1,016	390	15	405	99,200	400	99,600
Proposed									
Kenosha-West	--	70	70	--	25	25	--	2,000	2,000
Northridge	--	125	125	--	42	42	--	3,400	3,400
Cedarburg-Grafton	--	86	86	--	30	30	--	2,700	2,700
Racine-West	--	75	75	--	26	26	--	2,200	2,200
Waukesha CBD	--	69	69	--	44	44	--	3,700	3,700
Oconomowoc CBD	--	64	64	--	26	26	--	2,100	2,100
West Bend CBD	--	68	68	--	43	43	--	2,200	2,200
Burlington CBD	--	61	61	--	25	25	--	2,600	2,600
Subtotal	--	618	618	--	261	261	--	20,900	20,900
Total	989	645	1,634	390	276	666	99,200	21,300	120,500

[a] *Includes land actually used for retail and service purposes together with associated offstreet parking and road facilities, loading areas, and landscaped areas.*

[b] *Includes only that land actually used for retail and service purposes.*

[c] *Central Business District.*

[d] *This center would be replaced by a proposed new center at the intersection of STH 11 and STH 31. Elmwood Plaza would remain as a community level retail and service center.*

Source: SEWRPC.

Table 84

EXISTING AND PROPOSED COMMERCIAL EMPLOYMENT DISTRIBUTION BY TYPE OF COMMERCIAL AREA
1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Type of Commercial Area	Commercial Employment[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Major Retail and Service						
Existing	99,200	32.5	400	0.4	99,600	23.0
Proposed	--	--	20,900	--	20,900	4.8
Subtotal	99,200	32.5	21,300	21.5	120,500	27.8
Local and Other	205,900	67.5	107,300	52.1	313,200	72.2
Total	305,100	100.0	128,600	42.2	433,700	100.0

[a] *Includes retail and service industries; excludes government and transportation and communication industries.*

Source: SEWRPC.

Table 85

EXISTING AND PROPOSED COMMERCIAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Commercial Land Use in Acres											
	Major				Local and Other				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	29	25	54	86.2	475	122	597	25.7	504	147	651	29.1
Milwaukee	268	75	343	28.0	2,607	-645	1,962	-24.7	2,875	-570	2,305	-19.8
Ozaukee	--	30	30	--	330	101	431	30.6	330	131	461	39.7
Racine	49	33	82	67.3	526	67	593	12.7	575	100	675	17.4
Walworth	--	--	--	--	593	85	678	14.3	593	85	678	14.3
Washington	--	43	43	--	299	106	405	35.5	299	149	448	49.8
Waukesha	44	70	114	159.1	1,297	273	1,570	21.0	1,341	343	1,684	25.6
Total	390	276	666	70.8	6,127	109	6,236	1.8	6,517	385	6,902	5.9

Source: SEWRPC.

Table 86

EXISTING AND PROPOSED INDUSTRIAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Industrial Land Use in Acres											
	Major				Local and Other				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	214	294	508	137.4	597	135	732	22.6	811	429	1,240	52.9
Milwaukee	2,944	500	3,444	17.0	1,955	461	2,416	23.6	4,899	961	5,860	19.6
Ozaukee	--	198	198	--	444	139	583	31.3	444	337	781	75.9
Racine	435	356	791	81.8	664	186	850	28.0	1,099	542	1,641	49.3
Walworth	--	--	--	--	827	143	970	17.3	827	143	970	17.2
Washington	83	197	280	237.3	351	273	624	77.8	434	470	904	108.3
Waukesha	328	577	905	175.9	1,197	389	1,586	32.5	1,525	966	2,491	63.3
Total	4,004	2,122	6,126	53.0	6,035	1,726	7,761	28.6	10,039	3,848	13,887	38.3

Source: SEWRPC.

Table 87

EXISTING AND PROPOSED GOVERNMENTAL AND INSTITUTIONAL LAND USE IN THE REGION BY COUNTY 1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Governmental and Institutional Land Use in Acres			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	1,323.90	407.55	1,731.45	30.8
Milwaukee	7,489.97	204.53	7,694.50	2.7
Ozaukee	939.18	374.45	1,313.63	39.9
Racine	1,744.39	203.04	1,947.43	11.6
Walworth	1,192.13	210.14	1,402.27	17.6
Washington	919.03	398.63	1,317.66	43.4
Waukesha	3,008.97	937.07	3,946.04	31.1
Total	16,617.57	2,735.41	19,352.98	16.5

Source: SEWRPC.

Table 88

EXISTING AND PROPOSED TRANSPORTATION LAND USE IN THE REGION BY COUNTY 1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Transportation Land Use in Acres[a]			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	8,927.35	3,153.74	12,081.09	35.3
Milwaukee	35,430.62	1,332.96	36,763.58	3.8
Ozaukee	8,053.84	5,757.71	13,811.55	71.5
Racine	12,442.46	2,746.74	15,189.20	22.1
Walworth	12,019.97	2,516.03	14,536.00	20.9
Washington	11,286.02	7,335.39	18,621.41	65.0
Waukesha	21,246.56	10,945.59	32,192.15	51.5
Total	109,406.82	33,788.16	143,194.98	30.9

[a] *Includes communication and utility uses; harbor, railroad, and airport uses; truck terminals; and offstreet parking associated with other land use development as well as streets and highways.*

Source: SEWRPC.

Table 89

EXISTING AND PROPOSED RECREATIONAL LAND USE IN THE REGION BY COUNTY 1970, 1973, AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Recreational Land Use in Acres							
	Gross[a]				Net[b]			
	Existing 1973	Planned Increment[c]	Total 2000	Percent Change 1973-2000	Existing 1970	Planned Increment[c]	Total 2000	Percent Change 1970-2000
Kenosha	5,490	605	6,095	11.0	2,671.91	771.72	3,443.63	28.9
Milwaukee	16,414	107	16,521	0.7	9,924.02	255.34	10,179.36	2.6
Ozaukee	3,261	420	3,681	12.9	1,657.44	726.50	2,383.94	43.8
Racine	4,435	418	4,853	9.4	2,585.47	588.95	3,174.42	22.8
Walworth	9,979	1,148	11,127	11.5	4,274.76	1,325.91	5,600.67	31.0
Washington	6,019	641	6,660	10.6	1,663.71	1,101.68	2,765.39	66.2
Waukesha	10,056	968	11,024	9.6	6,218.79	967.97	7,186.76	15.6
Total	55,654	4,307	59,961	7.7	28,996.10	5,738.07	34,734.17	19.8

[a] *Includes entire site area of public and nonpublic recreational uses.*

[b] *Includes only that land intensively used for recreation purposes.*

[c] *Includes only that increment which is for public recreational use.*

Source: SEWRPC.

Table 90

EXISTING AND PROPOSED PUBLIC PARK AND OUTDOOR RECREATION LANDS IN THE REGION PER THOUSAND POPULATION 1973 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Type of Public Park and Outdoor Recreation Land	Existing 1973		Planned Increment			Total 2000	
	Acres[a]	Acres Per Thousand Population	Acres[a]	Acres Per Thousand Population	Percent Change	Acres[a]	Acres Per Thousand Population
Major Public Parks							
Existing	9,520	--	264	--	--	9,784	--
Proposed	--	--	1,120	--	--	1,120	--
Subtotal	9,520	5.3	1,384	3.0	14.5	10,904	4.9
Local and Other	19,620	11.0	2,923	6.3	14.9	22,543	10.2
Total	29,140	16.3	4,307	9.3	14.8	33,447	15.1

[a] *Represents gross recreation land; entire public site area.*

Source: SEWRPC.

acreage concentration and distribution by county under the controlled decentralization plan would be the same as that proposed under the controlled centralization plan alternative described earlier (see Map 9 and Tables 68 through 70).

Open Space—Agricultural and Other Open Space Land Use

Under the controlled decentralization plan, the expansion of urban activities into presently rural areas of the Region would result in the conversion of about 155,000 acres, or about 242 square miles, of rural land uses to urban land uses between 1970 and 2000. This would be equivalent to an average annual rate of conversion of about 6,200 acres, or nearly 10 square miles. As indicated in Table 91, much of the urban expansion under the controlled decentralization plan alternative—about 141,000 acres—would take place on lands now in agricultural uses and would result in a decrease of nearly 14 percent in the existing stock of agricultural land within the Region. New urban and suburban development in Ozaukee, Washington, and Waukesha Counties would require the conversion of about 26,000, 34,000, and 45,000 acres, respectively, to urban use by 2000. This represents about 26 percent, 18 percent, and 22 percent of the remaining agricultural acreages in these counties, respectively.

The other major open land category, consisting of woodlands, wetlands, water quarries, and unused lands, would be reduced within the Region as a whole by about 14,000 acres, or about 4 percent, by 2000 (see Table 92). The predominant land use in this category which would be subject to urban and suburban development is that of woodlands, since most woodlands provide a particularly desirable setting for residential development.

As discussed in Volume One of this report, areas particularly well suited for highly productive agricultural use within the Region—termed prime agricultural areas—were delineated in the initial regional land use-transportation study on the basis of results of detailed soil surveys and ratings by agri-business specialists. On a net basis, that is, not including existing urban development located within such areas, the areas totaled about 405,000 acres in 1970, or about 39 percent of the total land in agricultural use within the Region. As shown in Table 91, the controlled decentralization plan would propose to convert about 22,000 acres, or nearly 6 percent, of these remaining prime agricultural lands from agricultural to urban use. The largest conversions would occur in Ozaukee and Waukesha Counties where in each case about 8,000 acres of prime agricultural land would be converted (see Map 12).

Population Distribution

The 1970 resident population of the Region was estimated at about 1,756,100 persons; and population forecasts presented in Chapter III of this Volume indicate that approximately 463,000 additional persons may be expected to be added to the resident population of the Region by the year 2000. Under the controlled decentralization plan, this population growth, together with a redistribution of approximately 150,000 persons from Milwaukee County, would be distributed by county as indicated in Table 93. The land use pattern proposed by the controlled decentralization plan would accommodate these regional and county population levels. The absolute changes in county population levels would range from an increase of nearly 232,000 persons in Waukesha County to a decrease of nearly 156,000 persons in

Table 91

EXISTING AND PROPOSED AGRICULTURAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Agricultural Land Use in Acres							
	Total				Net Prime[a]			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	113,929.89	- 10,298.93	103,630.96	- 9.0	66,054.65	- 3,200.55	62,854.10	- 4.8
Milwaukee	28,607.65	- 3,225.05	25,382.60	- 11.3	7,164.83	- 641.50	6,523.33	- 9.0
Ozaukee	100,491.37	- 26,266.51	74,224.86	- 26.1	37,112.23	- 7,972.91	29,139.32	- 21.5
Racine	147,206.95	- 11,510.68	135,696.27	- 7.8	69,128.85	- 1,261.51	67,867.34	- 1.8
Walworth	261,743.76	- 10,452.40	251,291.36	- 4.0	112,462.66	- 894.14	111,568.52	- 0.8
Washington	186,465.75	- 34,310.81	152,154.94	- 18.4	49,537.08	- 387.56	49,149.52	- 0.8
Waukesha	201,676.09	- 45,006.19	156,669.90	- 22.3	63,743.55	- 8,030.45	55,713.10	- 12.6
Total	1,040,121.46	- 141,070.57	899,050.89	- 13.6	405,203.85	- 22,388.62	382,815.23	- 5.5

[a] *Net prime agricultural lands are defined as those areas which 1) contain soils rated in the regional detailed operational soil survey as very good or good for agriculture and 2) occur in concentrated areas over five square miles in extent and which have been designated as exceptionally good for agricultural production by agricultural specialists.*

Source: SEWRPC.

Table 92

EXISTING AND PROPOSED OPEN LAND USES IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

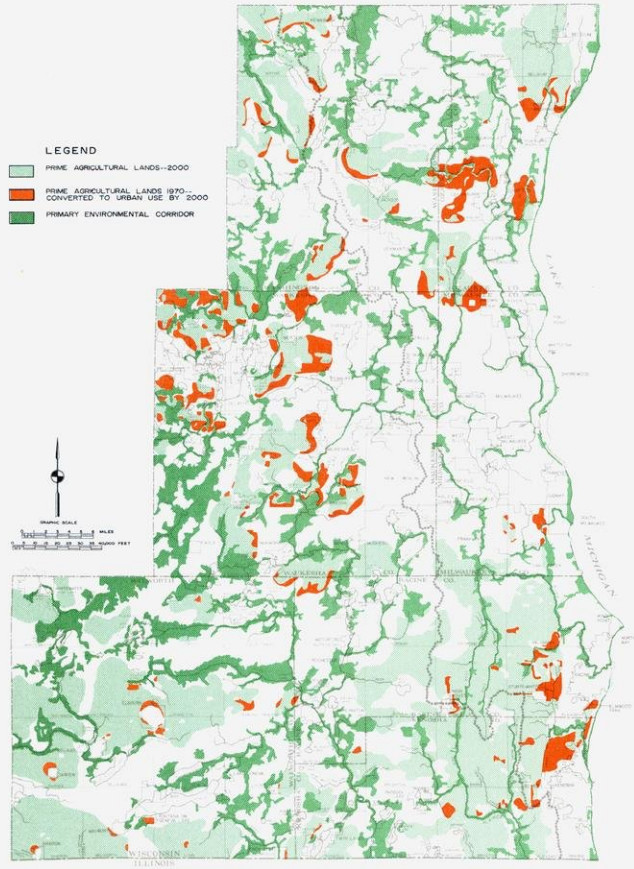
County	Open Land Uses in Acres[a]			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	36,454.39	- 1,760.04	34,694.35	- 4.8
Milwaukee	20,206.65	- 1,332.97	18,873.68	- 6.6
Ozaukee	25,775.67	- 1,680.67	24,095.00	- 6.5
Racine	35,284.69	- 1,243.07	34,041.62	- 3.5
Walworth	75,922.47	- 1,645.77	74,276.70	- 2.2
Washington	66,140.69	- 1,624.60	64,516.09	- 2.5
Waukesha	93,351.47	- 4,734.41	88,617.06	- 5.1
Total	353,136.03	- 14,021.53	339,114.50	- 4.0

[a] *Includes woodlands, wetlands, water, quarries, and unused lands.*

Source: SEWRPC.

Map 12

PRIME AGRICULTURAL LANDS IN THE REGION
2000 CONTROLLED DECENTRALIZATION LAND USE PLAN



The controlled decentralization land use plan alternative proposes to preserve 382,800 acres of net prime agricultural lands for permanent agricultural use. However, because this plan envisions continuation of the trend to diffuse low-density residential development observed over the period from 1963 to 1970, a total of 22,400 acres, or 5.5 percent, of the total net prime agricultural lands would be converted to urban uses by the year 2000.

Source: SEWRPC.

Milwaukee County, while the relative changes would range from a gain of about 173 percent in Ozaukee and Washington Counties to a loss of nearly 15 percent in Milwaukee County.

The proposed increase in the amount of land devoted to urban use within each county is compared to the proposed population change within each county in Table 94. In total, the controlled decentralization plan would accommodate an approximate 26 percent increase in regional population with an approximate 46 percent increase in urban land area.

As indicated in Table 95, the population density within the developed urban area of the Region under the controlled decentralization plan would continue to decline from the 1970 level of about 4,300 persons per square mile to a planned 2000 level of about 2,300 persons per square mile. Thus, under this alternative plan, the steady decline in urban population density since 1920 would continue unabated under the influence of the urban land market.

Employment Distribution

In 1972 the total number of jobs in the Region was estimated at nearly 749,000. This employment forecast prepared by the Commission and presented in Chapter III of this Volume indicates that, by the year 2000, total regional employment should increase to slightly over one million jobs. As shown in Table 96, the controlled decentralization plan would result in employment increases for each county ranging from an additional 14,900 jobs in Milwaukee County to an additional 90,900 jobs in Waukesha County. The proportion of total regional employment in Milwaukee County would, however, continue to decline from 68 percent in 1972 to 51 percent in 2000.

Public Sanitary Sewer and Water Supply Service

Under the controlled decentralization plan, about 39 percent of the proposed new urban development within the Region would be served by public sanitary sewer and water supply facilities. As indicated in Tables 97 and 98 and as shown on Map 13, about 608 square miles, or about 63 percent of the total developed area of the Region, and about 1.97 million persons, or about 89 percent of the resident population of the Region, would be served by public sanitary sewer and water supply services by 2000. In 1970 about 301 square miles, or 76 percent of the developed area of the Region, and about 1.49 million persons, or about 85 percent of the resident population of the Region were served by public sanitary sewer facilities. About 259 square miles, or about 65 percent of the developed area of the Region, and about 1.39 million persons, or about 79 percent of the resident population of the Region, were served by public water supply facilities in 1970. On a county basis, the percent of developed area served by sanitary sewer and water supply services by 2000 under the controlled centralization plan would range from a low of about 25 percent in Washington County to a high of 100 percent in Milwaukee County, while the percent of total resident population so served would range from 63 percent in Washington County to a high of 100 percent in Milwaukee County.

TRANSPORTATION SYSTEM PLAN CONCEPTS AND DESIGN METHODOLOGY

The travel demand generated by a given land use pattern can be met by various combinations of transportation facilities. At one end of the range of possibilities, the travel load can be distributed in relatively low volumes over a large number of standard arterial streets and highways providing a relatively low level of service. At

Table 93

EXISTING AND PROPOSED POPULATION DISTRIBUTION IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	1970 Population		Planned Increment		2000 Population	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha	117,917	6.7	84,884	72.0	202,801	9.1
Milwaukee	1,054,249	60.1	- 155,728	- 14.8	898,521	40.5
Ozaukee	54,461	3.1	94,475	173.5	148,936	6.7
Racine	170,838	9.7	53,858	31.5	224,696	10.1
Walworth	63,444	3.6	43,161	68.0	106,605	4.8
Washington	63,839	3.6	110,663	173.3	174,502	7.9
Waukesha	231,338	13.2	231,901	100.2	463,239	20.9
Total	1,756,086	100.0	463,214	26.4	2,219,300	100.0

Source: SEWRPC.

Table 94

URBAN LAND AREA AND POPULATION
INCREMENT IN THE REGION BY COUNTY: 1970-2000
CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Increment 1970-2000			
	Urban Land Area		Population	
	Acres	Percent	Number	Percent
Kenosha	12,004.68	43.3	84,884	72.0
Milwaukee	4,100.92	3.9	- 155,728	- 14.8
Ozaukee	27,627.75	116.3	94,475	173.5
Racine	12,705.13	36.2	53,858	31.5
Walworth	12,064.92	37.3	43,161	68.0
Washington	35,766.82	136.9	110,663	173.3
Waukesha	46,028.67	60.1	231,901	100.2
Total	150,298.89	45.8	463,214	26.4

Source: SEWRPC.

the opposite end of the range of possibilities, the travel load can be concentrated in relatively high volumes on a small number of high-capacity freeways, providing a relatively high level of service.

A similar range of possible facility arrangements can be envisioned for transit operations. Ultimately, a balance between loads and service levels in the system design is dictated by an assortment of factors: those transportation facilities that have already been committed, transportation system objectives and standards to be met, considerations of system integration and continuity, the pattern of land uses to be served, and the attendant benefits and costs. Some of these considerations may be conflicting and, as a result, the transportation system plan finally selected represents a compromise between the theoretical and the practical, the desirable and the possible, and between the demand for transportation service and the ability to pay for it.

Table 95

POPULATION DENSITY IN THE REGION: SELECTED YEARS
1850-1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Year	Population					Area (Square Miles)		Persons Per Square Mile	
	Urban		Rural		Total				
	Number	Percent of Total	Number	Percent of Total		Urban	Total	Urban	Total
1850	28,623	25.2	84,766	74.8	113,389	4	2,689	7,155.8	42.2
1880	139,509	50.3	137,610	49.7	277,119	18	2,689	7,750.5	103.1
1900	354,082	70.6	147,726	29.4	501,808	37	2,689	9,569.8	186.6
1920	635,376	81.1	148,305	18.9	783,681	56	2,689	11,346.0	291.4
1940	991,535	92.9	76,164	7.1	1,067,699	90	2,689	11,017.1	397.1
1950	1,179,084	95.0	61,534	5.0	1,240,618	138	2,689	8,544.1	461.4
1963	1,634,200	97.6	40,100	2.4	1,674,300	340	2,689	4,806.5	622.6
1970	1,728,949	98.5	27,137	1.5	1,756,086	397	2,689	4,355.0	653.1
2000	2,201,700	99.2	17,600	0.8	2,219,300	969	2,689	2,272.1	601.6

Source: SEWRPC.

Table 96

EXISTING AND PROPOSED EMPLOYMENT IN THE REGION BY COUNTY
1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	1972 Employment		Planned Increment 1972-2000		2000 Employment	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha	40,600	5	36,000	89	76,600	8
Milwaukee	508,500	68	14,900	3	523,400	51
Ozaukee	19,300	3	34,000	176	53,300	5
Racine	63,600	8	30,900	49	94,500	9
Walworth	24,100	3	22,600	94	46,700	5
Washington	21,200	3	37,900	179	59,100	6
Waukesha	71,500	10	90,900	127	162,400	16
Total	748,800	100	267,200	36	1,016,000	100

Source: SEWRPC.

Table 97

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED
BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN THE REGION
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Area and Population	Existing Service 1970		Planned Service Increment		Total Service 2000	
	Public Sanitary Sewer	Public Water Supply	Public Sanitary Sewer	Public Water Supply	Public Sanitary Sewer	Public Water Supply
Developed Area						
Total Square Miles	396.9	396.9	572.0	572.0	968.9	968.9
Square Miles Served	301.0 [a]	259.4	307.3	348.9	608.3	608.3
Percent of Total Served	75.8	65.3	--	--	62.8	62.8
Population						
Total Population	1,756,100	1,756,100	463,200	463,200	2,219,300	2,219,300
Population Served	1,488,700	1,390,000	482,800	581,500	1,971,500	1,971,500
Percent of Total Served	84.8	79.2	--	--	88.8	88.8

[a] *Does not include about four square miles located beyond the delineated urban growth ring for 1970.*

Source: SEWRPC.

The methodology for developing transportation system plans was described in this volume's Chapter IV which stressed the importance of quantitatively testing the final system plans by applying anticipated travel loads derived from the proposed land use pattern and evaluating the plans on the basis of these tests against rationally formulated transportation system development objectives and standards. Only in this way can the adequacy and practicality of transportation plan proposals be properly assessed. This methodology was applied to both regional land use plan alternatives to obtain an analysis of future transportation demand under the proposed land use patterns and to design alternative transportation systems to meet this demand.

Although essentially the same methodology was used for the new transportation alternatives as was used for the initial plans a decade ago, present conditions call for additional emphasis on the design of regional transportation systems that reflect increased public concern in

Table 98

EXISTING AND PLANNED DEVELOPED AREA AND POPULATION
BY PUBLIC SANITARY SEWER AND SUPPLY IN THE REGION BY COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Total Area (Square Miles)	Developed Area[a] (Square Miles)	Existing 1970								Planned 2000				
			Public Sewer Service				Public Water Supply Service				Public Sewer and Water Supply Service[b]				
			Developed Area Served		Population Served		Developed Area Served		Population Served		Developed Area (Square Miles)	Developed Area Served		Population Served	
			Square Miles	Percent	Number	Percent	Square Miles	Percent	Number	Percent		Square Miles	Percent	Number	Percent
Kenosha	278.3	32.5	23.83	73.3	94,000	79.7	16.44	50.6	81,000	68.7	74.8	59.3	79.3	187,500	92.5
Milwaukee	242.3	174.6	170.60	97.7	1,034,700	98.1	165.16	94.6	1,013,400	96.1	201.0	201.0	100.0	898,500	100.0
Ozaukee	234.4	19.8	17.28	87.3	36,300	66.7	7.17	36.2	25,700	47.2	109.5	52.7	48.1	110,300	74.1
Racine	339.9	46.4	29.49	63.6	135,900	79.5	25.23	54.4	120,900	70.8	104.0	62.7	60.3	195,000	86.8
Walworth	578.1	28.9	11.84	41.0	35,500	56.0	12.67	43.8	36,300	57.2	67.3	34.8	51.7	75,200	70.5
Washington	435.5	16.3	9.42	57.8	30,200	47.3	8.09	49.6	28,300	44.3	153.3	38.5	25.1	109,200	62.6
Waukesha	580.7	78.4	38.51	49.1	122,100	52.8	24.61	31.4	84,400	36.5	259.0	159.3	61.5	395,800	85.4
Total	2,689.2	396.9	300.97	75.8	1,488.700	84.8	259.37	65.3	1,390,000	79.2	968.9	608.3	62.8	1,971,500	88.8

[a] *Based on historic urban growth analysis. See Table 61, Page 122, Volume One of this report.*

[b] *Public sewer service based on existing sanitary sewerage systems. It was assumed that public water supply served would be extended to all areas served by public sewers.*

Source: SEWRPC.

three areas: the attainment of a better balanced transportation system with higher levels of transit use and lower levels of auto use; the impact of transportation facilities upon the physical environment, particularly the ambient air quality; and the continued availability of cheap motor fuels.

Special awareness of these public concerns accompanied the reappraisal of the adopted regional transportation plan. This reappraisal proceeded from an evaluation of how well the existing transportation system could be expected to operate under probable future traffic demands derived from two different land use plans to a consideration of two conceptually different alternative system plans for each land use plan. All steps of the reappraisal concentrated on allowing the implications of a broad range of actions concerning transportation system development to be evaluated and presented for critical public review and reaction.

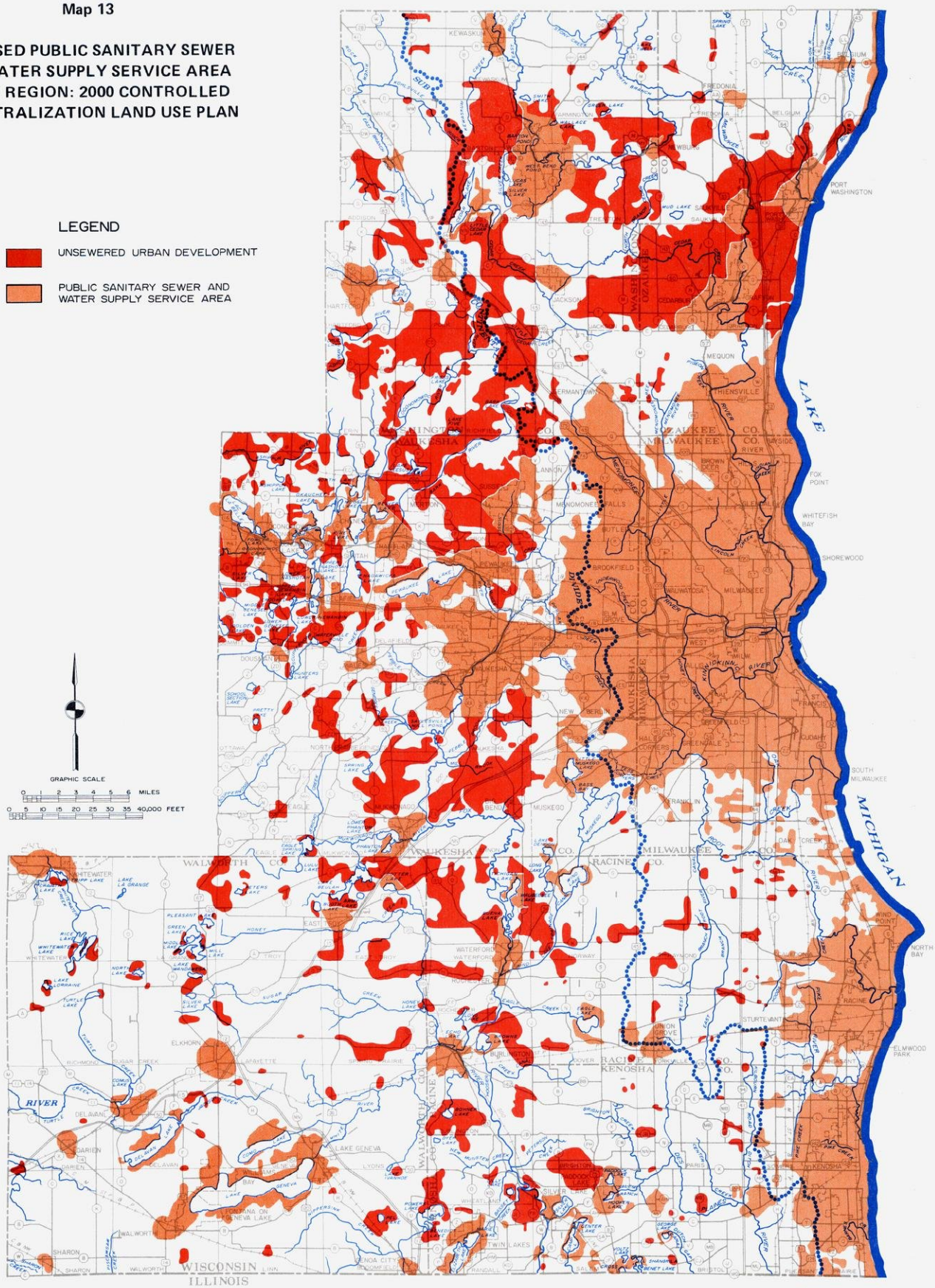
The two conceptually different alternative transportation plans that resulted from the reappraisal consist of a highway-supported transit alternative—which would seek to serve the Region's transportation needs with extensive transit improvements and only very limited arterial street and highway improvements—and alternatively a transit-supported highway plan alternative—that would seek to serve those same transportation needs with extensive arterial street and highway, as well as extensive transit, improvements.

An iterative process was used to develop the alternative transportation system plans. This process began by identifying an existing base year system (of 1975) which would constitute a "do nothing" or "no build" alternative system plan. The process then continued through a step-by-step analysis of the deficiencies of this system and through postulation of transportation improvements to overcome the identified deficiencies and achieve an understanding of the costs and benefits entailed in the addition of improvements to the existing transportation system. The technical and citizen advisory committees assisted in identification of the base year system; in review of the traffic analysis made to identify the operating conditions associated with that system in the design year; in development and analysis of the initial alternatives postulated to address deficiencies identified in the existing system under current and probable future traffic loadings; and in the design of the final alternative transportation system plans chosen to be fully evaluated and presented for public review and reaction.

The traffic analyses used in the iterative process required the full battery of travel and traffic simulation models described in Chapter IV of this volume. The application of these models included person trip generation at the zonal level for each land use plan and each transportation system plan; distribution of the trips generated by trip purpose between traffic analysis zones; subdivision of distributed person trip demand into the auto and transit modes; assignment of travel demand to the arterial street and highway and transit networks; and evaluation of the assigned travel demand against the supply of transportation capacity provided by each alternative system plan analyzed. Automobile availability—assumed to vary with the residential density and the level of transit service available and with household size and household income—was estimated using a submodel applied after

Map 13

PROPOSED PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE AREA IN THE REGION: 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN



Under the controlled decentralization land use plan alternative, about 39 percent of the proposed new urban development within the Region would be served by public sanitary sewer and water supply facilities. About 608 square miles, or about 63 percent of the total urban land area, and 2.0 million persons, or about 89 percent of the total population, would be served by 2000.

Source: SEWRPC.

determining the residential density pattern and transit system in the plan design process. Other transportation service and facility improvements were added to the postulated alternative system plans in the iterative process until the demands for transportation service could be met and the agreed-upon transportation system development objectives and standards largely satisfied.

The following sections of this chapter describe the development of the alternative transportation system plans for the controlled centralization and controlled decentralization land use development plans previously described. In total, six alternative regional transportation system plans are described, three for each of the two alternative regional land use plans. The three alternative regional transportation system plans consist of a "do nothing" or "no build" alternative system plan, a highway-supported transit alternative system plan, and a transit-supported highway alternative system plan.

"NO BUILD" TRANSPORTATION SYSTEM PLAN— CONTROLLED CENTRALIZATION LAND USE PLAN

One possible course of action for the provision of transportation services and facilities in the Region would be to make no major improvements to the existing transportation system. This course would attempt to serve the existing and probable future travel demand of the Region entirely with the existing arterial street and highway and mass transit facilities. This "do nothing" or "no build" alternative not only represents a possible policy alternative for the Region but, from a technical standpoint, also becomes the point of departure for initial testing and design of alternative transportation plans which do incorporate facility and service improvements. Thus, the "no build" alternative comprises both the final system to result from pursuing a course of action that would minimize the capital investment in transportation facilities and the point of departure for investigating a range of possible transportation system improvements that would seek to serve the existing and probable future travel demands of the Region through additional capital investment offering increased system capacity and improved levels of service.

Determination of Base Year Transportation System

In developing the base year transportation system which would constitute the "no build" alternative system plan, three possible definitions were considered by the staff and the two advisory committees. The first definition identified the base year system as composed only of those transportation facilities in use as of January 1, 1975. The advantages of this approach lie principally in the simplicity of identification and the potential that it offers for agreement on the part of all concerned; the principal disadvantage is that it ignores "committed" improvements to the regional transportation system that may currently be in a stage of implementation. Some of these improvements or modifications may be so nearly complete that to ignore them would not only be unrealistic but could lead to misinterpretation of any system test results, thereby requiring extensive additional technical analysis. Since transportation system development is a dynamic process and since certain transportation facility improvements within an urbanizing region are normally in some stage of implementation and will become available to system users in the near future, there may be certain proposed as well as partially completed facilities that should, as a practical matter, be incorporated into the initial transportation system. While, in the present public climate, no absolute certainty exists that these improvements will be completed and placed in operation, most reasonable persons probably would agree that certain transportation improvement projects will indeed be implemented and should, therefore, properly be considered a part of the base year system.

It is evident, then, that a second definition of the base year system is one composed of all facilities actually in use in the base year plus certain facilities under construction whose completion may reasonably be regarded as irreversible. Advantages of this expanded definition of the initial or base year system are that it provides a more realistic system for test and evaluation and a basis for identifying system deficiencies by recognizing and incorporating improvement projects likely to be available for use in the short-term future. The disadvantage of this alternative definition lies principally in the difficulty of all concerned in reaching agreement upon those projects currently in various stages of implementation that can be expected to be completed and available for use. Given the opposition, common in today's society, of some interest groups to certain transportation projects, such agreement is difficult to attain even on those facilities for which the right-of-way has been acquired and cleared and construction begun but then stopped by administrative or court action.

Yet a third definition of the base year transportation system recognizes that certain political and administrative decisions have been made which, in effect, should commit facility improvements, and that such committed improvements should be added to the transportation network already in use to describe the initial or base year system. This was the course of action followed in preparing the initial regional transportation system plan in 1963. The principal advantage of this alternative is that it is consistent with official actions and decisions undertaken to commit public resources to transportation facilities, facilities which may have been proposed in a legally adopted long-range plan. Any decision to reverse such a commitment must be made only after the most careful reappraisal if public funds are not to be wasted and great harm done to the public interest originally intended to be served. The principal disadvantage of this alternative is that, while some projects may appear to be committed by administrative and political actions, these projects may not be completed because of litigation or change in administrative or political decisions.

A particularly strong argument advanced for adopting this alternative definition of the base year system was that the electorate of Milwaukee County, in a general

referendum held in November 1974, approved completion of 17 miles of planned freeways on a segment-by-segment basis, thus supporting previous actions of the implementing governmental agencies concerned taken over at least a decade and involving the expenditure of many millions of dollars in public funds. The freeway segments so approved by the electorate were: the Lake Freeway South from the Milwaukee Harbor Bridge to E. Layton Avenue; the downtown freeway loop closure, including the Lake Freeway North from the Harbor Bridge to the proposed Juneau interchange and the Park Freeway west from the Juneau interchange to its current terminus east of the Milwaukee River; the Stadium Freeway south from its current terminus at W. National Avenue to an interchange with the Airport Freeway; the Airport Spur Freeway from the North-South Freeway to General Mitchell Field; the Park Freeway west from its current terminus at the North-South Freeway to the Stadium Freeway; and the Stadium Freeway north from its current terminus at W. Lloyd Street to the vicinity of the intersection of N. 60th Street and W. Burleigh Street.

Arterial Street and Highway System: Following extended consideration of the several alternative ways to define the initial base year transportation system, the Technical Coordinating and Advisory Committee and the Citizens Advisory Committee recommended the following: That the base year transportation system, which would constitute the "no build" alternative system plan for both the controlled centralization and the controlled decentralization land use plans, be defined for arterial streets and highways as the arterial street and highway system completed and opened to traffic as of July 1, 1975, with the addition of these "committed" freeway facilities:

1. The Rock Freeway, STH 15, from its terminus at STH 12 in the City of Elkhorn to the Rock County line.

2. IH 43 from its terminus north of the Village of Grafton through Ozaukee County to the Sheboygan County line.

3. IH 794 between its present eastern terminus at N. Jackson Street and N. Van Buren Street south over the high level Milwaukee Harbor Bridge under construction with a connection to the standard surface arterial street system at Carferry Drive.

4. The Airport Spur Freeway.

The base year arterial street and highway system, constituting the arterial street and highway component of the "no build" alternative regional transportation system plan, is shown on Map 14. The number of miles of existing and committed arterial street and highway facilities in the Region is defined by arterial facility type in the "no build" system plan on a county-by-county basis in Table 99. The planned increment under this alternative transportation system plan includes those new surface arterial streets and highways proposed to be opened to traffic during the period 1972 through mid-1975, those committed freeway facilities identified above, and certain existing streets and highways which did not function as arterials in 1972 but which would function as arterials by 2000. On a regional basis, the total arterial street and highway system would increase from the 1972 level of 3,010 miles to 3,279 miles, an increment of 269 miles, or 8.9 percent.

Transit System: The Technical Coordinating and Advisory Committee and the Citizens Advisory Committee recommended that the regional transit system for the base year be defined as the existing intraregional mass transit systems operating within the three urbanized areas of the Region—Kenosha, Milwaukee, and Racine—on July 1, 1975, with the addition of the following "committed" transit improvements:

1. In the Milwaukee urbanized area, a restoration of the service level—in terms of headways and route coverage—to about that provided in 1972, the regional plan reevaluation inventory base year. This system is identified on Map 15. As shown in Table 100, this system would consist of a total of about 1,560 route miles and would require a total of 436 buses operating about 61,480 bus miles per day. This "existing and committed system" may be compared to the approximately 410 buses operating about 50,000 bus miles per day over about 1,040 route miles in early 1975.

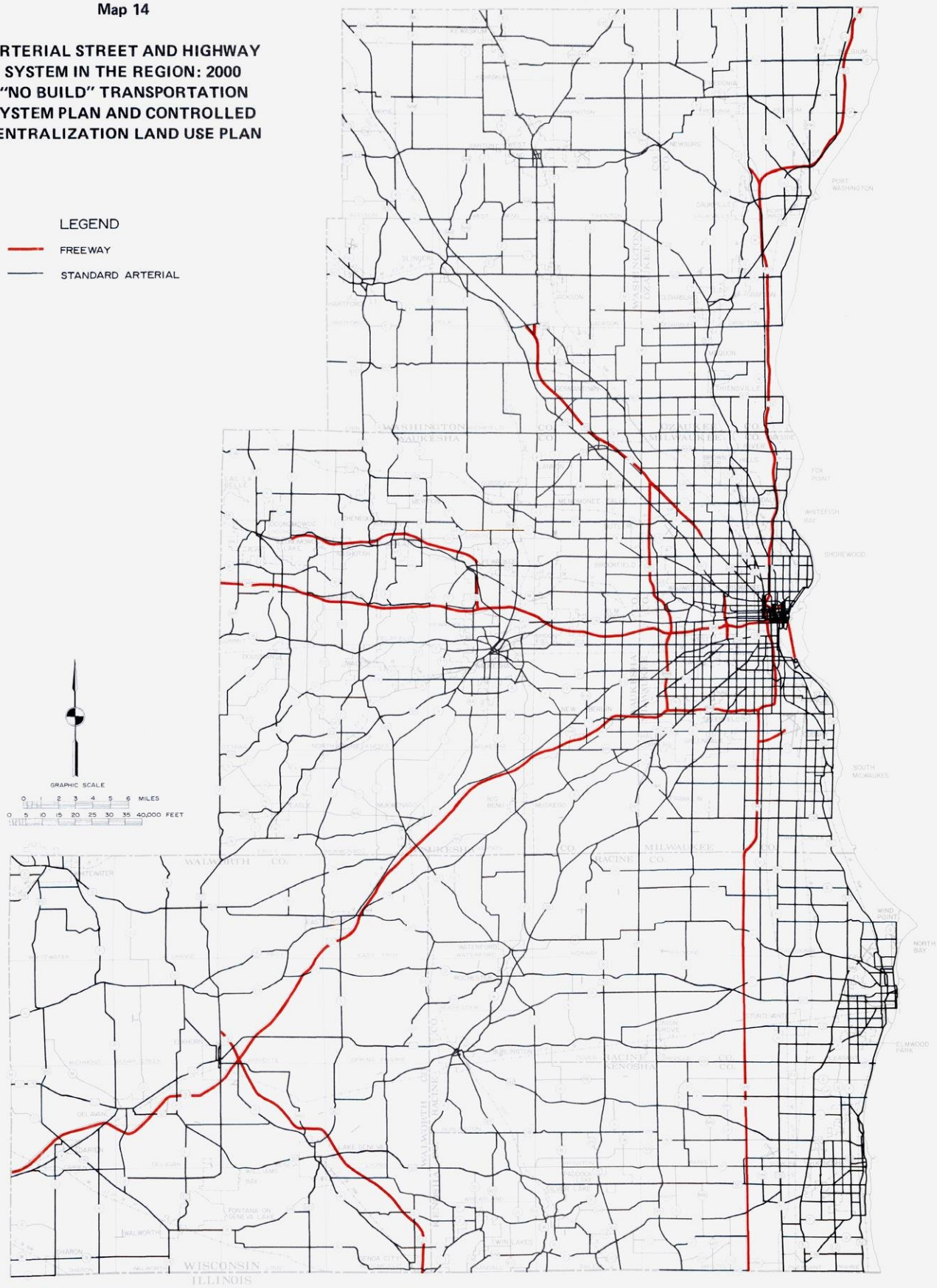
2. In the Milwaukee urbanized area, the addition of a new primary transit route from the Cities of South Milwaukee and Cudahy and the Bay View area of the City of Milwaukee into the Milwaukee central business district across the Milwaukee Harbor Bridge.

3. In the Milwaukee urbanized area, the addition of a new primary modified rapid transit service (Freeway Flyer service) between the Milwaukee central business district and transit stations at the following locations: N. 103rd Street and W. Silver Spring Drive, an existing shopping center parking lot; IH 94 and W. College Avenue, a public transit station opened in late 1975; IH 94 and W. Holt and W. Morgan Avenues, a public transit station programmed for construction in 1976; IH 94 and S. 84th Street, an existing parking lot on the Wisconsin State Fair Park grounds; and USH 45 and Watertown Plank Road, a public transit station under construction in 1976. These additional transit stations, together with all existing transit stations, are identified on Map 15; and their characteristics are set forth in Table 101.

4. In the Milwaukee urbanized area, the reduction of the base transit fare to 50 cents per ride, an action taken by the Milwaukee County Transit Board in mid-1975.

Map 14

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 "NO BUILD" TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the "no build" alternative transportation system plan, arterial street and highway system mileage within the Region would total about 3,279 miles by the year 2000, an increase of 269 miles, or about 9 percent, over 1972. Freeways would comprise 237 miles, or 7 percent, of the total arterial system in the year 2000, an increase of 75 miles over 1972.

Source: SEWRPC.

Table 99

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Kenosha County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.1	4.3	--	--	12.1	3.6
8-lane	--	--	--	--	--	--
Subtotal	12.1	4.3	--	--	12.1	3.6
Standard Arterial						
2-lane	243.6	87.1	42.6	17.5	286.2	86.3
4-lane	24.1	8.6	9.2	38.2	33.3	10.1
6-lane	--	--	--	--	--	--
Subtotal	267.7	95.7	51.8	19.4	319.5	96.4
County Subtotal	279.8	100.0	51.8	18.5	331.6	100.0
Milwaukee County						
Freeway						
4-lane	12.7	1.7	1.4	11.0	14.1	1.9
6-lane	49.0	6.7	3.6	7.3	52.6	7.0
8-lane	2.1	0.3	--	--	2.1	0.3
Subtotal	63.8	8.7	5.0	7.8	68.8	9.2
Standard Arterial						
2-lane	339.5	46.2	- 20.5	- 6.0	319.0	42.6
4-lane	268.7	36.6	- 30.3	- 11.3	238.4	31.9
6-lane	62.2	8.5	59.7	96.0	121.9	16.3
Subtotal	670.4	91.3	8.9	1.3	679.3	90.8
County Subtotal	734.2	100.0	13.9	1.2	748.1	100.0
Ozaukee County						
Freeway						
4-lane	10.8	4.3	16.6	153.7	27.4	9.0
6-lane	--	--	--	--	--	--
8-lane	--	--	--	--	--	--
Subtotal	10.8	4.3	16.6	153.7	27.4	9.0
Standard Arterial						
2-lane	233.0	93.1	34.8	14.9	267.8	88.1
4-lane	6.5	2.6	2.4	36.9	8.9	2.9
6-lane	--	--	--	--	--	--
Subtotal	239.5	95.7	37.2	15.5	276.7	91.0
County Subtotal	250.3	100.0	53.8	21.5	304.1	100.0

Table 99 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Racine County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.0	3.4	--	--	12.0	3.2
8-lane	--	--	--	--	--	--
Subtotal	12.0	3.4	--	--	12.0	3.2
Standard Arterial						
2-lane	303.5	86.9	24.1	7.9	327.6	86.7
4-lane	28.0	8.0	1.1	3.9	29.1	7.7
6-lane	5.9	1.7	3.1	52.5	9.0	2.4
Subtotal	337.4	96.6	28.3	8.4	365.7	96.8
County Subtotal	349.4	100.0	28.3	8.1	377.7	100.0
Walworth County						
Freeway						
4-lane	19.1	4.7	31.3	163.9	50.4	11.2
6-lane	--	--	--	--	--	--
8-lane	--	--	--	--	--	--
Subtotal	19.1	4.7	31.3	163.9	50.4	11.2
Standard Arterial						
2-lane	379.4	92.9	10.7	2.8	390.1	86.6
4-lane	9.7	2.4	0.4	4.1	10.1	2.2
6-lane	--	--	--	--	--	--
Subtotal	389.1	95.3	11.1	2.8	400.2	88.8
County Subtotal	408.2	100.0	42.4	10.4	450.6	100.0
Washington County						
Freeway						
4-lane	0.4	0.1	1.9	475.0	2.3	0.6
6-lane	6.4	1.9	--	--	6.4	1.7
8-lane	--	--	--	--	--	--
Subtotal	6.8	2.0	1.9	27.9	8.7	2.3
Standard Arterial						
2-lane	305.6	90.1	44.5	14.6	350.1	90.5
4-lane	26.8	7.9	1.0	3.7	27.8	7.2
6-lane	--	--	--	--	--	--
Subtotal	332.4	98.0	45.5	13.7	377.9	97.7
County Subtotal	339.2	100.0	47.4	14.0	386.6	100.0

Table 99 (continued)

Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Waukesha County						
Freeway						
4-lane	29.1	4.5	16.0	55.0	45.1	6.6
6-lane	8.7	1.3	4.2	48.3	12.9	1.9
8-lane	--	--	--	--	--	--
Subtotal	37.8	5.8	20.2	53.4	58.0	8.5
Standard Arterial						
2-lane	565.5	87.2	7.0	1.2	572.5	84.3
4-lane	41.3	6.4	3.1	7.5	44.4	6.5
6-lane	3.9	0.6	1.0	25.6	4.9	0.7
Subtotal	610.7	94.2	11.1	1.8	621.8	91.5
County Subtotal	648.5	100.0	31.3	4.8	679.8	100.0
Southeastern Wisconsin Region						
Freeway						
4-lane	72.1	2.4	67.2	93.2	139.3	4.2
6-lane	88.2	2.9	7.8	8.9	96.0	2.9
8-lane	2.1	0.1	--	--	2.1	0.1
Subtotal	162.4	5.4	75.0	46.2	237.4	7.2
Standard Arterial						
2-lane	2,370.1	78.7	143.2	6.0	2,513.3	76.7
4-lane	405.1	13.5	- 13.1	- 3.2	392.0	12.0
6-lane	72.0	2.4	63.8	88.6	135.8	4.1
Subtotal	2,847.2	94.6	193.9	6.8	3,041.1	92.8
Region Total	3,009.6	100.0	268.9	8.9	3,278.5	100.0

Source: SEWRPC.

5. In the Kenosha urbanized area, improvements in service level in terms of headways and route changes and additions, all as recommended in the preliminary draft of SEWRPC Community Assistance Planning Report No. 7, Kenosha Area Transit Development Program 1976-1978 (see Map 16 and Table 102).

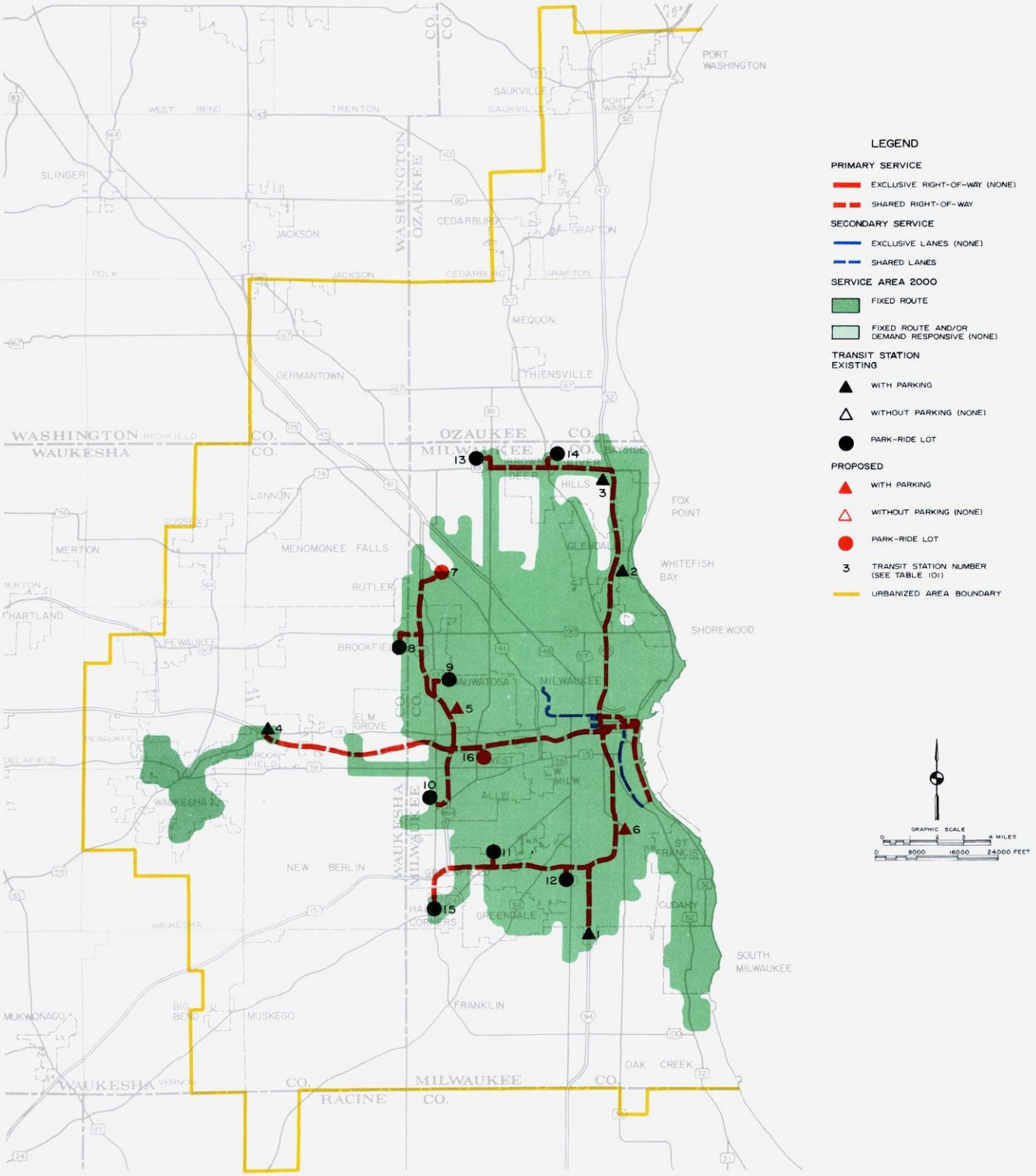
6. In the Racine urbanized area, improvements in the service level in terms of headways and route changes and extensions and the institution of a 25 cent base fare, all as recommended in SEWRPC Community Assistance Planning Report No. 3, Racine Area Transit Development Program 1975-1979 (see Map 16 and Table 102).

Assignment of Travel to Highway and Transit Networks

An analysis of the performance of the existing base year transportation system, in effect the "no build" alternative transportation system plan, under present and probable future travel demand was the first basic step in the plan design and test phase of the transportation system plan development process. This first step revealed the location and magnitude of any deficiencies in the existing transportation system under both existing and probable future travel demand conditions. Thus, this step constituted one of the most important analyses for developing alternative transportation system plans which can overcome the identified deficiencies. Furthermore, an understanding of the travel conditions on the existing base year transportation system under probable future

Map 15

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 2000 "NO BUILD" TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the "no build" alternative transportation system plan, the transit system in the Milwaukee urbanized area would consist of the existing 1975 transit system with the addition of a primary transit route from South Milwaukee through Cudahy to the Milwaukee central business district and the addition of Freeway Flyer service to the Milwaukee central business district from the five new transit stations indicated on the map. The total system would consist of approximately 1,560 round-trip route miles of transit line and would require about 436 buses for service during peak ridership periods. This would represent an increase of 499 route miles over 1972. No additional buses would have to be added to the 1972 fleet.

Source: SEWRPC.

Table 100

MASS TRANSIT FACILITIES IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972		Planned Increment		2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Round Trip Route Miles						
Primary	150	14.1	121	80.7	271	17.4
Secondary	56	5.3	- 42	- 75.0	14	0.9
Tertiary	855	80.6	420	49.1	1,275	81.7
Total	1,061	100.0	499	47.0	1,560	100.0
Special Facilities	Miles		Miles	Percent Change	Miles	
Exclusive Right-of-Way	0		0	--	0	
Exclusive Lanes on Streets	0		0	--	0	
Vehicle Requirements	Number		Number	Percent Change	Number	
Peak Period	442		- 6	- 1.4	436	
Midday Period	220		21	9.5	241	

Source: SEWRPC.

Table 101

TRANSIT STATION CHARACTERISTICS BY PRIMARY TRANSIT SERVICE CORRIDOR
2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Station Identification				Type of Transit Service				Passenger Facilities			
Number[a]	Location	Civil Division	Station Status	Primary	Secondary	Tertiary	Collection-Distribution	Parking	Shelter	Buses Per Peak Hour in Peak Direction	Parking Spaces Required
	Existing and Proposed Stations										
1	North-South Freeway and College Avenue	City of Milwaukee	Existing	X		X		X	X	3	300
2	North-South Freeway and Silver Spring Drive	City of Glendale	Existing	X		X		X	X	2	190
3	North-South Freeway and Brown Deer Road	Village of River Hills	Existing	X		X		X	X	10	250
4	East-West Freeway and Barker Road	Town of Brookfield	Existing	X		X		X	X	8	200
5	Zoo Freeway and Watertown Plank Road	City of Wauwatosa	Existing	X		X		X	X	6	500
6	North-South Freeway and Morgan Avenue	City of Milwaukee	Proposed	X		X		X	X	2	500
	Existing Parking Lots										
7	N. 103rd Street and W. Silver Spring Drive	City of Milwaukee	Proposed	X		X		X	X	7	200
8	N. 124th Street and W. Capitol Drive	City of Brookfield	Existing	X		X		X	X	2	100
9	N. Mayfair Road and W. Center Street	City of Wauwatosa	Existing	X		X		X	X	4	200
10	S. 108th Street and W. Cleveland Avenue	City of West Allis	Existing	X		X		X	X	4	100
11	S. 76th Street and W. Cold Spring Road	City of Greenfield	Existing	X		X		X	X	3	100
12	S. 27th Street and Layton Avenue	City of Greenfield	Existing	X		X		X	X	4	100
13	N. 76th Street and Brown Deer Road	City of Milwaukee	Existing	X		X		X	X	10	200
14	N. Green Bay Road and Brown Deer Road	Village of Brown Deer	Existing	X		X		X	X	10	125
15	S. 108th Street and Abbott Avenue	Village of Hales Corners	Existing	X		X		X	X	6	50
16	East-West Freeway and S. 84th Street	City of Milwaukee	Proposed	X		X		X	X	8	200

[a] *See Map 15.*

Source: SEWRPC.

Table 102

TRANSIT FACILITIES IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Transit Round Trip Route Miles				
Primary (None)	--	--	--	--
Secondary (None)	--	--	--	--
Tertiary	59	41	69.5	100
Vehicle Requirements (Buses)				
Peak Period	12	6	50.0	18
Midday	6	12	200.0	18
Racine Urbanized Area				
Transit Route Miles				
Primary (None)	-	--	--	--
Secondary (None)	--	--	--	--
Tertiary	81	52.4	64.7	133.4
Vehicle Requirements (Buses)				
Peak Period	10	16	160.0	26
Midday	10	16	160.0	26

Source: SEWRPC.

travel demand provides a basis for measuring the impact and implication of alternative improvements as opposed to taking no action to improve the transportation system. The analysis of the operation of the existing base year transportation system under probable future conditions was undertaken with the aid of the travel simulation models described in Chapter IV of this volume. Through application of these models, travel demand for the plan design year 2000 was developed for the anticipated activities under the controlled centralization land use plan and assigned to the existing base year arterial street and highway and transit system networks.

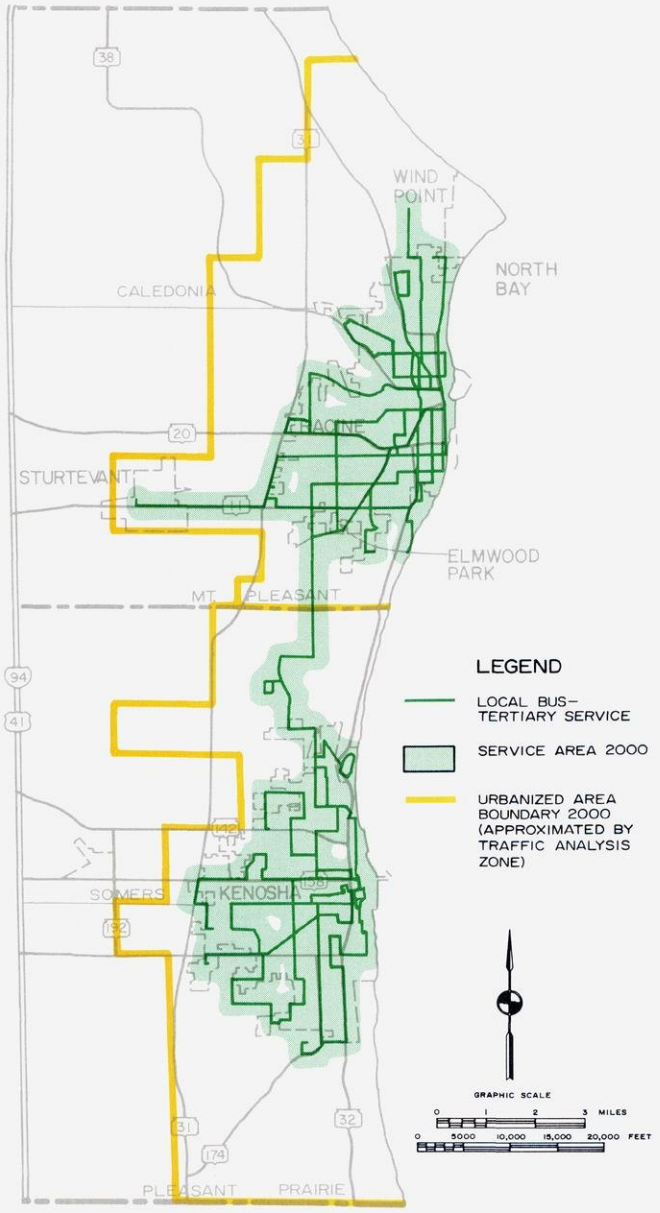
Automobile Availability: Given the postulated "no build" alternative transportation system plan and land use development in conjunction with the controlled centralization land use plan, it is estimated that the number of automobiles available in the Region will increase by nearly 336,000 by the year 2000, from about 705,000 in 1972 to 1,041,000 in 2000, a 48 percent increase. This compares with an approximate 23 percent increase in regional population over the same time period. The number of persons per automobile would, then, be expected to continue to decline from 2.57 in 1972 to 2.13 in 2000, a decline of about 17 percent (see Table 103). The regional forecast of automobiles available in the year 2000, as set forth in Chapter III of this volume, is 1,168,100, or about 12 percent more than the number anticipated under this alternative plan.

Person Trip Generation:[2] If fully developed, the land use pattern postulated under the controlled centralization plan, together with the transportation system postulated under the attendant "no build" transportation system plan, may be expected to generate a total of nearly 5.8 million internal person trips on an average weekday. This represents an increase of nearly 31 percent over the nearly 4.5 million internal person trips generated within

[2] *In deriving future travel demand for all transportation plan alternatives presented in this chapter, all of the simulation models were applied at the traffic analysis zone level. To present the resulting detailed traffic demand data in conventional report format is impractical, but it is important to note that these detailed data are available from Commission files upon specific request. For the purpose of presenting the travel demand data in this report, it was necessary to aggregate the zonal data to obtain regional totals which could be used to present and analyze the major traffic characteristics under each alternative plan at the regional scale. It is also important to note that all travel demand flows are estimates of probable future conditions and, while necessarily expressed as exact numbers, in reality they reflect the variability and uncertainties inherent in any forecasting procedure.*

Map 16

TRANSIT SYSTEM IN THE KENOSHA AND RACINE URBANIZED AREAS: 2000 "NO BUILD" TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the "no build" alternative transportation system plan, the transit systems for the Kenosha and Racine urbanized areas would consist of approximately 100 round-trip route miles of transit line in the Kenosha urbanized area and 133 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 18 buses in the Kenosha urbanized area and 26 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 41 round-trip route miles and six buses in the Kenosha area and 52 route miles and 16 buses in the Racine area over 1972.

Source: SEWRPC.

Table 103

AUTOMOBILE AVAILABILITY WITHIN THE REGION: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population	1,810,700	408,600	22.6	2,219,300
Automobiles Available	704,600	336,200	47.7	1,040,800
Persons Per Automobile	2.57	-0.44	-17.1	2.13

Source: SEWRPC.

the Region on an average weekday in 1972. This percentage increase in internal person trip production may be compared with a forecast increase in population within the Region of about 23 percent and in automobile availability of about 48 percent over the same period of time. Probable future internal person trip production within the Region by trip purpose under this alternative plan combination is indicated in Table 104 and compared to existing trip production. The largest proportionate increase in internal person tripmaking is expected to occur in the school tripmaking category, which is expected to increase by nearly 39 percent. Home-based work trips are expected to increase by about 30 percent over the 25-year plan design period. The average number of internal person trips generated per capita may be expected to increase from about 2.5 in 1972 to about 2.6 in 2000, while the average number of internal person trips generated per household may be expected to increase from about 7.9 to about 8.1.

Mode of Travel: The distribution of internal person trips within the Region by mode of travel under the controlled centralization land use plan and the "no build" transportation system plan is summarized in Table 105. Average weekday transit trip production within the Region may be expected to increase by only about 1 percent, from 184,000 trips in 1972, or about 53.4 million trips per year, to about 187,000 trips in 2000, or 54.2 million trips per year. The proportion of total internal travel generated within the Region in 2000 served by transit could be expected to decrease from 4.1 percent in 1972 to 3.2 percent in 2000.

The relative utilization of transit and private automobiles under this combination of alternative plans is indicated by trip purpose categories in Tables 106 and 107. The largest increase in transit trip production, over 21 percent, is estimated to occur in the home-based other trip purpose category. Because of declining school age population in the transit service areas, school transit trips are anticipated to decrease slightly. Home-based work transit trips are estimated to increase by about 12 percent, while home-based shopping transit trips are estimated to decrease by about 8 percent.

Table 104

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	1,055,500	23.7	318,300	30.2	1,373,800	23.6
Home-based Shopping	673,600	15.1	184,900	27.4	858,500	14.7
Home-based Other	1,532,600	34.3	457,900	29.9	1,990,500	34.2
Nonhome-based	779,800	17.5	238,200	30.5	1,018,000	17.5
School	418,900	9.4	161,500	38.6	580,400	10.0
Total	4,460,400	100.0	1,360,800	30.5	5,821,200	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 105

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Mode of Travel	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Automobile Driver	2,884,700	64.7	1,041,800	36.1	3,926,500	67.5
Automobile Passenger	1,217,900	27.3	202,000	16.6	1,419,900	24.4
Transit Passenger	184,200	4.1	2,600	1.4	186,800	3.2
School Bus Passenger	173,600	3.9	114,400	65.9	288,000	4.9
Total	4,460,400	100.0	1,360,800	30.5	5,821,200	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 106

DISTRIBUTION OF INTERNAL TRANSIT TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Transit Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	70,900	38.5	8,700	12.3	79,600	42.6
Home-based Shopping	18,800	10.2	- 1,500	- 8.0	17,300	9.3
Home-based Other	28,300	15.4	6,000	21.2	34,300	18.4
Nonhome-based	13,100	7.1	- 9,000	- 68.7	4,100	2.2
School	53,100	28.8	- 1,600	- 3.0	51,500	27.5
Total	184,200	100.0	2,600	1.4	186,800	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC

Under this combination of plan alternatives, it is estimated that a total of about 3.9 million internal automobile driver trips would be generated within the Region on an average weekday in 2000. This represents an increase of nearly one-third over the 1970 level of nearly 2.9 million such trips. The anticipated increases in internal automobile driver trips by trip purpose category are identified in Table 108, while the anticipated increase in internal automobile person trips within the Region is shown in Table 107.

Total vehicle trip production on an average weekday under this combination of alternative plans is estimated to increase by about 35 percent, from about 3.4 million vehicle trips in 1972 to about 4.6 million in 2000. As shown in Table 109, the largest absolute increases in vehicle trip production are anticipated to occur in internal automobile and in internal truck trips, while the largest percentage increases in vehicle trip production are anticipated to occur in external automobile and other truck vehicle categories. The proportion of trips by vehicle class would not, however, change significantly from 1972 to 2000 under this alternative plan combination.

System Performance

Allocation of the vehicle travel demand generated under the controlled centralization land use plan to the "no build" alternative transportation system plan indicates that vehicle miles of travel on the arterial street and highway system may be expected to increase from about 20.1 million per average weekday in 1972 to nearly 31.9 million in 2000, an increase of about 58 percent. The most significant increase in vehicle miles of travel is anticipated to occur on the regional freeway system, where such travel would increase from about 6.2 million miles in 1972 to about 11.7 million miles in 2000, an increase of about 88 percent. The anticipated arterial vehicle miles of travel on an average weekday under

Table 107

DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	984,600	24.0	309,500	31.4	1,294,100	24.2
Home-based Shopping	654,800	16.0	186,500	28.5	841,300	15.7
Home-based Other	1,504,300	36.6	451,900	30.0	1,956,200	36.6
Nonhome-based	766,700	18.7	247,200	32.2	1,013,900	19.0
School	192,200	4.7	48,700	25.3	240,900	4.5
Total	4,102,600	100.0	1,243,800	30.3	5,346,400	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 108

DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Driver Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Home-based Work	840,800	29.2	313,100	32.2	1,153,900	29.4
Home-based Shopping	444,500	15.4	152,200	34.2	596,700	15.2
Home-based Other	976,300	33.8	344,300	35.3	1,320,600	33.6
Nonhome-based	555,700	19.3	213,300	38.4	769,000	19.6
School	67,400	2.3	18,900	28.0	86,300	2.2
Total	2,884,700	100.0	1,041,800	36.1	3,926,500	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 109

DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Vehicle Class	Total Vehicle Trips Generated on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent Change
Automobile						
Internal	2,884,700	84.0	1,041,800	36.1	3,926,500	84.6
External[a]	111,900	3.2	51,900	46.4	163,800	3.5
Other[b]	34,200	1.0	11,800	34.5	46,000	1.0
Subtotal	3,030,800	88.2	1,105,500	36.5	4,136,300	89.1
Truck						
Internal	383,600	11.2	93,600	24.4	477,200	10.3
External	13,800	0.4	4,700	34.1	18,500	0.4
Other[b]	6,000	0.2	2,500	41.7	8,500	0.2
Subtotal	403,400	11.8	100,800	25.0	504,200	10.9
Total	3,434,200	100.0	1,206,300	35.1	4,640,500	100.0

[a] *Includes light trucks, i.e., those under 6,000 pounds gross weight.*

[b] *Includes vehicle trips made by persons residing in group quarters and by nonresidents of the Region.*

Source: SEWRPC.

this alternative plan combination are identified by county and facility type in Table 110. The anticipated average daily traffic volumes on the arterial street and highway system in the Region in 2000 are shown on Map 17.

The impact of the anticipated increase in travel on the base year arterial street and highway system is reflected in the anticipated number of miles of that system projected to operate at or over the design capacity in the year 2000 (see Table 111 and Map 18). In 1972, there were nearly 166 miles of arterial streets and highways operating over design capacity. By 2000, the number of miles operating over design capacity may be expected to increase to about 486, an increase of 320 miles, or about 194 percent. Similarly, the number of arterial miles operating at design capacity, which totaled about 152 in 1972, may be expected to increase to 505 by the year 2000, an increase of about 353 miles, or about 232 percent. As indicated on Map 18, the congested miles of arterial facility occur not only on the regional freeway system but also on many of the standard surface arterial streets and highways.

Allocation of the transit travel demands generated under the controlled centralization land use plan to the "no build" alternative transportation system plan indicates that, in the Milwaukee urbanized area, revenue passengers may be expected to decrease from about 177,800 per average weekday, or 52.4 million per year in 1972, to about 168,800 per average weekday, or 48.9 million in 2000, a decrease of about 9,000 per average weekday or 3.5 million per year, or 6.6 percent. The annual number of transit rides per capita in the Milwaukee urbanized area may be expected to decrease from about 50 in 1972 to 46 in 2000 (see Table 112). In the Kenosha urbanized area, as shown in Table 113, the number of annual transit revenue passengers is anticipated to increase from about 0.5 million in 1972 to about 1.7 million in 2000, an increase of about 1.2 million or 234 percent. The annual number of rides per capita would increase from about six in 1972 to about 14 in 2000. In the Racine urbanized area, the number of annual transit revenue passengers would be expected to increase from 0.5 million in 1972 to about 3.5 million in 2000, an increase of about 3.0 million or 557 percent. The annual number of rides per capita would increase from about five in 1972 to about 27 in 2000.

System Development Cost

The estimated capital costs of carrying out the "no build" transportation system plan under the land use development assumptions contained in the controlled centraliza-

Table 110

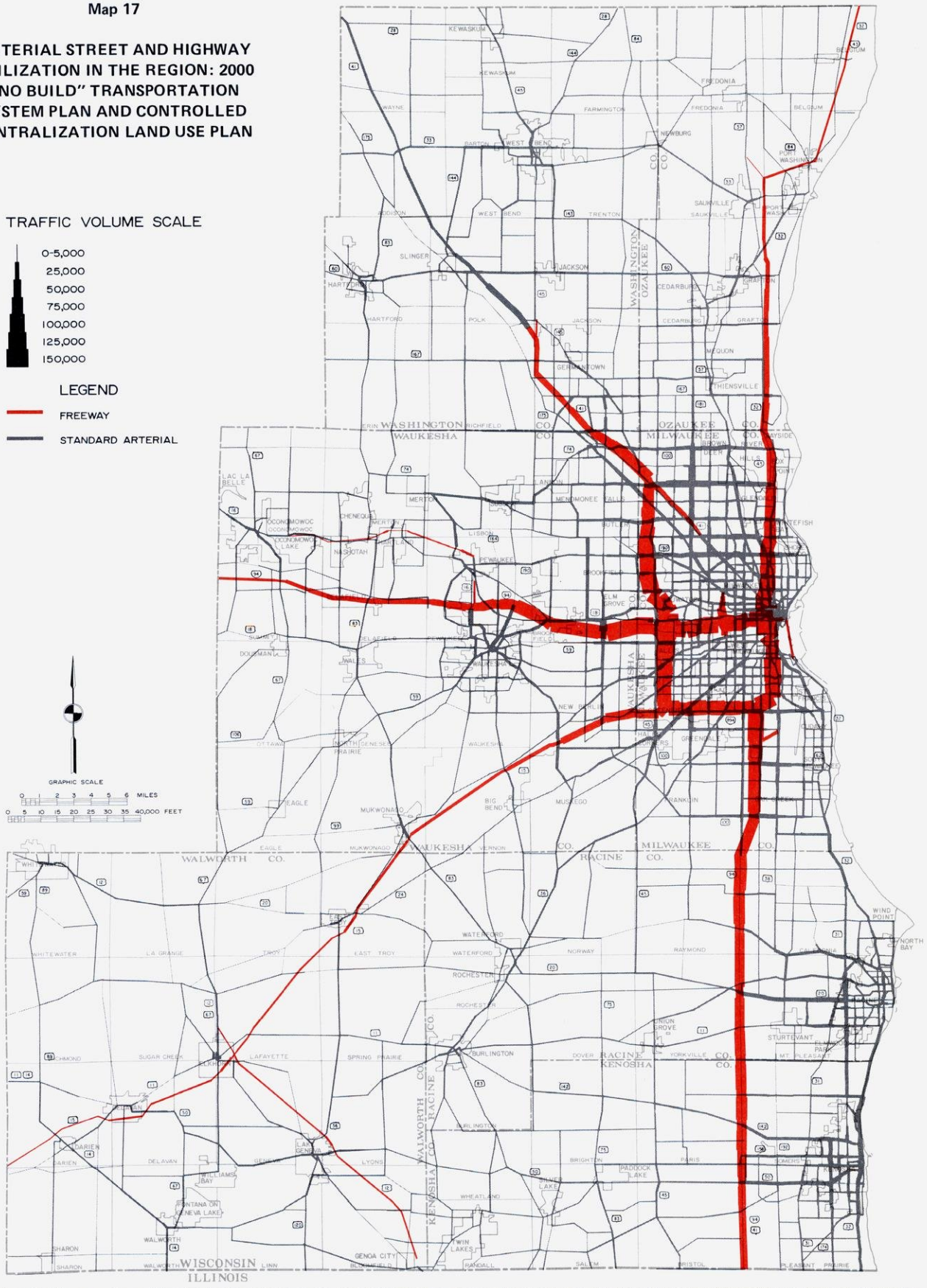
VEHICLE MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY
1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

County	Arterial Vehicle Miles of Travel on An Average Weekday (thousands)					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha						
Freeway	382	26.8	393	102.8	775	27.9
Standard Arterial	1,046	73.2	955	91.3	2,001	72.1
Subtotal	1,428	100.0	1,348	94.4	2,776	100.0
Milwaukee						
Freeway	3,977	37.2	2,091	52.6	6,068	43.3
Standard Arterial	6,718	62.8	1,215	18.1	7,933	56.7
Subtotal	10,695	100.0	3,306	30.9	14,001	100.0
Ozaukee						
Freeway	223	26.2	426	191.0	649	39.2
Standard Arterial	627	73.8	381	60.8	1,008	60.8
Subtotal	850	100.0	807	94.9	1,657	100.0
Racine						
Freeway	415	22.9	466	112.3	881	27.2
Standard Arterial	1,398	77.1	957	68.5	2,355	72.8
Subtotal	1,813	100.0	1,423	78.5	3,236	100.0
Walworth						
Freeway	56	6.4	436	778.6	492	28.3
Standard Arterial	817	93.6	428	52.4	1,245	71.7
Subtotal	873	100.0	864	99.0	1,737	100.0
Washington						
Freeway	190	16.5	263	138.4	453	21.4
Standard Arterial	961	83.5	698	72.6	1,659	78.6
Subtotal	1,151	100.0	961	83.5	2,112	100.0
Waukesha						
Freeway	970	29.3	1,381	142.4	2,351	37.1
Standard Arterial	2,344	70.7	1,639	69.9	3,983	62.9
Subtotal	3,314	100.0	3,020	91.1	6,334	100.0
Southeastern Wisconsin Region						
Freeway	6,213	30.9	5,456	87.8	11,669	36.6
Standard Arterial	13,911	69.1	6,273	45.1	20,184	63.4
Total	20,124	100.0	11,729	58.3	31,853	100.0

Source: SEWRPC.

Map 17

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 "NO BUILD" TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Arterial street and highway system utilization in the Region in the year 2000 may be expected to increase to nearly 32 million vehicle miles of travel on an average weekday under the "no build" alternative transportation system plan, an increase of nearly 12 million vehicle miles, or about 58 percent, over 1972. About 12 million vehicle miles of travel, or 37 percent of the total, could be expected to occur on the freeway system, as opposed to 31 percent in 1972.

Source: SEWRPC.

Table 111

ARTERIAL STREET AND HIGHWAY SERVICE LEVELS IN THE REGION BY COUNTY: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

County	Existing 1972						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	243.1	9.0	14.7	9.7	22.0	13.3	279.8
Milwaukee	601.4	22.4	71.8	47.2	61.0	36.8	734.2
Ozaukee	234.7	8.7	10.1	6.6	5.5	3.3	250.3
Racine	310.0	11.5	19.1	12.6	20.3	12.3	349.4
Walworth	400.7	14.9	2.7	1.8	4.8	2.9	408.2
Washington	320.4	11.9	9.7	6.4	9.1	5.5	339.2
Waukesha	581.8	21.6	23.8	15.7	42.9	25.9	648.5
Total	2,692.1	100.0	151.9	100.0	165.6	100.0	3,009.6

County	Planned Increment						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent Change	Miles	Percent Change	Miles	Percent Change	Total Miles
Kenosha	- 44.6	- 18.4	43.2	293.9	53.2	241.8	51.8
Milwaukee	- 135.5	- 22.5	70.8	98.6	78.6	128.9	13.9
Ozaukee	17.5	7.5	15.2	150.5	21.1	383.6	53.8
Racine	- 63.1	- 20.4	53.8	281.7	37.6	185.2	28.3
Walworth	4.1	1.0	30.4	1,125.9	7.9	164.6	42.4
Washington	- 23.2	- 7.2	44.2	455.7	26.4	290.1	47.4
Waukesha	- 159.5	- 27.4	95.2	400.0	95.6	222.8	31.3
Total	- 404.3	- 15.0	352.8	232.3	320.4	193.5	268.9

County	Total 2000						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	198.5	8.7	57.9	11.5	75.2	15.5	331.6
Milwaukee	465.9	20.4	142.6	28.3	139.6	28.7	748.1
Ozaukee	252.2	11.0	25.3	5.0	26.6	5.5	304.1
Racine	246.9	10.8	72.9	14.4	57.9	11.9	377.7
Walworth	404.8	17.7	33.1	6.5	12.7	2.6	450.6
Washington	297.2	13.0	53.9	10.7	35.5	7.3	386.6
Waukesha	422.3	18.4	119.0	23.6	138.5	28.5	679.8
Total	2,287.8	100.0	504.7	100.0	486.0	100.0	3,278.5

[a] *Volume-to-capacity ratio 0.00-0.90; fully adequate and safest operational levels.*

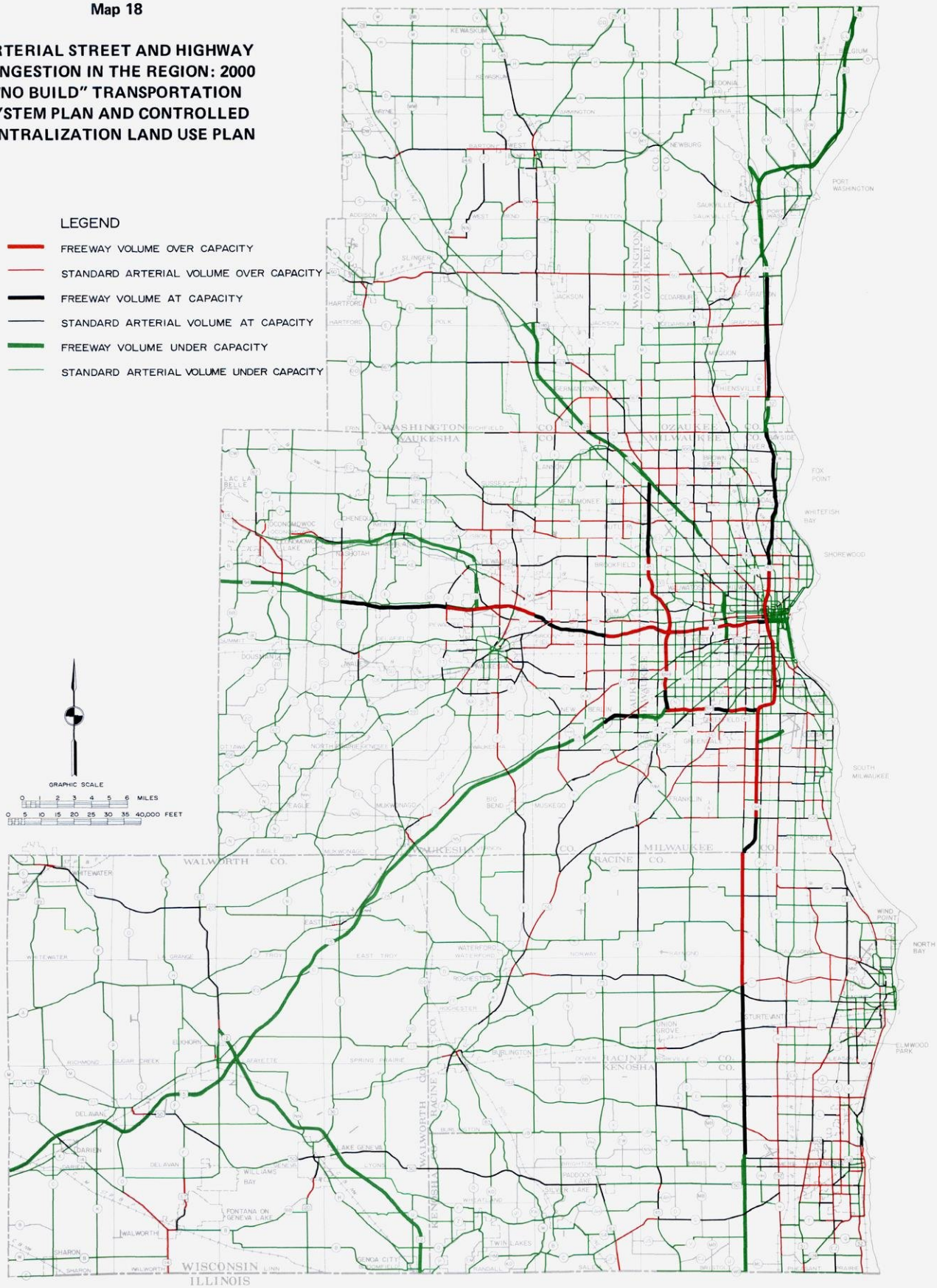
[b] *Volume-to-capacity ratio 0.91-1.10; adequate operational level.*

[c] *Volume-to-capacity ratio over 1.10; congested at times.*

Source: SEWRPC.

Map 18

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 "NO BUILD" TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the "no build" alternative transportation system plan, 991 miles of arterial street and highway facilities, or about 30 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, were operating at or over design capacity.

Source: SEWRPC.

Table 112

TRANSIT SYSTEM PERFORMANCE IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population				
Urbanized Area	1,267,400	241,700	19.1	1,509,100
Service Area	1,043,600	18,900	1.8	1,062,500
Urbanized Area Population Served	1,043,600	18,900	1.8	1,062,500
Percent Urbanized Area Population Served	82.3	--	--	70.4
Nonurbanized Area Population Served	--	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	1,410	4,060	287.9	5,470
Secondary	--[a]	--	--	--[a]
Tertiary	60,670	- 4,660	- 7.7	56,010
Total	62,080	- 600	- 1.0	61,480
Daily Seat Miles	3,220,640	- 146,640	- 5.0	3,074,000
Daily Revenue Passengers	177,800	- 9,000	- 5.1	168,800
Daily Passenger Miles	1,175,700	- 605,800	- 51.5	569,900
Passengers Per Vehicle Mile	2.9	--	--	2.7
Percent Utilization—Seat Miles Provided to Passenger Miles Used	36.5	--	--	18.5
Annual Revenue Passengers	52,417,800	- 3,465,800	- 6.6	48,952,000
Rides Per Capita	50.2	--	--	46.1

[a] *Included in tertiary.*

Source: SEWRPC.

tion land use plan are identified in Table 114. The total cost for preserving and improving the arterial street and highway system is estimated at about $756 million. The estimated cost of preserving and improving the mass transit systems in the three urbanized areas is estimated at about $90.9 million. The total estimated cost of preserving and improving the street and highway system, including nonarterial streets, and the transit system, is estimated at about $1.5 billion.

DEVELOPMENT OF HIGHWAY-SUPPORTED TRANSIT AND TRANSIT-SUPPORTED HIGHWAY ALTERNATIVE PLANS

With an understanding of the probable magnitude and distribution of future travel demand within the Region, and a further understanding of the probable impact of that demand upon the existing transportation system—as made possible by analyses of the assignment of future travel demand to the "no build" arterial street and highway and transit networks—alternative transportation improvement plans were postulated to overcome transportation system deficiencies and to serve the alternative regional land use plans. The process involved was iterative in nature and included the development and analysis of two highway-supported transit alternative plans and six transit-supported highway alternative plans. These alternative plans were described and analyzed in a series of technical memoranda prepared by the Commission and reviewed by the technical and citizen advisory committees concerned.[3]

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[3] *See SEWRPC Technical Memoranda TD-75-1, "Alternative Transportation System Concepts for Consideration in the Evaluation of the Adopted Transportation Plan—and Alternative No. 1—the Initial Transportation System"; TD-75-3, "Analysis of the Existing Transportation System"; TD-75-4, "Alternative Transportation Systems"; TD-75-5, "Analysis of Alternative Transportation Systems"; TD-75-6, "Transit Intensive-II and Balanced Plan-II Alternative Transportation Systems"; and "Refinement of Highway Intensive Alternative Transportation Systems."*

Table 113

TRANSIT SYSTEM PERFORMANCE IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Population				
Urbanized Area	86,500	48,700	56.3	135,200
Service Area	83,900	37,900	45.2	121,800
Urbanized Area Population Served	83,900	37,800	45.1	121,700
Percent Urbanized Area Population Served	97.0	--	--	90.0
Nonurbanized Area Population Served	--	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	--	--	--	--
Secondary	--	--	--	--
Tertiary	1,140	660	57.9	1,800
Total	1,140	660	57.9	1,800
Daily Seat Miles	43,300	37,700	87.1	81,000
Daily Revenue Passengers	2,800	3,000	107.1	5,800
Daily Passenger Miles	9,610	1,690	17.6	11,300
Passengers Per Vehicle Mile	2.5	--	--	3.2
Percent Utilization—Seat Miles Provided to Passenger Miles Used	22.2	--	--	14.0
Annual Revenue Passengers	503,200	1,178,800	234.3	1,682,000
Rides Per Capita	5.8	--	--	13. 2
Racine Urbanized Area				
Population				
Urbanized Area	115,200	34,000	29.5	149,200
Service Area	100,600	26,200	26.0	126,800
Urbanized Area Population Served	100,600	26,200	26.0	126,800
Percent Urbanized Area Population Served	83.3	--	--	85.0
Nonurbanized Area Population Served	-	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	-	--	--	--
Secondary	--	--	--	--
Tertiary	1,560	1,640	105.1	3,200
Total	1,560	1,640	105.1	3,200
Daily Seat Miles	29,600	114,400	386.5	144,000
Daily Revenue Passengers	3,100	8,800	283.9	11,900
Daily Passenger Miles	10,920	9,280	85.0	20,200
Passengers Per Vehicle Mile	2.0	--	--	3.7
Percent Utilization—Seat Miles Provided to Passenger Miles Used	36.9	--	--	14.0
Annual Revenue Passengers	525,700	2,925,300	556.5	3,451,000
Rides Per Capita	5.2	--	--	27.2

Source: SEWRPC.

Table 114

ESTIMATED TRANSPORTATION SYSTEM CAPITAL COST IN THE REGION: 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

System Component	Capital Cost		
	System Preservation (dollars)	System Improvement and Expansion (dollars)	Total (dollars)
Streets and Highways			
Arterial	333,958,000	422,484,000	756,442,000
Nonarterial	172,520,000	457,036,000	629,556,000
Subtotal	506,478,000	879,520,000	1,385,998,000
Transit			
Transitways	--	--	--
Exclusive Lanes	--	--	--
Stations and Terminals	--	1,400,000	1,400,000
Offices and Shops	5,800,000	--	5,800,000
Operating and Maintenance Equipment	83,650,000	--	83,650,000
Subtotal	89,450,000	1,400,000	90,850,000
Total	595,928,000	880,920,000	1,476,848,000

Source: SEWRPC.

Following review by the interagency staff and the technical and citizen advisory committees of the initial highway-supported transit and transit-supported highway alternative regional transportation system plans, two final alternative system plans were prepared for full comparative testing and evaluation. The following sections of this chapter present a description of the two final alternative transportation system plans to be tested and evaluated under each of the two land use plans—the controlled centralization land use plan and the controlled decentralization land use plan—as well as a description of the "no build" alternative under the land use development pattern represented by the controlled decentralization land use plan.

HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN— CONTROLLED CENTRALIZATION LAND USE PLAN

The highway-supported transit alternative transportation system plan developed to serve and support the controlled centralization land use plan is composed of significant improvements to the existing transit systems, primarily in the urban areas of the Region, and of improvements to the existing arterial street and highway system, primarily in the rural areas of the Region. Under this alternative, however, capital investment in, and operating subsidies to, transit are emphasized in order to limit further investment in urban arterial street and highway improvements to those requiring no or very minimal right-of-way acquisition and only limited residential, commercial, and industrial displacement. In the rural areas of the Region, however, arterial street and highway improvements were postulated as necessary to provide levels of service in accordance with the plan development standards.

Transit System

The primary level of transit service under this alternative plan would consist of transit vehicles operating over exclusive rights-of-way, that is, in rapid transit service, and over available freeways, that is, in modified rapid transit service. In addition to an exclusive transit right-of-way in the major east-west travel corridor emanating from central Milwaukee County, as initially recommended in the adopted 1990 regional transportation plan and as reaffirmed in the adopted Milwaukee area transit plan, exclusive rights-of-way for the operation of transit vehicles would be provided under this alternative over the partially Milwaukee County-owned and abandoned Chicago and North Western Railroad right-of-way in the corridor between the Milwaukee central business district and W. Brown Deer Road in the Village of Brown Deer, herein termed the "East Side Transitway"; over the abandoned electric interurban railway right-of-way paralleling the Zoo Freeway between W. Schlinger Avenue in the City of West Allis and W. Janesville Road in the Village of Hales Corners; along the Chicago and North Western Railroad right-of-way between the south end of the Milwaukee Harbor Bridge and Drexel Boulevard in the City of South Milwaukee; along the Stadium Freeway South corridor between W. National Avenue

and W. Lincoln Avenue in the Village of West Milwaukee; and along the Park Freeway West corridor between the North-South Freeway and N. Sherman Boulevard in the City of Milwaukee.

In addition to the primary transit service predominantly oriented to the Milwaukee central business district, this alternative plan would provide for two primary transit routes to directly serve the University of Wisconsin-Milwaukee campus, one from the City of Mequon along the North-South Freeway and East Side Transitway, and one from the vicinity of S. 108th Street and W. Oklahoma Avenue in the City of West Allis along the Zoo Freeway transitway, the East-West transitway, and the East Side transitway. The plan envisions that, where and as appropriate, the primary transit service vehicles also would provide a collection and distribution service within the neighborhoods surrounding the transit stations located on the primary network. The primary transit network under this alternative plan is graphically summarized on Map 19.

The secondary level of transit service proposed under this alternative would consist of an extensive network of transit vehicles operating in limited stop, express service on the arterial streets in mixed traffic, or on exclusive transit lanes reserved for the purpose on the arterial streets. Such secondary service would be provided over 14 individual transit routes, with stops between terminals made only at intersections with other transit routes or at land uses identified as major traffic generators. As shown on Map 19, the routes are located so as to provide crosstown service as well as central business district oriented service. Where and as appropriate, vehicles operating in secondary transit service also would provide collection and distribution service beyond the termini of such express service.

The tertiary level of service proposed under this alternative plan would consist of a grid of local bus routes operating over arterial and, in some cases, collector streets. This network of proposed local bus lines would be developed from the existing 1975 local transit network, with such changes as required to provide "feeder" service to the postulated primary and secondary networks, to provide extension of transit service into areas expected to be urbanized by the year 2000, and to provide a shuttle bus service from the N. 32nd Street transit station on the east-west transitway to the Menomonee Valley major industrial centers.

A total of 42 public transit stations would be provided under this alternative plan. Such stations would be located on both the primary and secondary transit systems (see Map 19). The stations are identified in Table 115. As indicated in this table, many of the stations would be provided with primary, secondary, and tertiary service and most would provide park-and-ride facilities. Of the 42 stations, 19 would be located in and would primarily serve the City of Milwaukee.

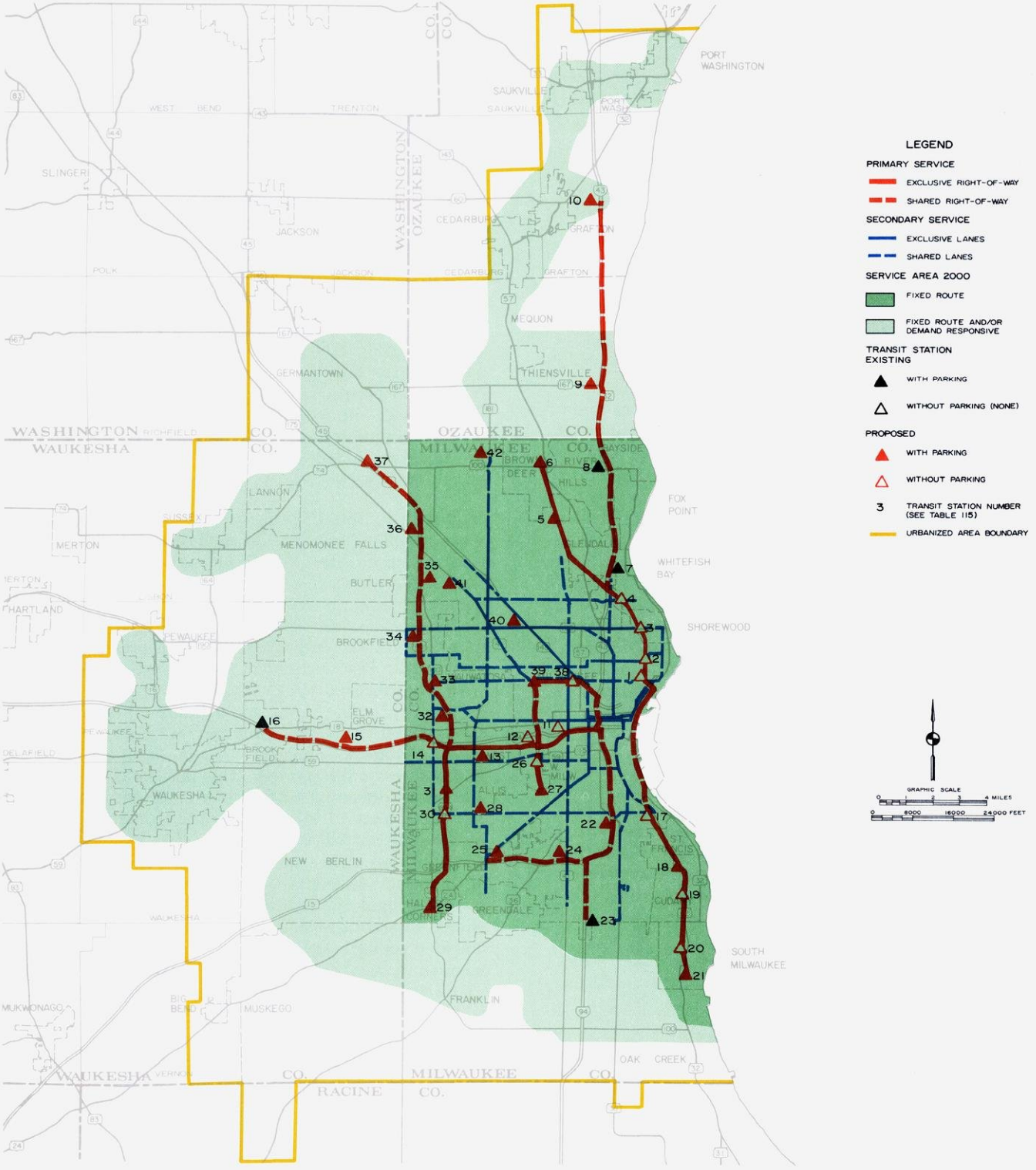
Headways on all types of transit service were set at a maximum of 10 minutes during peak travel periods, except for those routes serving low-density urban residential areas. As shown on Map 19, this plan alternative proposes that consideration be given to a demand-responsive type of mass transit service to serve residents of certain low-density residential areas, particularly in Ozaukee and Waukesha Counties. In an effort to speed the passage of transit vehicles through areas of traffic congestion, lanes for the exclusive use of transit vehicles are proposed to be provided on 15 arterial streets within Milwaukee County. A listing of these exclusive transit lanes is set forth in Table 116. This plan alternative further assumes that appropriate traffic engineering techniques will be used to obtain higher transit operating speeds on these exclusive lanes and along the other secondary routes. Where possible, the exclusive lane would be obtained from the lanes normally provided in the "off peak" direction in order to minimize the impact of the reserved transit lane upon other arterial street traffic. Where existing arterial street lanes are proposed to be set aside for the exclusive use of transit vehicles, the highway network description was modified to reflect the decrease in available capacity which, in turn, is reflected in increased levels of traffic congestion, thus providing an added inducement to the use of the proposed transit service.

Importantly, this highway-supported transit alternative seeks to induce transit utilization through two important pricing actions: the establishment of a 25 cent base fare in the Milwaukee urbanized area and the establishment of minimum all-day parking fees in the Milwaukee central business district at a level equivalent to the cost of a round trip transit fare, or 50 cents. As shown in Table 117, the postulated transit system in the Milwaukee urbanized area consists of a total of 3,130 "round trip" route miles, about 2,069 miles, or 195 percent greater than that provided in 1972. The system would require a total of 1,462 buses operating about 265,000 bus miles per day. This may be compared with 442 buses operating 62,080 bus miles per day in 1972. It is important to note that in the development of the highway-supported transit alternative system plan, no decision was made regarding transit vehicle type which, at this stage of plan development, could be either a motor bus or a light rail vehicle. It was determined that the choice of transit vehicle in any particular transit service corridor would be made only after selection of a recommended system configuration. For comparative system evaluation purposes, however, it was assumed that all transit service would be provided by motor bus.

For the Kenosha and Racine urbanized areas, the transit system postulated under the highway-supported transit alternative plan included, in addition to the existing systems and changes to those systems identified in published transit development programs, extensions to provide service to the anticipated year 2000 urbanized area in each case. In addition, service connections were made between the two urbanized areas and the University of Wisconsin-Parkside Campus. The transit systems for

Map 19

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZD AREA: 2000 HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the highway-supported transit alternative transportation system plan, transit service would be provided over 3,130 round-trip route miles of transit line in the Milwaukee urbanized area; of this total, 1,082 route miles would provide primary service, 357 route miles secondary service, and 1,691 route miles tertiary service. The system would require the operation of about 1,462 buses during peak ridership periods. This would represent an increase of 2,069 round-trip route miles and 1,020 buses over 1972. The plan also recommends the provision of 42 public transit stations, an increase of 38 stations over 1972, and of demand responsive service to low-density urban residential areas.

Source: SEWRPC.

Table 115

TRANSIT STATION CHARACTERISTICS BY PRIMARY TRANSIT SERVICE CORRIDOR: 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION PLAN

Transit Station Identification				Type of Transit Service				Passenger Facilities			
Number[a]	Location	Civil Division	Station Status	Primary	Secondary	Tertiary	Collection-Distribution	Parking	Shelter	Buses Per Peak Hour in Peak Direction	Parking Spaces Required
1	East Side Transitway and North Avenue	City of Milwaukee	Proposed	X	X	X			X	71	--
2	East Side Transitway and Locust Street	City of Milwaukee	Proposed	X	X	X			X	71	--
3	East Side Transitway and Capitol Drive	Village of Shorewood	Proposed	X	X	X			X	54	--
4	East Side Transitway and Hampton Avenue	City of Glendale and Village of Whitefish Bay	Proposed	X	X	X			X	54	--
5	East Side Transitway and Good Hope Road	City of Milwaukee and City of Glendale	Proposed	X		X		X	X	4	250
6	East Side Transitway and Brown Deer Road	Village of Brown Deer	Proposed	X		X	X	X	X	4	900
7	North-South Freeway and Silver Spring Drive	City of Glendale	Existing	X	X	X	X	X	X	12	1,200
8	North-South Freeway and Brown Deer Road	Village of River Hills	Existing	X		X	X	X	X	9	1,200
9	North-South Freeway and Mequon Road	Cityof Mequon	Proposed	X		X	X	X	X	10	800
10	North-South Freeway and Ulao Road (CTH Q)	Town of Grafton	Proposed	X			X	X	X	12	600
11	East-West Transitway and 32nd Street	City of Milwaukee	Proposed	X		X			X	148	--
12	East-West Transitway and Veterans Administration	City of Milwaukee	Proposed	X					X	6	--
13	East-West Transitway and 84th Street	City of Milwaukee	Proposed	X	X	X		X	X	32	1,200
14	East-West Transitway and 108th Street	City of West Allis	Proposed	X	X	X			X	37	--
15	East-West Freeway and Moorland Road	City of Brookfield	Proposed	X		X	X	X	X	8	400
16	East-West Freeway and Barker Road	Town of Brookfield	Existing	X		X	X	X	X	20	600
17	South Transitway and Oklahoma Avenue	City of Milwaukee	Proposed	X	X	X			X	54	--
18	South Transitway and Layton Avenue	City of Cudahy	Proposed	X		X	X	X	X	30	800
19	South Transitway and Grange Avenue	City of Cudahy	Proposed	X		X			X	30	--
20	South Transitway and Rawson Avenue	City of South Milwaukee	Proposed	X	X	X			X	30	--
21	South Transitway and Drexel Boulevard	City of South Milwaukee	Proposed	X		X	X	X	X	30	700
22	North-South Freeway and Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	X	21	1,200
23	North-South Freeway and College Avenue	City of Milwaukee	Existing	X	X	X	X	X	X	10	400
24	Airport Freeway and 27th Street	City of Milwaukee and City of Greenfield	Proposed	X	X	X	X	X	X	7	500
25	Airport Freeway and 76th Street	City of Greenfield	Proposed	X	X	X		X	X	11	800
26	W. Milwaukee Transitway and Greenfield Avenue	Village of West Milwaukee	Proposed	X	X	X			X	12	--
27	W. Milwaukee Transitway and Lincoln Avenue	Village of West Milwaukee	Proposed	X		X	X	X	X	12	500
28	S. 76th Street and Oklahoma Avenue	City of Milwaukee and City of West Allis	Proposed		X	X		X	X	28	400
29	Zoo Transitway and Janesville Road	Village of Hales Corners	Proposed	X		X	X	X	X	15	600
30	Zoo Transitway and Oklahoma Avenue	City of Milwaukee and City of West Allis	Proposed	X	X	X			X	15	--
31	Zoo Transitway and Lincoln Avenue	City of West Allis	Proposed	X		X	X	X	X	9	1,200
32	Zoo Freeway and Watertown Plank Road	City of Wauwatosa	Proposed	X	X	X	X	X	X	11	500
33	Zoo Freeway and North Avenue	City of Wauwatosa	Proposed	X	X	X	X	X	X	12	1,200
34	Zoo Freeway and Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	X	10	1,000
35	Zoo Freeway and Silver Spring Drive	City of Milwaukee	Proposed	X		X	X	X	X	6	400
36	Zoo Freeway and Good Hope Road	City of Milwaukee	Proposed	X		X	X	X	X	7	400
37	Fond du Lac Freeway and Main Street	Village of Menomonee Falls	Proposed	X		X	X	X	X	12	500
38	Park-West Transitway and 27th Street	City of Milwaukee	Proposed	X	X	X			X	15	--
39	N. 46th Street and North Avenue	City of Milwaukee	Proposed	X	X	X		X	X	24	1,200
40	N. 55th Street and Capitol Drive	City of Milwaukee	Proposed		X	X		X	X	26	1,200
41	Timmerman Airport	City of Milwaukee	Proposed		X	X		X	X	24	900
42	N. 76th Street and Brown Deer Road	City of Milwaukee	Proposed		X	X		X	X	4	600

[a] *See Map 19.*

Source: SEWRPC.

Table 116

EXCLUSIVE MASS TRANSIT LANES ON ARTERIAL STREET FACILITIES IN MILWAUKEE COUNTY: 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Arterial Street		Exclusive Secondary Transit Lane			
Name	Limits	Direction	Duration	Number of Transit Vehicles (Buses) in Peak Hours	Remarks
N. Third Street and Green Bay Avenue	W. Keefe Avenue - W. Michigan Street	Southbound	6:00 a.m. - 9:00 a.m.	38	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	47	
S. 16th Street	W. Forest Home Avenue - W. Clybourn Street	Northbound	6:00 a.m. - 9:00 a.m.	21	Removal of curb parking
		Southbound	3:00 p.m. - 6:00 p.m.	30	
N. 27th Street	W. Capitol Drive - W. St. Paul Avenue	Northbound and Southbound	6:00 a.m. - 6:00 p.m.	74	Removal of curb parking
N. 76th Street	W. Capitol Drive - W. Good Hope Road	Southbound	6:00 a.m. - 9:00 a.m.	18	Removal of curb parking
		Northbound	3:00 p.m.- 6:00 p.m.	30	
Capitol Drive	N. 76th Street - N. Oakland Avenue	Eastbound and Westbound	6:00 a.m. - 6:00 p.m.	51	Removal of curb parking and center median
Farwell Avenue	E. North Avenue - E. Ogden Avenue	Southbound	6:00 a.m. - 6:00 p.m.	58	Removal of curb parking
Fond du Lac Avenue	N. 17th Street - W. Hampton Avenue	Southbound	6:00 a.m. - 9:00 a.m.	23	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	36	
Forest Home Avenue	S. 16th Street - W. Oklahoma Avenue	Northbound	6:00 a.m. - 9:00 a.m.	24	Removal of curb parking
		Southbound	3:00 p.m. - 6:00 p.m.	28	
Kenwood Boulevard	N. Oakland Avenue - N. Downer Avenue	Westbound	6:00 a.m. - 6:00 p.m.	157	Removal of curb parking
Lisbon and Appleton Avenues	N. 46th Street - W. Hampton Avenue	Southbound	6:00 a.m. - 9:00 a.m.	24	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	28	
Locust Street	W. Hopkins Street - N. Oakland Avenue	Eastbound	6:00 a.m. - 9:00 a.m.	31	Removal of curb parking
		Westbound	3:00 p.m. - 6:00 p.m.	33	
Prospect Avenue	E. Wisconsin Avenue - E. North Avenue	Northbound	6:00 a.m. - 6:00 p.m.	58	Removal of curb parking
Wells Street	N. Prospect Avenue	Westbound	24 hours	53	Removal of curb parking and median construction
Wisconsin Avenue	N. 10th Street - N. Jackson Street	Eastbound and Westbound	24 hours	560	Removal of all auto traffic
Wisconsin Avenue	N. 35th Street - N. 10th Street	Eastbound	6:00 a.m. - 9:00 a.m.	95	Removal of curb parking
		Westbound	3:00 p.m. - 6:00 p.m.	132	

Source: SEWRPC.

Table 117

MASS TRANSIT FACILITIES IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972		Planned Increment		2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Round Trip Route Miles						
Primary	150	14.1	932	621.3	1,082	34.6
Secondary	56	5.3	301	537.5	357	11.4
Tertiary	855	80.6	836	97.8	1,691	54.0
Total	1,061	100.0	2,069	195.0	3,130	100.0
Special Facilities	Miles		Miles	Percent Change	Miles	
Exclusive Right-of-Way	0		36.5	--	36.5	
Exclusive Lanes on Streets	0		40.8	--	40.8	
Vehicle Requirements	Number		Number	Percent Change	Number	
Peak Period	442		1,020	230.8	1,462	
Midday Period	220		681	309.5	901	

Source: SEWRPC.

the Kenosha and Racine urbanized areas are identified on Map 20. As shown in Table 118, the postulated transit system in the Kenosha urbanized area would consist of a total of 116 round trip route miles, and would require a total of 29 buses operating 4,770 bus miles per day. This system may be compared to the 12 buses operating about 1,140 bus miles per day over about 59 round trip route miles in 1972.

In the Racine urbanized area, the postulated transit system would consist of a total of 157 round trip route miles and would require a total of 36 buses operating about 6,420 bus miles per day. This may be compared to the 10 buses operating 1,560 bus miles per day over about 81 round trip route miles in 1972.

Arterial Street and Highway System

Under the highway-supported alternative transportation system plan, the arterial street and highway system would be selectively improved to assist in accommodating the future travel demand. Improvements to the regional freeway system under this alternative would consist of the following:

1. The four "committed" freeway improvements identified under the "no build" alternative transportation system plan: STH 15 from STH 12 to the Rock County line; IH 43 from the Village of Grafton to the Sheboygan County line; IH 794 south over the high level Milwaukee Harbor Ridge to Carferry Drive; and the Airport Spur Freeway.
2. Provision of additional traffic lanes along IH 43—the North-South Freeway—from the Silver Spring Drive interchange northerly to Mequon Road.
3. Provision of additional traffic lanes along the Stadium Freeway South from IH 94 to W. National Avenue.
4. Construction of the West Bend Freeway from STH 145 north to and around the west side of the City of West Bend, rejoining existing STH 45 near CTH D.
5. Conversion of USH 41 from an expressway to a freeway from STH 145 to the Dodge County line.
6. Completion of the conversion of USH 16 to a freeway through the Village of Pewaukee and the completion of the conversion of USH 16 as a freeway from STH 83 to STH 67.

Certain standard arterial street and highway improvements are also proposed under this alternative. Such improvements were designed to alleviate capacity deficiencies identified under prior analyses. Within the urbanized areas of the Region, arterial street improvements were provided only where rights-of-way were either adequate or where right-of-way acquisition would not require extensive residential, commercial, or industrial relocation. The proposed arterial street and highway system under

Table 118

TRANSIT FACILITIES IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Transit Round Trip Route Miles				
Primary (None)	--	--	--	--
Secondary (None)	--	--	--	--
Tertiary	59	57	97.6	116
Vehicle Requirements (Buses)				
Peak Period	12	17	141.7	29
Midday	6	13	216.7	19
Racine Urbanized Area				
Transit Route Miles				
Primary (None)	--	--	--	--
Secondary (None)	--	--	--	--
Tertiary	81	76	93.8	157
Vehicle Requirements (Buses)				
Peak Period	10	26	260.0	36
Midday	10	15	150.0	25

Source: SEWRPC.

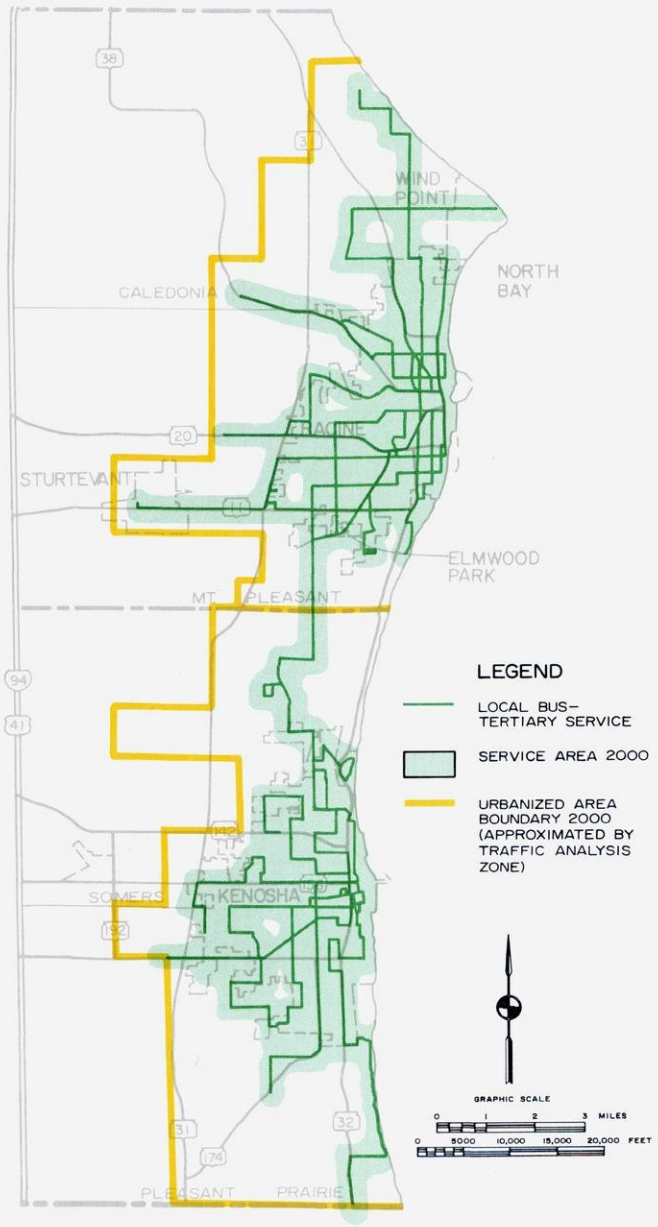
the highway-supported transit alternative plan is shown on Map 21. The changes in miles of arterial streets and highways by facility type, including identification of change in the number of miles of facilities by the number of lanes provided, is set forth in Table 119. On a regional basis the total arterial street and highway system mileage would increase from a 1972 level of 3,010 miles to 3,436 miles, an increment of about 426 miles, or about 14.1 percent. The number of miles of freeway would increase from 162 in 1972 to 278 in 2000, an increment of 116 miles, or nearly 71 percent. The number of miles of four-lane standard arterial streets would increase from 405 miles in 1972 to 747 miles in 2000, an increment of 342 miles, or nearly 84 percent; while the number of miles of six-lane standard arterial streets would increase from 72 miles in 1972 to 140 miles in 2000, an increment of 68 miles, or 94 percent.

Assignment of Travel to Highway and Transit Networks The performance of the postulated highway-supported transit alternative plan under probable future land use and travel conditions was analyzed with the help of the traffic simulation models described in Chapter IV of this volume. By applying these models, travel demand for the plan design year 2000 was developed for the land use pattern proposed under the controlled centralization land use plan and assigned to the highway-supported transit alternative arterial street and highway and transit system networks. The comparative evaluation of this alternative, described in Chapter VI, indicates the ramifications of providing that level of transportation service attainable with minimum disruption of the urban land use pattern. It should be noted that the mathematical simulation models used to estimate the total trips generated under each alternative transportation system plan take into account the fact that household size and income, automobile availability, and the level of transit service are interrelated variables influencing person tripmaking within the Region. Thus, while gross initial forecasts based upon current trends indicate, for example, that the number of automobiles available to residents in the Region may be expected to increase from about 705,000 in 1972 to 1,168,000 in the year 2000—an increase of about 463,000, or 65 percent—the level of transit service proposed under each alternative plan can be expected to modify that forecast.

Automobile Availability: Given transportation system development in accordance with the highway-supported transit alternative transprotation system plan and land use development in accord with the controlled centralization land use plan, the number of automobiles available in the Region is expected to increase from about 705,000 in 1972 to about 953,000 in 2000, an increase of about

Map 20

TRANSIT SYSTEMS IN THE KENOSHA AND RACINE URBANIZED AREAS: 2000 HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the highway-supported transit alternative transportation system plan, the transit systems for the Kenosha and Racine urbanized areas would consist of approximately 116 round-trip route miles of transit line in the Kenosha urbanized area, and 157 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 29 buses in the Kenosha urbanized area and 36 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 57 round-trip route miles and 17 buses in the Kenosha area, and 76 route miles and 26 buses in the Racine area over 1972.

Source: SEWRPC.

248,000, or 35 percent. This compares with an approximately 23 percent increase in resident population over the same time period. The number of persons per automobile would, then, be expected to continue to decline from 2.57 in 1972 to 2.33 in 2000, a decline of about 9 percent (see Table 120). The regional forecast of automobiles available in the year 2000, as noted above, is 1,168,000, or about 23 percent more than the number anticipated under this alternative plan.

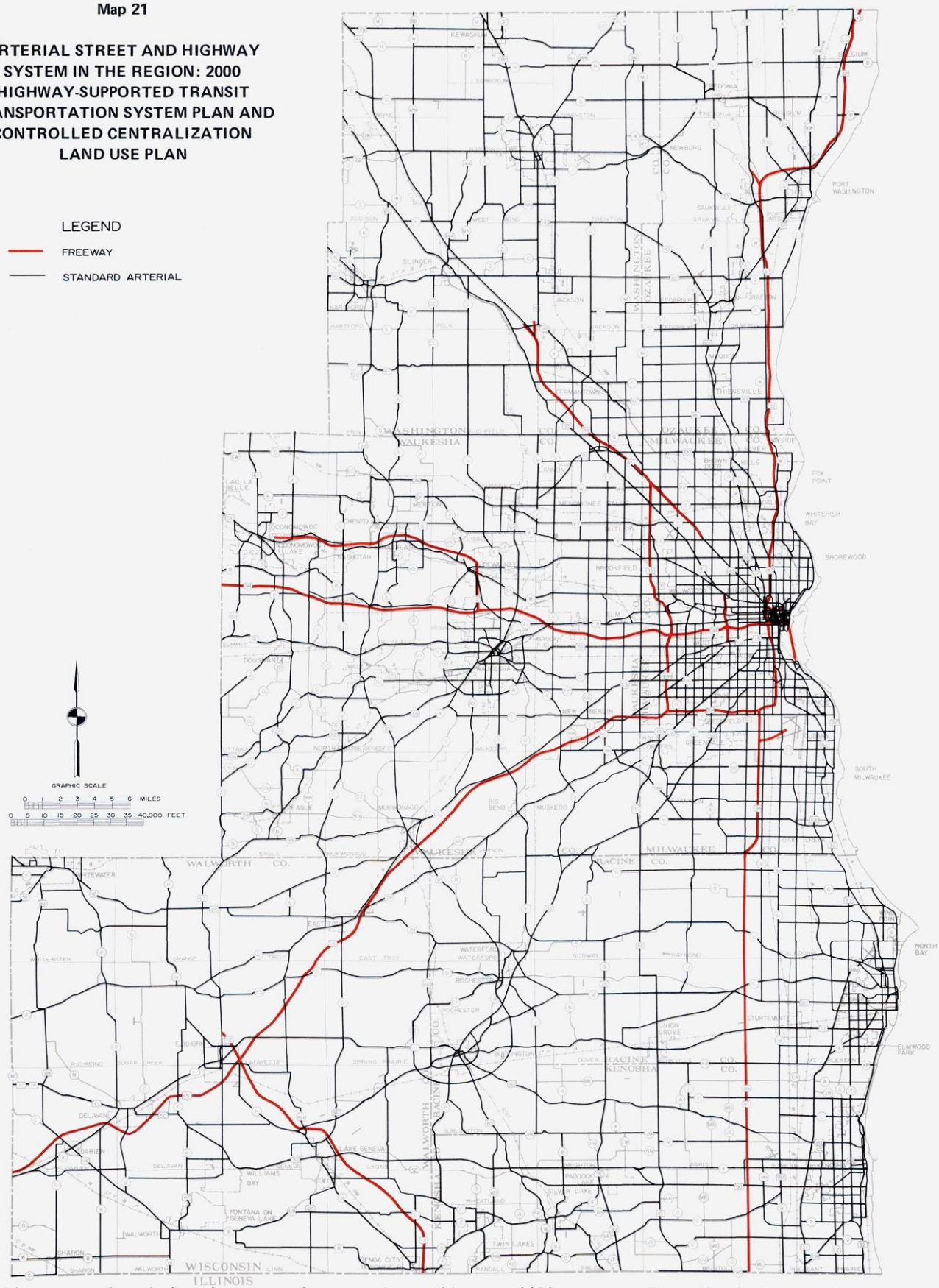
Person Trip Generation: Given transportation system development in accordance with the highway-supported transit alternative transportation system plan and land use development in accordance with the controlled centralization land use plan, internal person trips may be expected to increase from nearly 4.5 million trips per average weekday in 1972 to about 5.7 million such trips in 2000, an increase of about 1.2 million trips, or about 28 percent. This increase in internal trip production may be compared with an approximately 23 percent increase in resident population and 35 percent in automobile availability over the same period of time. Probable future internal person trip production within the Region by trip purpose under this alternative plan combination is indicated in Table 121, and compared to existing trip production. The largest proportionate increase in internal person tripmaking is expected to occur in the school tripmaking category, which is expected to increase by nearly 39 percent. Home-based work trips are expected to increase by about 28 percent over the same 25-year plan design period. The average number of internal person trips generated per capita may be expected to increase from about 2.5 in 1972 to about 2.6 in 2000, while the average number of internal person trips generated per household can be expected to remain at about 7.9.

Mode of Travel: The distribution of internal person trips within the Region by mode of travel under the controlled centralization land use plan and the highway-supported transit transportation system plan is summarized in Table 122. Average weekday transit trip production within the Region may be expected to increase by over 276 percent, from 184,000 trips in 1972, or 53.4 million trips per year, to about 693,000 trips in 2000, or 201.0 million trips per year, thus reversing the historic decline in transit use that began after World War II and returning transit ridership levels to those experienced in 1952. The proportion of total internal travel generated within the Region in 2000 served by transit would, accordingly, rise significantly, from about 4 percent in 1972 to about 12.2 percent in 2000. Even with this increase in transit ridership, however, auto driver travel could be expected to increase by about 20 percent, from about 2.9 million trips in 1972 to about 3.5 million trips in 2000.

The relative use of transit and automobile under this combination of alternative plans is indicated by trip purpose categories in Tables 123 and 124. Significant increases in transit trip production of 535 and 913 percent, respectively, are estimated to occur in the home-based shopping and home-based other tripmaking categories. School

Map 21

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the highway-supported transit alternative transportation system plan, arterial street and highway system mileage within the Region would total about 3,436 miles by the year 2000, an increase of 426 miles, or about 14 percent, over 1972. Freeways would comprise 278 miles, or 8 percent, of the total arterial system in the year 2000, an increase of 116 miles over 1972.

Source: SEWRPC.

Table 119

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION PLAN

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Kenosha County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.1	4.3	--	--	12.1	3.5
8-lane	--	--	--	--	--	--
Subtotal	12.1	4.3	--	--	12.1	3.5
Standard Arterial						
2-lane	243.6	87.1	- 14.1	- 5.8	229.5	66.4
4-lane	24.1	8.6	49.5	205.4	73.6	21.2
6-lane	--	--	30.7	--	30.7	8.9
Subtotal	267.7	95.7	66.1	24.7	333.8	96.5
County Subtotal	279.8	100.0	66.1	23.6	345.9	100.0
Milwaukee County						
Freeway						
4-lane	12.7	1.7	1.4	11.0	14.1	1.8
6-lane	49.0	6.7	3.6	7.3	52.6	6.8
8-lane	2.1	0.3	--	--	2.1	0.3
Subtotal	63.8	8.7	5.0	7.8	68.8	8.9
Standard Arterial						
2-lane	339.5	46.2	- 112.9	- 33.2	226.6	29.3
4-lane	268.7	36.6	143.0	53.2	411.7	53.4
6-lane	62.2	8.5	3.1	5.0	65.3	8.4
Subtotal	670.4	91.3	33.2	4.9	703.6	91.1
County Subtotal	734.2	100.0	38.2	5.2	772.4	100.0
Ozaukee County						
Freeway						
4-lane	10.8	4.3	16.6	153.7	27.4	8.8
6-lane	--	--	--	--	--	--
8-lane	--	--	--	--	--	--
Subtotal	10.8	4.3	16.6	153.7	27.4	8.8
Standard Arterial						
2-lane	233.0	93.1	17.3	7.4	250.3	80.8
4-lane	6.5	2.6	25.5	392.3	32.0	10.4
6-lane	--	--	--	--	--	--
Subtotal	239.5	95.7	42.8	17.9	282.3	91.2
County Subtotal	250.3	100.0	59.4	23.7	309.7	100.0

Table 119 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Racine County						
Freeway						
4-lane	–	--	--	--	--	–
6-lane	12.0	3.4	--	–	12.0	3.0
8-lane	–	--	--	–	–	--
Subtotal	12.0	3.4	--	--	12.0	3.0
Standard Arterial						
2-lane	303.5	86.9	- 14.4	- 4.7	289.1	73.0
4-lane	28.0	8.0	53.4	190.7	81.4	20.5
6-lane	5.9	1.7	7.8	132.2	13.7	3.5
Subtotal	337.4	96.6	46.8	13.9	384.2	97.0
County Subtotal	349.4	100.0	46.8	13.4	396.2	100.0
Walworth County						
Freeway						
4-lane	19.1	4.7	31.3	163.9	50.4	10.9
6-lane	–	--	--	--	–	--
8-lane	–	--	--	--	–	--
Subtotal	19.1	4.7	31.3	163.9	50.4	10.9
Standard Arterial						
2-lane	379.4	92.9	4.7	1.2	384.1	82.9
4-lane	9.7	2.4	19.1	196.9	28.8	6.2
6-lane	–	--	--	--	–	--
Subtotal	389.1	95.3	23.8	6.1	412.9	89.1
County Subtotal	408.2	100.0	55.1	13.5	463.3	100.0
Washington County						
Freeway						
4-lane	0.4	0.1	35.6	8,900.0	36.0	8.3
6-lane	6.4	1.9	--	--	6.4	1.5
8-lane	–	--	--	--	--	–
Subtotal	6.8	2.0	35.6	523.5	42.4	9.8
Standard Arterial						
2-lane	305.6	90.1	47.3	15.5	352.9	81.4
4-lane	26.8	7.9	3.0	11.2	29.8	6.9
6-lane	--	--	8.4	–	8.4	1.9
Subtotal	332.4	98.0	58.7	17.7	391.1	90.2
County Subtotal	339.2	100.0	94.3	27.8	433.5	100.0

Table 119 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Waukesha County						
Freeway						
4-lane	29.1	4.5	23.0	79.0	52.1	7.3
6-lane	8.7	1.3	4.2	48.3	12.9	1.8
8-lane	--	--	--	--	--	--
Subtotal	37.8	5.8	27.2	72.0	65.0	9.1
Standard Arterial						
2-lane	565.5	87.2	- 27.3	- 4.8	538.2	75.3
4-lane	41.3	6.4	48.1	116.5	89.4	12.5
6-lane	3.9	0.6	18.0	461.5	21.9	3.1
Subtotal	610.7	94.2	38.8	6.3	649.5	90.9
County Subtotal	648.5	100.0	66.0	10.2	714.5	100.0
Southeastern Wisconsin Region						
Freeway						
4-lane	72.1	2.4	107.9	149.6	180.0	5.2
6-lane	88.2	2.9	7.8	8.8	96.0	2.8
8-lane	2.1	0.1	--	--	2.1	0.1
Subtotal	162.4	5.4	115.7	71.3	278.1	8.1
Standard Arterial						
2-lane	2,370.1	78.7	- 99.4	- 4.2	2,270.7	66.1
4-lane	405.1	13.5	341.6	84.3	746.7	21.7
6-lane	72.0	2.4	68.0	94.4	140.0	4.1
Subtotal	2,847.2	94.6	310.2	10.9	3,157.4	91.9
Region Total	3,009.6	100.0	425.9	14.1	3,435.5	100.0

Source: SEWRPC.

transit trips are anticipated to decrease slightly. Home-based work transit trips are estimated to increase by about 174 percent, from nearly 71,000 trips in 1972 to about 194,000 trips in 2000.

Under this combination of land use and transportation plan alternatives, it is estimated that a total of about 3.5 million internal automobile driver trips would be generated within the Region on an average weekday in 2000. This represents an increase of about 20 percent over the 1972 level of nearly 2.9 million such trips. The anticipated increases in internal automobile driver trips by trip purpose category are identified in Table 125, while the anticipated increase in internal automobile person trips within the Region is shown in Table 124.

Table 120

AUTOMOBILE AVAILABILITY WITHIN THE REGION 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population	1,810,700	408,600	22.6	2,219,300
Automobiles Available	704,600	248,200	35.2	952,800
Persons Per Automobile	2.57	-0.24	-9.3	2.33

Source: SEWRPC.

Table 121

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	1,055,500	23.7	291,400	27.6	1,346,900	23.6
Home-based Shopping	673,600	15.1	171,300	25.4	844,900	14.8
Home-based Other	1,532,600	34.3	407,700	26.6	1,940,300	34.0
Nonhome-based	779,800	17.5	208,800	26.8	988,600	17.4
School	418,900	9.4	161,500	38.6	580,400	10.2
Total	4,460,400	100.0	1,240,700	27.8	5,701,100	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 122

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Mode of Travel	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Automobile Driver	2,884,700	64.7	583,400	20.2	3,468,100	60.8
Automobile Passenger	1,217,900	27.3	34,000	2.8	1,251,900	22.0
Transit Passenger	184,200	4.1	508,900	276.3	693,100	12.2
School Bus Passenger	173,600	3.9	114,400	65.9	288,000	5.0
Total	4,460,400	100.0	1,240,700	27.8	5,701,100	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 123

DISTRIBUTION OF INTERNAL TRANSIT TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Transit Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	70,900	38.5	123,000	173.5	193,900	28.0
Home-based Shopping	18,800	10.2	100,500	534.6	119,300	17.2
Home-based Other	28,300	15.4	258,500	913.4	286,800	41.4
Nonhome-based	13,100	7.1	28,500	217.5	41,600	6.0
School	53,100	28.8	- 1,600	- 3.0	51,500	7.4
Total	184,200	100.0	508,900	276.3	693,100	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 124

DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	984,600	24.0	168,400	17.1	1,153,000	24.4
Home-based Shopping	654,800	16.0	70,800	11.0	725,600	15.4
Home-based Other	1,504,300	36.6	149,200	10.0	1,653,500	35.0
Nonhome-based	766,700	18.7	180,300	23.5	947,000	20.1
School	192,200	4.7	48,700	25.3	240,900	5.1
Total	4,102,600	100.0	617,400	15.0	4,720,000	100.0

[a]*Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 125

DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Driver Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	840,800	29.2	194,500	23.1	1,035,300	29.8
Home-based Shopping	444,500	15.4	71,100	16.0	515,600	14.9
Home-based Other	976,300	33.8	136,400	14.0	1,112,700	32.1
Nonhome-based	555,700	19.3	162,500	29.2	718,200	20.7
School	67,400	2.3	18,900	28.0	86,300	2.5
Total	2,884,700	100.0	583,400	20.2	3,468,100	100.0

[a]*Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Total vehicle trip production on an average weekday under this combination of alternative plans is estimated to increase by nearly 22 percent, from about 3.4 million vehicle trips in 1972 to about 4.2 million in 2000. As shown in Table 126, the largest absolute increases in vehicle trip production are anticipated to occur in internal automobile and truck trips, while the largest percentage increases in vehicle trip production are anticipated in external automobile and other truck trip categories. The proportion of trips by vehicle class would not, however, change significantly from 1972 to 2000 under this alternative plans combination.

System Performance

Allocation of the vehicle travel demand generated under the controlled centralization land use plan to the highway-supported transit alternative transportation system plan indicates that vehicle miles of travel on the arterial street and highway system may be expected to increase from about 20.1 million per average weekday in 1972 to about 28.0 million in 2000, an increase of nearly 39 percent. More than one-half of this increase could be expected to occur on the regional freeway system, where such travel could be expected to increase from about 6.2 million miles in 1972 to about 10.3 million miles in 2000, an increase of about 66 percent. The anticipated arterial vehicle miles of travel on an average weekday under this alternative plan combination are identified by county and facility type in Table 127. The anticipated average daily traffic volumes on the arterial street and highway systems in the Region by the year 2000 are shown on Map 22.

Even with the extensive transit facility and service improvements postulated under this alternative within the urbanized areas of the Region, the anticipated increase in

Table 126

DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Vehicle Class	Total Vehicle Trips Generated on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Automobile						
Internal	2,884,700	84.0	583,400	20.2	3,468,100	82.9
External[a]	111,900	3.2	51,900	46.4	163,800	3.9
Other[b]	34,200	1.0	11,800	34.5	46,000	1.1
Subtotal	3,030,800	88.2	647,100	21.4	3,677,900	87.9
Truck						
Internal	383,600	11.2	93,600	24.4	477,200	11.4
External	13,800	0.4	4,700	34.1	18,500	0.5
Other[b]	6,000	0.2	2,500	41.7	8,500	0.2
Subtotal	403,400	11.8	100,800	25.0	504,200	12.1
Total	3,434,200	100.0	747,900	21.8	4,182,100	100.0

[a] *Includes light trucks, i.e., those under 6,000 pounds gross weight.*

[b] *Includes vehicle trips made by persons residing in group quarters and by nonresidents of the Region.*

Source: SEWRPC.

vehicle travel would produce nearly a doubling in the number of miles of arterial street and highway facilities operating at or over capacity (see Table 128). In 1972 there were about 318 miles of arterial streets and highway facilities operating at or over capacity; by the year 2000 about 609 miles of arterial facilities could be expected to operate at or above congested levels, a 92 percent increase. Of the 609 miles, the number of miles of arterial facilities operating over capacity could be expected to decrease from 166 in 1972 to 148 in 2000, while the number of miles operating at capacity could be expected to increase from 152 in 1972 to 461 in 2000. Locations of those arterial facilities that could be expected to operate at or above capacity under the design year conditions given this combination of plan alternatives are identified on Map 23. Important freeway facilities in the Milwaukee urbanized area that may be expected to operate at or beyond congestion levels include IH 94 and IH 894, the Zoo Freeway from IH 94 to the Fond du Lac Freeway, and the North-South Freeway south of Capitol Drive. In addition, several important standard arterial facilities in the Milwaukee urbanized area could be expected to operate at or near congested levels, including N. and S. 27th Street, W. Rawson Avenue, W. Ryan Road, W. Capitol Drive, Hampton Avenue, Silver Spring Drive, and portions of N. Fond du Lac Avenue, N. Lisbon Avenue, and E. Locust Street. Beyond the Milwaukee urbanized area such key facilities as IH 94 from the Milwaukee County line to STH 158 in Kenosha County, STH 190 in Waukesha County, and STH 31 in Kenosha County would be adversely affected. In addition, severe congestion would also be experienced on the arterial streets within the City of Kenosha. Transit service improvements in eastern Waukesha County would be sufficient to permit much of the arterial street system to operate at or below design capacity.

Allocation of the transit travel demand generated under the controlled centralization land use plan to the highway-supported transit alternative transportation system plan indicates that, in the Milwaukee urbanized area, revenue passengers could be expected to increase from about 177,800 per average weekday, or 52.4 million per year in 1972, to about 643,100 per average weekday, or 186.5 million per year in 2000, an increase of about 465,000 per average weekday, or 134.1 million per year, or 256 percent. The annual number of transit rides per capita in the Milwaukee urbanized area may be expected to increase from nearly 50 in 1972 to 130 in 2000 (see Table 129).

Table 127

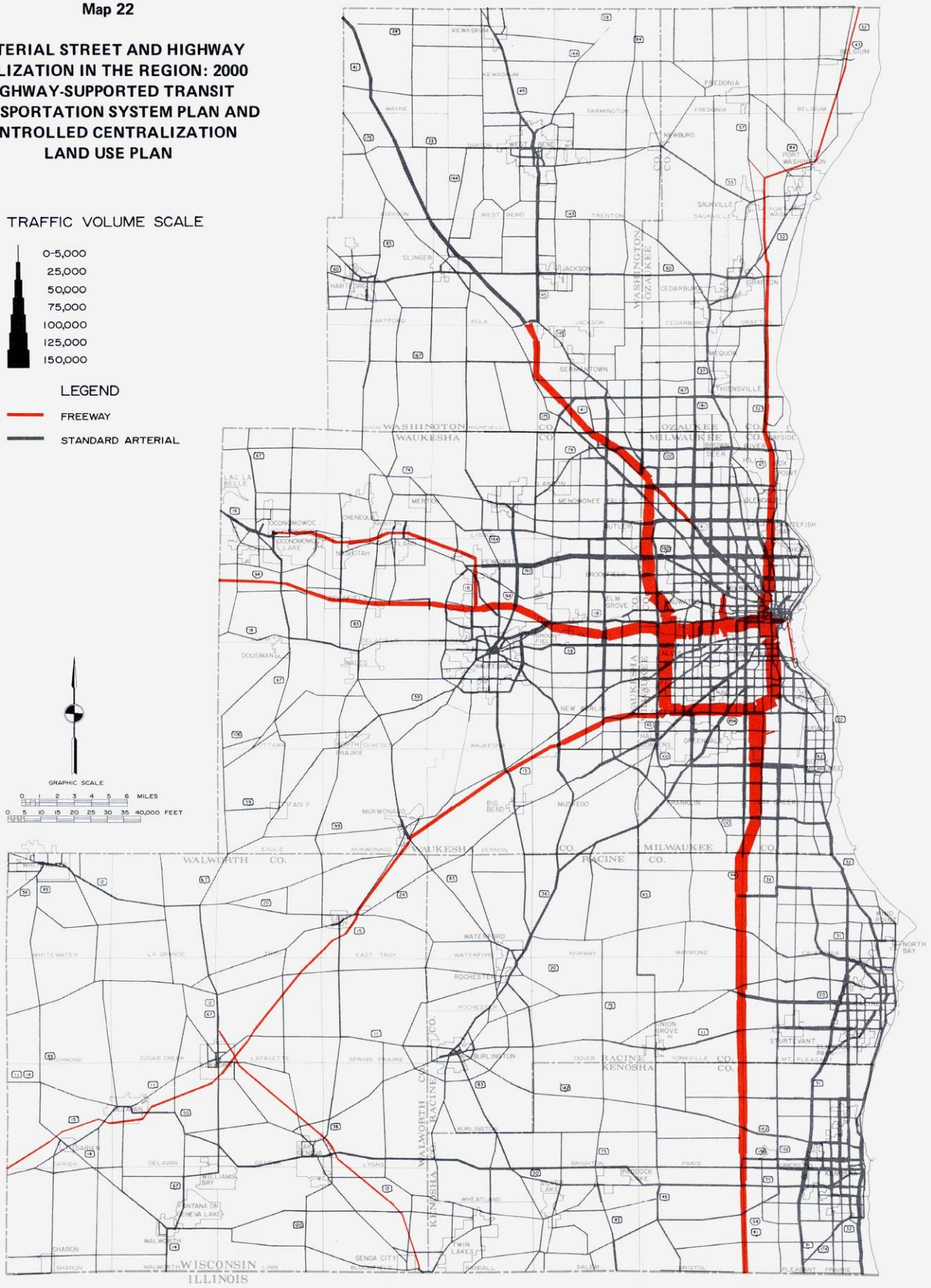
VEHICLE MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

County	Arterial Vehicle Miles of Travel on An Average Weekday (thousands)					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha						
Freeway	382	26.8	264	69.1	646	22.9
Standard Arterial	1,046	73.2	1,125	107.6	2,171	77.1
Subtotal	1,428	100.0	1,389	97.3	2,817	100.0
Milwaukee						
Freeway	3,977	37.2	904	22.7	4,881	43.4
Standard Arterial	6,718	62.8	- 353	- 5.3	6,365	56.6
Subtotal	10,695	100.0	551	5.2	11,246	100.0
Ozaukee						
Freeway	223	26.2	187	83.9	410	31.8
Standard Arterial	627	73.8	254	40.5	881	68.2
Subtotal	850	100.0	441	51.9	1,291	100.0
Racine						
Freeway	415	22.9	459	110.6	874	27.9
Standard Arterial	1,398	77.1	858	61.4	2,256	72.1
Subtotal	1,813	100.0	1,317	72.6	3,130	100.0
Walworth						
Freeway	56	6.4	475	848.2	531	31.6
Standard Arterial	817	93.6	330	40.4	1,147	68.4
Subtotal	873	100.0	805	92.2	1,678	100.0
Washington						
Freeway	190	16.5	756	397.9	946	44.2
Standard Arterial	961	83.5	233	24.2	1,194	55.8
Subtotal	1,151	100.0	989	85.9	2,140	100.0
Waukesha						
Freeway	970	29.3	1,048	108.0	2,018	35.7
Standard Arterial	2,344	70.7	1,298	55.4	3,642	64.3
Subtotal	3,314	100.0	2,346	70.8	5,660	100.0
Southeastern Wisconsin Region						
Freeway	6,213	30.9	4,093	65.9	10,306	36.9
Standard Arterial	13,911	69.1	3,745	26.9	17,656	63.1
Total	20,124	100.0	7,838	38.9	27,962	100.0

Source: SEWRPC.

Map 22

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Arterial street and highway system utilization in the Region in the year 2000 may be expecteu to increase to nearly 28 million vehicle miles of travel on an average weekday under the highway-supported transit alternative transportation system plan, an increase of nearly eight million vehicle miles, or about 39 percent, over 1972. About 10 million vehicle miles of travel, or 37 percent of the total, could be expected to occur on the freeway system, as opposed to 31 percent in 1972.

Source: SEWRPC.

Table 128

ARTERIAL STREET AND HIGHWAY SERVICE LEVELS IN THE REGION BY COUNTY: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

County	Existing 1972						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	243.1	9.0	14.7	9.7	22.0	13.3	279.8
Milwaukee	601.4	22.4	71.8	47.2	61.0	36.8	734.2
Ozaukee	234.7	8.7	10.1	6.6	5.5	3.3	250.3
Racine	310.0	11.5	19.1	12.6	20.3	12.3	349.4
Walworth	400.7	14.9	2.7	1.8	4.8	2.9	408.2
Washington	320.4	11.9	9.7	6.4	9.1	5.5	339.2
Waukesha	581.8	21.6	23.8	15.7	42.9	25.9	648.5
Total	2,692.1	100.0	151.9	100.0	165.6	100.0	3,009.6

County	Planned Increment						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent Change	Miles	Percent Change	Miles	Percent Change	Total Miles
Kenosha	- 11.7	- 4.8	40.6	276.2	37.2	169.1	66.1
Milwaukee	2.0	0.3	63.2	88.0	- 27.0	- 44.3	38.2
Ozaukee	57.0	24.3	7.9	78.2	- 5.5	- 100.0	59.4
Racine	- 31.5	- 10.2	67.5	353.4	10.8	53.2	46.8
Walworth	29.8	7.4	29.6	1,096.3	- 4.3	- 89.6	55.1
Washington	89.8	28.0	6.7	69.1	- 2.2	- 24.2	94.3
Waukesha	- 1.7	- 0.3	93.9	394.5	- 26.2	- 61.1	66.0
Total	133.7	5.0	309.4	203.7	- 17.2	- 10.4	425.9

County	Total 2000						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	231.4	8.2	55.3	12.0	59.2	39.9	345.9
Milwaukee	603.4	21.4	135.0	29.3	34.0	22.9	772.4
Ozaukee	291.7	10.3	18.0	3.9	0.0	0.0	309.7
Racine	278.5	9.9	86.6	18.8	31.1	21.0	396.2
Walworth	430.5	15.2	32.3	7.0	0.5	0.3	463.3
Washington	410.2	14.5	16.4	3.5	6.9	4.6	433.5
Waukesha	580.1	20.5	117.7	25.5	16.7	11.3	714.5
Total	2,825.8	100.0	461.3	100.0	148.4	100.0	3,435.5

[a] *Volume-to-capacity ratio 0.00-0.90; fully adequate and safest operational levels.*

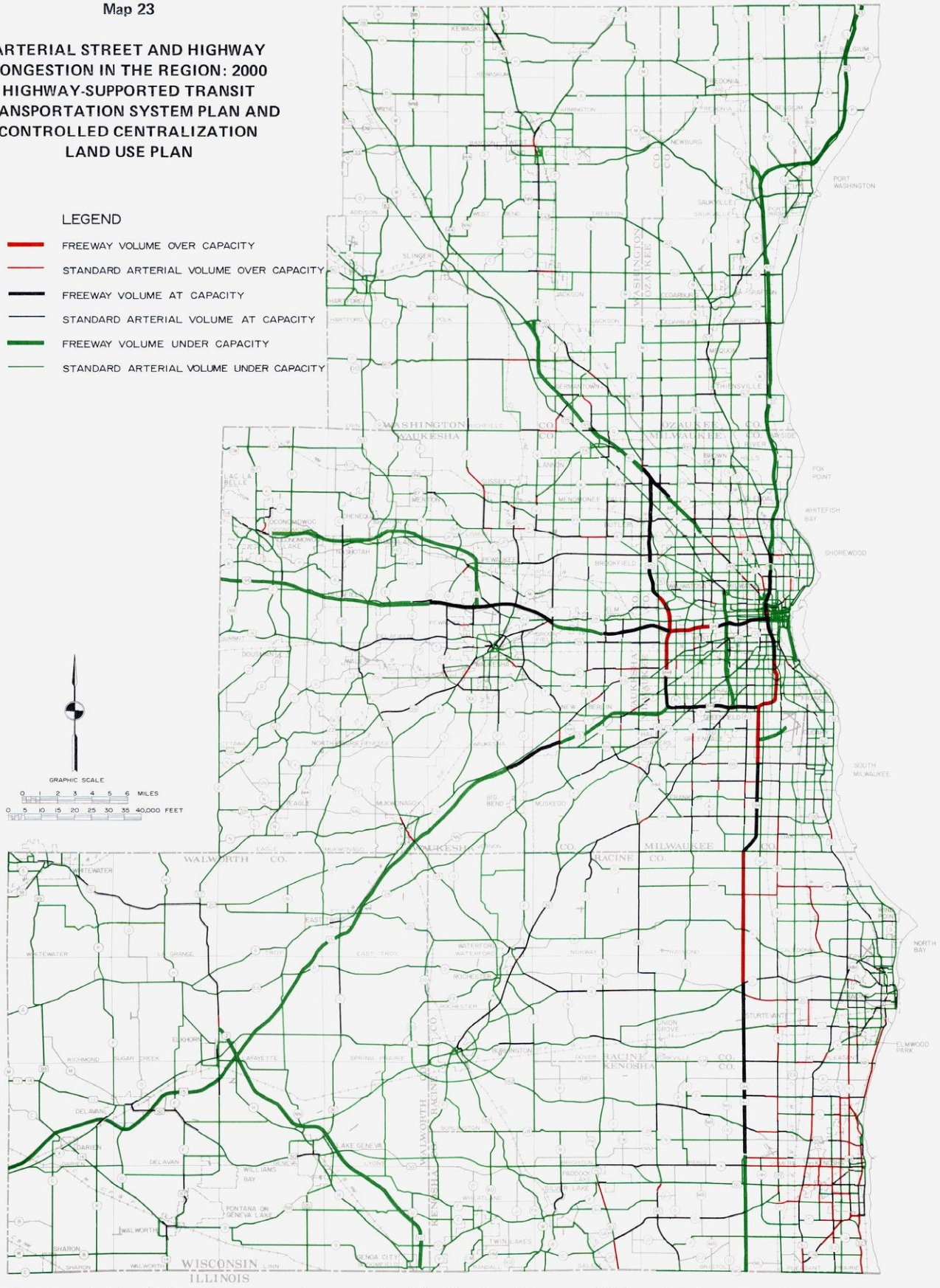
[b] *Volume-to-capacity ratio 0.91-1.10; adequate operational level.*

[c] *Volume-to-capacity ratio over 1.10; congested at times.*

Source: SEWRPC.

Map 23

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the highway-supported transit alternative transportation system plan, 610 miles of arterial street and highway facilities, or about 18 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent, of the total arterial system were operating at or over design capacity.

Source: SEWRPC.

Table 129

TRANSIT SYSTEM PERFORMANCE IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population				
Urbanized Area	1,267,400	241,700	19.1	1,509,100
Service Area	1,043,600	394,200	37.8	1,437,800
Urbanized Area Population Served	1,043,600	394,200	37.8	1,437,800
Percent Urbanized Area Population Served	82.3	--	--	95.3
Nonurbanized Area Population Served	--	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	1,410	68,930	4,888.7	70,340
Secondary	--[a]	--	--	72,020
Tertiary	60,670	61,790	101.8	122,460
Total	62,080	202,740	326.6	264,820
Daily Seat Miles	3,220,640	10,020,360	311.1	13,241,000
Daily Revenue Passengers	177,800	465,300	261.7	643,100
Daily Passenger Miles	1,175,700	2,755,900	234.4	3,931,600
Passengers Per Vehicle Mile	2.9	--	--	2.4
Percent Utilization—Seat Miles Provided to Passenger Miles Used	36.5	--	--	29.7
Annual Revenue Passengers	52,417,800	134,081,200	255.8	186,499,000
Rides Per Capita	50.2	--	--	129.7

[a] *Included in tertiary.*

Source: SEWRPC.

In the Kenosha urbanized area, as shown in Table 130, the annual number of transit revenue passengers is anticipated to increase from about 503,000 in 1972 to about 6.7 million in 2000, an increase of about 6.1 million, or 1,226 percent. The annual number of rides per capita would increase from about six in 1972 to about 52 in 2000.

In the Racine urbanized area, the annual number of transit revenue passengers would be expected to increase from about 526,000 in 1972 to about 7.6 million in 2000, an increase of about 7.1 million or 1,345 percent. The annual number of rides per capita would increase from about five in 1972 to about 52 in 2000.

System Development Cost

The estimated capital costs of carrying out the highway-supported transit transportation system plan under the land use development assumptions contained in the controlled centralization land use plan are identified in Table 131. The total cost of preserving, improving, and expanding the arterial street and highway system is estimated at about $1.6 billion. The estimated cost of preserving, improving, and expanding the mass transit systems in the three urbanized areas is estimated at about $456 million. The total estimated cost of preserving, improving, and expanding the street and highway system, including nonarterial streets, and the transit system is estimated at about $2.7 billion.

TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN— CONTROLLED CENTRALIZATION LAND USE PLAN

The transit-supported highway alternative transportation system plan developed to serve and support the controlled centralization land use plan is composed of significant improvements to the existing transit systems in the three urbanized areas of the Region and the existing arterial street and highway system. Under this alternative, however, the emphasis in capital investment in the Milwaukee urbanized area would shift from one of heavy emphasis on providing transit service improvements to one of placing greater emphasis on further investment in arterial

Table 130

TRANSIT SYSTEM PERFORMANCE IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Population				
Urbanized Area	86,500	48,700	56.3	135,200
Service Area	83,900	44,500	53.0	128,400
Urbanized Area Population Served	83,900	44,500	53.0	128,400
Percent Urbanized Area Population Served	97.0	--	--	95.0
Nonurbanized Area Population Served	--	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	--	--	--	--
Secondary	--	--	--	--
Tertiary	1,140	3,630	318.4	4,770
Total	1,140	3,630	318.4	4,770
Daily Seat Miles	43,300	171,350	395.7	214,650
Daily Revenue Passengers	2,800	20,200	721.4	23,000
Daily Passenger Miles	9,610	43,790	455.7	53,400
Passengers Per Vehicle Mile	2.5	--	--	4.8
Percent Utilization—Seat Miles Provided to Passenger Miles Used	22.2	--	--	24.9
Annual Revenue Passengers	503,200	6,166,800	1,225.5	6,670,000
Rides Per Capita	6.0	--	--	51.9
Racine Urbanized Area				
Population				
Urbanized Area	115,200	34,000	29.5	149,200
Service Area	100,600	45,400	45.1	146,000
Urbanized Area Population Served	100,600	45,400	45.1	146,000
Percent Urbanized Area Population Served	87.3	--	--	97.9
Nonurbanized Area Population Served	--	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	--	--	--	--
Secondary	--	--	--	--
Tertiary	1,560	4,860	311.5	6,420
Total	1,560	4,860	311.5	6,420
Daily Seat Miles	29,600	259,300	876.0	288,900
Daily Revenue Passengers	3,100	23,100	745.2	26,200
Daily Passenger Miles	10,920	52,380	479.7	63,300
Passengers Per Vehicle Mile	2.0	--	--	4.1
Percent Utilization—Seat Miles Provided to Passenger Miles Used	36.9	--	--	21.9
Annual Revenue Passengers	525,700	7,072,300	1,345.3	7,598,000
Rides Per Capita	5.2	--	--	52.0

Source: SEWRPC.

Table 131

ESTIMATED TRANSPORTATION SYSTEM PRESERVATION, IMPROVEMENT AND EXPANSION, AND OPERATION AND MAINTENANCE COST IN THE REGION: 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

System Component	Capital Cost		
	System Preservation (dollars)	System Improvement and Expansion (dollars)	Total (dollars)
Streets and Highways			
Arterial	228,466,000	1,380,459,600	1,608,925,600
Nonarterial	170,966,000	437,539,000	608,505,000
Subtotal	399,432,000	1,817,998,600	2,217,430,600
Transit			
Transitways	--	174,295,000	174,295,000
Exclusive Lanes	--	12,075,000	12,075,000
Stations and Terminals	4,852,000	51,496,000	56,348,000
Offices and Shops	16,233,000	--	16,233,000
Operating and Maintenance Equipment	87,325,000	110,100,000	197,425,000
Subtotal	108,410,000	347,966,000	456,376,000
Total	507,842,000	2,165,964,600	2,673,806,600

Source: SEWRPC.

street and highway improvements. Beyond the Milwaukee urbanized area, the transit-supported highway transportation system plan, with very few exceptions, is similar to the highway-supported transit transportation system plan.

Arterial Street and Highway System

Under the transit-supported highway alternative transportation system plan, the arterial street and highway system would be selectively improved to accommodate the developing future travel demand. Improvements to the regional freeway system under this alternative would consist of the following:

1. The four "committed" freeway improvements identified under the "no build" alternative transportation system plan: STH 15 from STH 12 to the Rock County line; IH 43 from the Village of Grafton to the Sheboygan County line; IH 794 south over the high level Milwaukee Harbor Bridge to Carferry Drive; and the Airport Spur Freeway.

2. Provision of additional traffic lanes along IH 43—the North-South Freeway—from the Silver Spring Drive interchange north to Mequon Road.

3. Provision of additional traffic lanes along the Stadium Freeway South from IH 94 to W. National Avenue, and the extension of the Stadium Freeway South to an interchange with the Airport Freeway.

4. Construction of the West Bend Freeway from STH 145 north, to and around the west side of the City of West Bend, rejoining existing STH 45 near CTH D.

5. Conversion of USH 41 from an expressway to a freeway from STH 145 to the Dodge County line.

6. Completion of the conversion of USH 16 to a freeway through the Village of Pewaukee; the completion of the conversion of USH 16 to a freeway from STH 83 to STH 67; the construction of a USH 16 Oconomowoc Bypass Freeway from STH 67 around the eastern and northern sides of the City of Oconomowoc, rejoining existing STH 16 in Jefferson County; and the construction of an eastern extension of USH 16 as the Bay Freeway from STH 190 in the Village of Pewaukee to the Fond du Lac Freeway.

7. Construction of an extension of the Lake Freeway south from Carferry Drive to the Illinois State line, connecting there with a proposed freeway in Illinois.

8. Construction of the Airport Spur Freeway from the North-South Freeway to General Mitchell Field.

9. Completion of the Milwaukee downtown loop freeway, including the northern extension of the Lake Freeway from IH 794 to the Juneau interchange as a four-lane facility, and completion of the Park Freeway east from its current terminus at N. Milwaukee Street to the Juneau interchange, also as a four-lane facility.

10. Completion of the western extension of the Park Freeway to an interchange with the Stadium Freeway in the vicinity of N. 46th Street and W. North Avenue; and the northerly extension of the Stadium Freeway from its current terminus at W. Lloyd Street to and through the interchange with the Park Freeway and connecting with the Fond du Lac Freeway.

11. Construction of a metropolitan Belt Freeway from the proposed Lake Freeway in the City of Oak Creek west through the Cities of Franklin and Muskego and north through the Cities of Brookfield and New Berlin and the Villages of Menomonee Falls and Germantown to an interchange with USH 41-45 in the Village of Germantown.

Under this plan alternative, the regional freeway system would be expanded from its current total of about 162 miles to a total of about 375 miles, an increase of 213 miles, or 131 percent. This increase would include all of the 17 miles of Milwaukee County freeways endorsed by the electorate in that County in the referendum held in November 1974. Standard arterial street and highway improvements are also proposed under this alternative, such improvements being necessary to alleviate capacity deficiencies identified under prior analyses. The proposed arterial street and highway system under the transit-supported highway alternative plan is shown on Map 24. The change in arterial street and highway mileage by facility type, including identification of the change in the number of miles of facility by the number of lanes provided, is set forth in Table 132. On a regional basis, the total arterial street and highway mileage under the transit-supported highway alternative would increase from the 1972 level of about 3,010 miles to a 2000 level of about 3,546 miles, an increment of 536 miles, or about 18 percent.

Transit System

Within the Milwaukee urbanized area, the proposed transit facilities and services under the transit-supported highway alternative system plan would consist of improvements to the existing primary, secondary, and tertiary transit facilities including the provision of improved service over the expanded regional freeway system made available under this alternative. Primary transit service would be offered by transit vehicles operating over exclusive rights-of-way—that is, in rapid transit service—and over available freeways—that is, in modified rapid transit service. Because of the expanded freeway system made available under this alternative, the primary transit system would consist of a greater number of miles of modified rapid transit line and a lesser number of miles of rapid transit line. Under this alternative, rapid transit service would be provided over exclusive rights-of-way in the major east-west travel corridor emanating from central Milwaukee County; over the partially Milwaukee County-owned and abandoned Chicago and North Western Railroad right-of-way between the Milwaukee central business district and the North-South Freeway near Hampton Avenue, termed the "East Side" Transitway; and along the proposed Park Freeway West and Stadium Freeway North "gap closure," termed the "northwest transitway." Primary modified rapid transit service would be provided over nearly all available freeways within the County. Like the highway-supported transit alternative system plan, the transit-supported highway plan envisions the primary transit service vehicle also providing a collection and distribution service within the neighborhoods surrounding the transit stations located on the primary network. The primary transit network under this plan alternative is graphically summarized on Map 25.

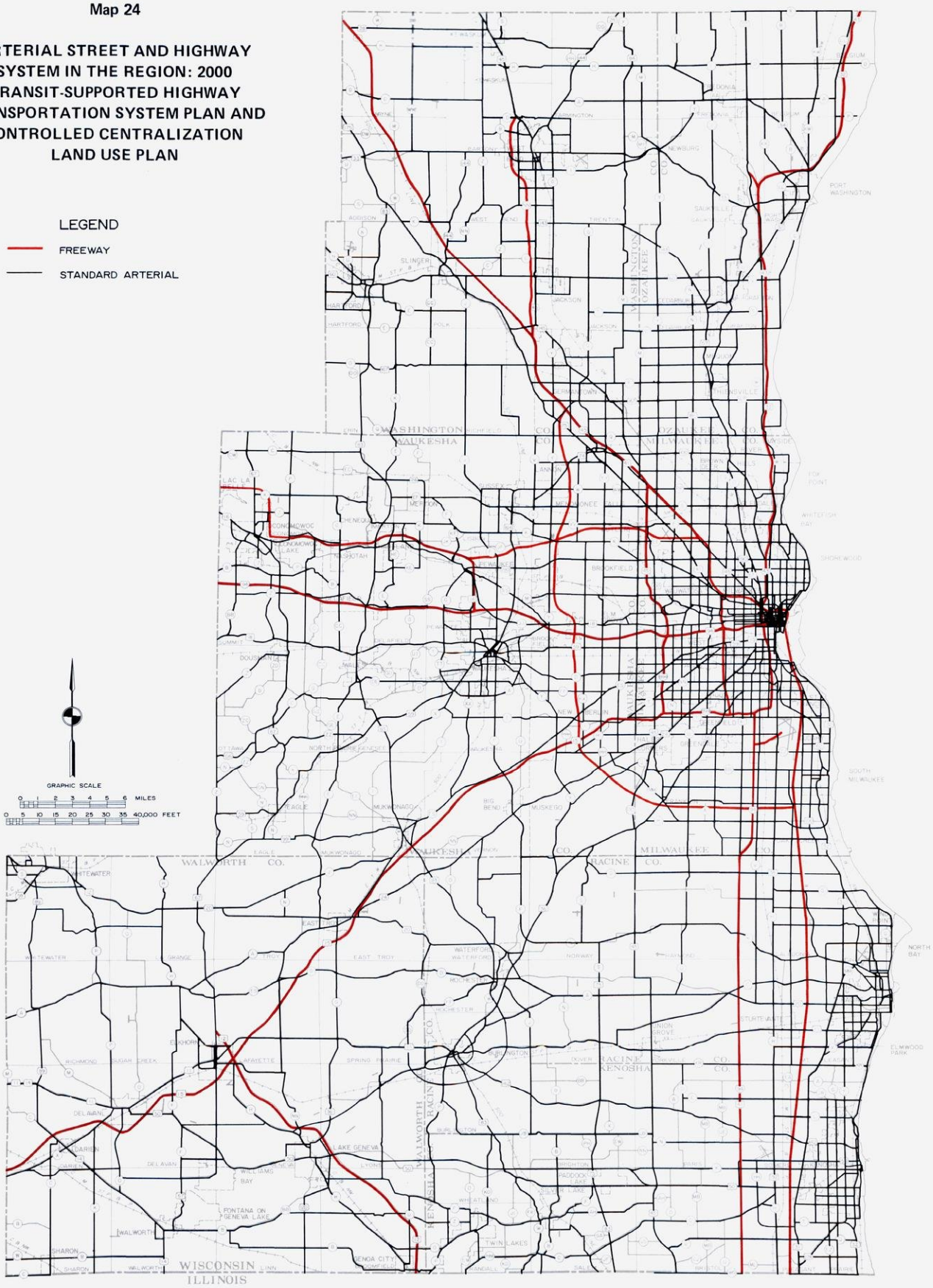
A secondary level of transit service also is proposed under this alternative, consisting of an extensive network of limited stop, express service transit lines operating on the arterial streets in mixed traffic or on exclusive transit lanes. Such express, or secondary, service would be provided on 13 individual transit routes, with stops between terminals made only at intersections with other transit routes or at land uses identified as major traffic generators. These secondary transit routes proposed to be provided under this alternative are also identified on Map 25. Where appropriate, vehicles operating at secondary levels of transit service would also provide collection and distribution functions beyond the termini of such express service.

Like the highway-supported transit plan, the transit-supported highway alternative would provide for a tertiary level of transit service consisting of a grid of load bus routes operating over arterial and collector streets. A total of 41 public transit stations would be provided under this alternative plan, located on both the primary and secondary transit systems. These stations are identified on Map 25 and in Table 133. Of the 41 stations, 22 would be located in and would primarily serve the City of Milwaukee. Lanes would also be reserved on arterial streets under this alternative for the exclusive use of transit vehicles as shown on Map 25 and as identified in Table 134. This plan alternative further assumes that appropriate traffic engineering techniques will be used to obtain higher transit operating speeds on these exclusive lanes and along the other secondary routes. Unlike the highway-supported transit alternative, the transit system and level of service proposed in the Milwaukee urbanized area under the transit-supported highway alternative plan does not provide for public actions to reduce the transit fare to 25 cents or to increase the automobile parking costs in the Milwaukee central business district.

As shown in Table 135, the proposed transit system in the Milwaukee urbanized area under the transit-supported highway alternative consists of a total of about 3,110 round trip route miles, about 2,049 miles, or 193 percent greater than the mileage provided in 1972. For proper

Map 24

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the transit-supported highway alternative transportation system plan, arterial street and highway system mileage within the Region would total about 3,546 miles by the year 2000, an increase of 536 miles, or about 18 percent, over 1972. Freeways would comprise 375 miles, or 11 percent, of the total arterial system in the year 2000, an increase of 212 miles over 1972.

Source: SEWRPC.

Table 132

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Kenosha County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.1	4.3	12.2	101.7	24.3	6.7
8-lane	--	--	--	--	-	--
Subtotal	12.1	4.3	12.2	101.7	24.3	6.7
Standard Arterial						
2-lane	243.6	87.1	- 4.6	- 1.9	239.0	66.8
4-lane	24.1	8.6	51.5	213.7	75.6	21.1
6-lane	-	-	19.2	-	19.2	5.4
Subtotal	267.7	95.7	66.1	24.7	333.8	93.3
County Subtotal	279.8	100.0	78.3	28.0	358.1	100.0
Milwaukee County						
Freeway						
4-lane	12.7	1.7	- 0.1	- 0.8	12.6	1.5
6-lane	49.0	6.7	36.3	74.1	85.3	10.4
8-lane	2.1	0.3	6.7	317.0	8.8	1.1
Subtotal	63.8	8.7	42.9	67.2	106.7	13.0
Standard Arterial						
2-lane	339.5	46.2	- 84.2	- 24.8	255.3	31.2
4-lane	268.7	36.6	125.0	46.5	393.7	48.1
6-lane	62.2	8.5	0.9	1.4	63.1	7.7
Subtotal	670.4	91.3	41.7	6.2	712.1	87.0
County Subtotal	734.2	100.0	84.6	11.5	818.8	100.0
Ozaukee County						
Freeway						
4-lane	10.8	4.3	16.6	153.7	27.4	8.8
6-lane	--	--	--	--	--	--
8-lane	--	-	--	--	-	-
Subtotal	10.8	4.3	16.6	153.7	27.4	8.8
Standard Arterial						
2-lane	233.0	93.1	11.8	5.1	244.8	79.1
4-lane	6.5	2.6	31.0	476.9	37.5	12.1
6-lane	--	--	--	-	--	--
Subtotal	239.5	95.7	42.8	17.9	282.3	91.2
County Subtotal	250.3	100.0	59.4	23.7	309.7	100.0

Table 132 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Racine County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.0	3.4	12.1	100.8	24.1	5.8
8-lane	--	--	--	--	--	--
Subtotal	12.0	3.4	12.1	100.8	24.1	5.8
Standard Arterial						
2-lane	303.5	86.9	- 1.1	- 0.4	302.4	72.9
4-lane	28.0	8.0	56.3	201.1	84.3	20.3
6-lane	5.9	1.7	- 2.1	- 35.6	3.8	1.0
Subtotal	337.4	96.6	53.1	15.7	390.5	94.2
County Subtotal	349.4	100.0	65.2	18.7	414.6	100.0
Walworth County						
Freeway						
4-lane	19.1	4.7	31.3	163.9	50.4	10.9
6-lane	--	--	--	--	--	--
8-lane	--	--	--	--	--	--
Subtotal	19.1	4.7	31.3	163.9	50.4	10.9
Standard Arterial						
2-lane	379.4	92.9	4.7	1.2	384.1	82.9
4-lane	9.7	2.4	19.1	196.9	28.8	6.2
6-lane	--	--	--	--	--	--
Subtotal	389.1	95.3	23.8	6.1	412.9	89.1
County Subtotal	408.2	100.0	55.1	13.5	463.3	100.0
Washington County						
Freeway						
4-lane	0.4	0.1	37.2	9,300.0	37.6	8.6
6-lane	6.4	1.9	0.0	--	6.4	1.5
8-lane	-	--	--	--	--	--
Subtotal	6.8	2.0	37.2	547.1	44.0	10.1
Standard Arterial						
2-lane	305.6	90.1	48.5	15.9	354.1	81.5
4-lane	26.8	7.9	3.0	11.2	29.8	6.9
6-lane	--	--	6.7	--	6.7	1.5
Subtotal	332.4	98.0	58.2	17.5	390.6	89.9
County Subtotal	339.2	100.0	95.4	28.1	434.6	100.0

Table 132 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Waukesha County						
Freeway						
4-lane	29.1	4.5	38.7	133.0	67.8	9.1
6-lane	8.7	1.3	21.2	243.7	29.9	4.0
8-lane	-	--	--	--	-	-
Subtotal	37.8	5.8	59.9	158.5	97.7	13.1
Standard Arterial						
2-lane	565.5	87.2	- 27.1	- 4.8	538.4	72.1
4-lane	41.3	6.4	60.1	145.5	101.4	13.6
6-lane	3.9	0.6	5.1	130.8	9.0	1.2
Subtotal	610.7	94.2	38.1	6.2	648.8	86.9
County Subtotal	648.5	100.0	98.0	15.1	746.5	100.0
Southeastern Wisconsin Region						
Freeway						
4-lane	72.1	2.4	123.7	171.6	195.8	5.5
6-lane	88.2	2.9	81.8	92.8	170.0	4.8
8-lane	2.1	0.1	6.7	319.0	8.8	0.2
Subtotal	162.4	5.4	212.2	130.7	374.6	10.5
Standard Arterial						
2-lane	2,370.1	78.7	- 52.0	- 2.2	2,318.1	65.4
4-lane	405.1	13.5	346.0	- 85.4	751.1	21.2
6-lane	72.0	2.4	29.8	41.4	101.8	2.9
Subtotal	2,847.2	94.6	323.8	11.4	3,171.0	89.5
Region Total	3,009.6	100.0	536.0	17.8	3,545.6	100.0

Source: SEWRPC.

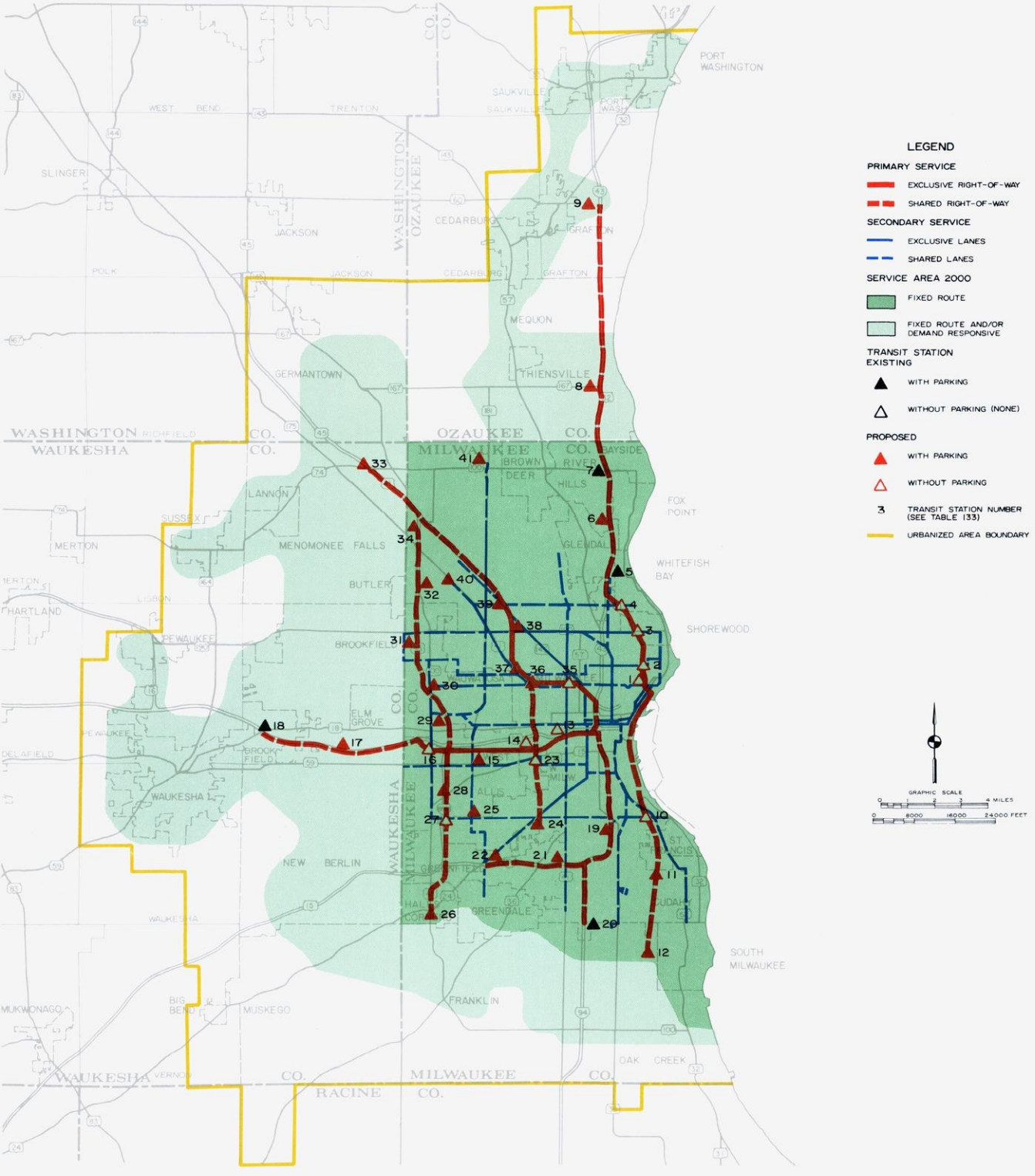
operation the system would require a total of 1,161 buses operating about 211,900 bus miles per day. This may be compared with 442 buses operating 62,080 bus miles per day in 1972.

For the Racine and Kenosha urbanized areas, the transit facilities and services postulated under the transit-supported highway alternative are essentially the same as those described above under the highway-supported transit alternative. The transit systems for the Kenosha and Racine urbanized areas are identified on Map 20. As shown in Table 136, the postulated transit system in the Kenosha urbanized area would consist of a total of about 116 round trip route miles, and would require a total of 29 buses operating about 4,770 bus miles per day. This system may be compared to the approximately 12 buses operating about 1,140 bus miles per day over about 59 round trip route miles in 1972.

In the Racine urbanized area the postulated transit system would consist of a total of about 157 round trip route miles and would require a total of about 36 buses operating 6,420 bus miles per day. This may be compared to the approximately 10 buses operating 1,560 bus miles per day over about 81 round trip route miles in 1972.

Map 25

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 2000 TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the transit-supported highway alternative transportation system plan, transit service would be provided over 3,110 round-trip route miles of transit line in the Milwaukee urbanized area; of this total, 1,083 route miles would provide primary service, 349 route miles secondary service, and 1,678 route miles tertiary service. The system would require the operation of about 1,161 buses during peak ridership periods. This would represent an increase of 2,049 route-trip route miles and 719 buses over 1972. The plan also recommends the provision of 41 public transit stations, an increase of 37 stations over 1972, and of demand responsive service to low-density urban residential areas.

Source: SEWRPC.

Table 133

TRANSIT STATION CHARACTERISTICS BY PRIMARY TRANSIT SERVICE CORRIDOR: 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Station Identification				Type of Transit Service				Passenger Facilities			
Number[a]	Location	Civil Division	Station Status	Primary	Secondary	Tertiary	Collection-Distribution	Parking	Shelter	Buses Per Peak Hour in Peak Direction	Parking Spaces Required
1	East Side Transitway and North Avenue	City of Milwaukee	Proposed	X	X	X			X	38	--
2	East Side Transitway and Locust Street	City of Milwaukee	Proposed	X	X	X			X	38	--
3	East Side Transitway and Capitol Drive	Village of Shorewood	Proposed	X	X	X			X	38	--
4	East Side Transitway and Hampton Avenue	City of Glendale and Village of Whitefish Bay	Proposed	X		X			X	38	--
5	North-South Freeway and Silver Spring Drive	City of Glendale	Existing	X	X	X	X	X	X	12	1,200
6	North-South Freeway and Good Hope Road	City of Glendale	Proposed	X		X		X	X	10	250
7	North-South Freeway and Brown Deer Road	Village of River Hills	Existing	X		X	X	X	X	6	1,200
8	North-South Freeway and Mequon Road	City of Mequon	Proposed	X		X	X	X	X	10	800
9	North-South Freeway and Ulao Road (CTH Q)	Town of Grafton	Proposed	X		X	X	X	X	6	600
10	Lake Freeway and Oklahoma Avenue	City of Milwaukee	Proposed	X	X	X			X	25	
11	Lake Freeway and Layton Avenue	City of Milwaukee, Village of St. Francis, City of Cudahy	Proposed	X		X	X	X	X	12	800
12	Lake Freeway and Rawson Avenue	City of Oak Creek	Proposed	X			X	X	X	13	800
13	East-West Transitway and 32nd Street	City of Milwaukee	Proposed	X		X			X	104	--
14	East-West Transitway and Veterans Administration	City of Milwaukee	Proposed	X					X	6	--
15	East-West Transitway and 84th Street	City of Milwaukee	Proposed	X	X	X		X	X	12	1,200
16	East-West Transitway and 108th Street	City of West Allis	Proposed	X	X	X	X		X	24	--
17	East-West Freeway and Moorland Road	City of Brookfield	Proposed	X		X	X	X	X	8	400
18	East-West Freeway and Barker Road	Town of Brookfield	Existing	X		X	X	X	X	16	600
19	North-South Freeway and Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	X	17	1,200
20	North-South Freeway and College Avenue	City of Milwaukee	Existing	X		X	X	X	X	6	400
21	Airport Freeway and 27th Street	City of Milwaukee and City of Greenfield	Proposed	X	X	X	X	X	X	7	500
22	Airport Freeway and 76th Street	City of Greenfield	Proposed	X	X	X		X	X	11	800
23	Stadium Freeway and National Avenue	Village of West Milwaukee	Proposed	X	X	X			X	9	--
24	Stadium Freeway and Morgan Avenue	City of Milwaukee and City of Greenfield	Proposed	X		X	X	X	X	9	600
25	S. 76th Street and Oklahoma Avenue	City of Milwaukee and City of West Allis	Proposed		X	X		X	X	15	400
26	108th Street and Janesville Road	Village of Hales Corners	Proposed	X		X	X	X	X	10	600
27	Zoo Freeway and Oklahoma Avenue	City of Milwaukee and City of West Allis	Proposed	X	X	X			X	10	--
28	Zoo Freeway and Lincoln Avenue	City of West Allis	Proposed	X		X	X	X	X	9	1,200
29	Zoo Freeway and Watertown Plank Road	City of Wauwatosa	Proposed	X	X	X	X	X	X	10	500
30	Zoo Freeway and North Avenue	City of Wauwatosa	Proposed	X	X	X	X	X	X	12	1,200
31	Zoo Freeway and Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	X	11	1,000
32	Zoo Freeway and Silver Spring Drive	City of Milwaukee	Proposed	X		X	X	X	X	6	400
33	Fond du Lac Freeway and Main Street	Village of Menomonee Falls	Proposed	X		X	X	X	X	6	500
34	Zoo Freeway and Good Hope Road	City of Milwaukee	Proposed	X	X	X	X	X	X	6	400
35	Northwest Transitway and 27th Street	City of Milwaukee	Proposed	X	X	X			X	46	--
36	N. Sherman Boulevard and North Avenue	City of Milwaukee	Proposed	X	X	X		X	X	46	1,200
37	Northwest Transitway and Center Street	City of Milwaukee	Proposed	X	X	X		X	X	46	800
38	Northwest Transitway and Capitol Drive	City of Milwaukee	Proposed	X	X	X		X	X	46	1,200
39	Northwest Transitway and Hampton Avenue	City of Milwaukee	Proposed	X	X	X	X	X	X	46	1,200
40	Timmerman Airport	City of Milwaukee	Proposed		X	X		X	X	9	900
41	N. 76th Street and Brown Deer Road	City of Milwaukee	Proposed	X	X	X		X	X	40	600

[a] *See Map 25.*

Source: SEWRPC.

Table 134

EXCLUSIVE MASS TRANSIT LANES ON ARTERIAL STREET FACILITIES IN MILWAUKEE COUNTY: CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Arterial Street		Exclusive Secondary Transit Lane			
Name	Limits	Direction	Duration	Number of Transit Vehicles (Buses) in Peak Hours	Remarks
N. Third Street and Green Bay Avenue	W. Keefe Avenue - W. Michigan Street	Southbound	6:00 a.m. - 9:00 a.m.	36	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	41	
S. 16th Street	W. Forest Home Avenue - W. Clybourn Street	Northbound	6:00 a.m. - 9:00 a.m.	21	Removal of curb parking
		Southbound	3:00 p.m. - 6:00 p.m.	25	
N. 27th Street	W. Capitol Drive - W. St. Paul Avenue	Northbound and Southbound	6:00 a.m. - 6:00 p.m.	54	Removal of curb parking
N. 76th Street	W. Capitol Drive - W. Good Hope Road	Southbound	6:00 a.m. - 9:00 a.m.	34	Removal of curb parking
		Northbound	3:00 p.m.- 6:00 p.m.	56	
Capitol Drive	N. 76th Street - N. Oakland Avenue	Eastbound and Westbound	6:00 a.m. - 6:00 p.m.	41	Removal of curb parking and center median
Farwell Avenue	E. North Avenue - E. Ogden Avenue	Southbound	6:00 a.m. - 6:00 p.m.	48	Removal of curb parking
Fond du Lac Avenue	N. 17th Street - W. Hampton Avenue	Southbound	6:00 a.m. - 9:00 a.m.	22	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	21	
Forest Home Avenue	S. 16th Street - W. Oklahoma Avenue	Northbound	6:00 a.m. - 9:00 a.m.	16	Removal of curb parking
		Southbound	3:00 p.m. - 6:00 p.m.	18	
Kenwood Boulevard	N. Oakland Avenue - N. Downer Avenue	Westbound	6:00 a.m. - 6:00 p.m.	102	Removal of curb parking
Lisbon and Appleton Avenues	N. 46th Street - W. Hampton Avenue	Southbound	6:00 a.m. - 9:00 a.m.	16	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	17	
Locust Street	W. Hopkins Street - N. Oakland Avenue	Eastbound	6:00 a.m. - 9:00 a.m.	30	Removal of curb parking
		Westbound	3:00 p.m. - 6:00 p.m.	31	
Prospect Avenue	E. Wisconsin Avenue - E. North Avenue	Northbound	6:00 a.m. - 6:00 p.m.	47	Removal of curb parking
Wells Street	N. Prospect Avenue - N. 35th Street	Westbound	24 hours	63	Removal of curb parking and median construction
Wisconsin Avenue	N. 10th Street - N. Jackson Street	Eastbound and Westbound	24 hours	480	Removal of all auto traffic
Wisconsin Avenue	N. 35th Street - N. 10th Street	Eastbound	6:00 a.m. - 9:00 a.m.	20	Removal of curb parking
		Westbound	3:00 p.m. - 6:00 p.m.	38	

Source: SEWRPC.

Table 135

MASS TRANSIT FACILITIES IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972		Planned Increment		2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Round Trip Route Miles						
Primary	150	14.1	933	622.0	1,083	34.8
Secondary	56	5.3	293	523.2	349	11.2
Tertiary	855	80.6	823	96.3	1,678	54.0
Total	1,061	100.0	2,049	193.1	3,110	100.0
Special Facilities	Miles		Miles	Percent Change	Miles	
Exclusive Right-of-Way	0		20.0	--	20.0	
Exclusive Lanes on Streets	0		40.8	--	40.8	
Vehicle Requirements	Number		Number	Percent Change	Number	
Peak Period	442		719	162.7	1,161	
Midday Period	220		466	211.8	686	

Source: SEWRPC.

Table 136

TRANSIT FACILITIES IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Transit Round Trip Route Miles				
Primary (None)	-	--	--	--
Secondary (None)	-	--	--	--
Tertiary	59	57	96.6	116
Vehicle Requirements (Buses)				
Peak Period	12	17	141.7	29
Midday	6	13	216.7	19
Racine Urbanized Area				
Transit Route Miles				
Primary (None)	-	--	--	--
Secondary (None)	-	--	--	--
Tertiary	81	76	93.8	157
Vehicle Requirements (Buses)				
Peak Period	10	26	260.0	36
Midday	10	15	150.0	25

Source: SEWRPC.

Assignment of Travel to Highway and Transit Networks: An analysis of the performance of the postulated transit-supported highway alternative plan under probable future land use and travel conditions was undertaken with the aid of the traffic simulation models described in Chapter IV of this volume. Through application of these models, travel demand for the plan design year 2000 was developed for the land use pattern proposed under the controlled centralization land use plan and assigned to the transit-supported highway alternative street and highway and transit system networks.

Automobile Availability: Given transportation system development in accordance with the transit-supported highway alternative transportation system plan and land use development in accordance with the controlled centralization land use plan, it is expected that the number of automobiles available in the Region may increase from about 705,000 in 1972 to about 955,000 in 2000, an increase of about 250,000 or 36 percent.

This increase compares with an approximately 23 percent increase in resident population over the same time period. The number of persons per automobile would, then, be expected to continue to decline from 2.57 in 1972 to 2.32 in 2000, a decline of nearly 10 percent (see Table 137). The regional forecast of automobiles available in the year 2000, as noted earlier, is 1,168,000, or about 22 percent more than the number anticipated under this alternative plan.

Person Trip Generation: Given transportation system development in accordance with the transit-supported highway alternative transportation system plan and land use development in accordance with the controlled centralization land use plan, internal person trips may be expected to increase from nearly 4.5 million trips per average weekday in 1972 to about 5.7 million such trips in 2000, an increase of about 1.2 million trips or about 28 percent. This increase in internal trip production may be compared with an approximately 23 percent increase in resident population and a 36 percent increase in automobile availability over the same period of time. Probable future internal person trip production within the Region by trip purpose under this alternative plan combination is indicated in Table 138 and compared to existing trip production. The largest proportionate increase in internal person tripmaking is expected to occur in the school tripmaking category, which is expected to increase by nearly 39 percent. Home-based work trips are expected to increase by about 28 percent over the same 25-year plan design period. The average number of internal person trips generated per capita may be expected to increase from about 2.5 in 1972 to about 2.6 in 2000, while the average number of internal person trips generated per household can be expected to remain at about 7.9.

Mode of Travel: The distribution of internal person trips within the Region by mode of travel under the controlled centralization land use plan and the transit-supported highway transportation system plan is summarized in Table 139. Average weekday transit trip production within the Region may be expected to increase by nearly 91 percent, from 184,200 trips in 1972, or 53.4 million trips per year, to about 350,900 trips in 2000, or 101.8 million trips per year, thus reversing the historic decline in transit use that began after World War II and returning transit ridership levels to those experienced in 1961. The proportion of total internal travel generated within the Region in 2000 served by transit would rise somewhat, from about 4 percent in 1972 to nearly 6.2 percent in 2000. Auto driver travel could be expected to increase by about 29 percent, from about 2.9 million trips in 1972 to about 3.7 million trips in 2000.

The relative use of transit and automobile under this combination of alternative plans is indicated by trip purpose category in Tables 140 and 141. Significant increases in transit trip production of 145 percent and 268 percent, respectively, are estimated to occur in the home-based shopping and home-based other tripmaking categories. School transit trips are anticipated to decrease slightly. Home-based work transit trips are estimated to increase by about 95 percent, from nearly 71,000 trips in 1972 to about 138,000 trips in 2000.

Under this combination of land use and transportation plan alternatives, it is estimated that a total of about 3.7 million internal automobile driver trips would be

Table 137

AUTOMOBILE AVAILABILITY WITHIN THE REGION: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population	1,810,700	408,600	22.6	2,219,300
Automobiles Available	704,600	250,600	35.6	955,200
Persons Per Automobile	2.57	-0.25	-9.7	2.32

Source: SEWRPC.

Table 138

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	1,055,500	23.7	293,000	27.8	1,348,500	23.7
Home-based Shopping	673,600	15.1	171,700	25.5	845,300	14.8
Home-based Other	1,532,600	34.3	409,200	26.7	1,941,800	34.0
Nonhome-based	779,800	17.5	209,600	26.9	989,400	17.3
School	418,900	9.4	161,500	38.6	580,400	10.2
Total	4,460,400	100.0	1,245,000	27.9	5,705,400	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 139

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Mode of Travel	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Automobile Driver	2,884,700	64.7	842,300	29.2	3,727,000	65.3
Automobile Passenger	1,217,900	27.3	121,600	10.0	1,339,500	23.5
Transit Passenger	184,200	4.1	166,700	90.5	350,900	6.2
School Bus Passenger	173,600	3.9	114,400	65.9	288,000	5.0
Total	4,460,400	100.0	1,245,000	27.9	5,705,400	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 140

DISTRIBUTION OF INTERNAL TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Transit Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	70,900	38.5	67,000	94.5	137,900	39.3
Home-based Shopping	18,800	10.2	27,200	144.7	46,000	13.1
Home-based Other	28,300	15.4	75,900	268.2	104,200	29.7
Nonhome-based	13,100	7.1	- 1,800	- 13.8	11,300	3.2
School	53,100	28.8	- 1,600	- 3.0	51,500	14.7
Total	184,200	100.0	166,700	90.5	350,900	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

generated within the Region on an average weekday in 2000. This represents an increase of nearly 29 percent over the 1972 level of nearly 2.9 million such trips. Anticipated increases in internal automobile driver trips by trip category are identified in Table 142, while the anticipated increases in internal automobile person trips within the Region are shown in Table 141.

Total vehicle trip production on an average weekday under this combination of alternative plans is estimated to increase by nearly 29 percent, from about 3.4 million vehicle trips in 1972 to about 4.4 million in 2000. As shown in Table 143, the largest absolute increases in vehicle trip production are anticipated to occur in internal automobile and internal truck trips, while the largest percentage increases in vehicle trip production are anticipated in the external automobile and other truck trip categories. The proportion of trips by vehicle class does not, however, change significantly from 1972 to 2000 under this alternative plan combination.

System Performance

Allocation of the vehicle travel demand generated under the controlled centralization land use plan to the transit-supported highway alternative transportation system plan indicates that vehicle miles of travel on the arterial street and highway system may be expected to increase from about 20.1 million per average weekday in 1972 to about

Table 141

DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	984,600	24.0	226,000	23.0	1,210,600	23.9
Home-based Shopping . .	654,800	16.0	144,500	22.1	799,300	15.8
Home-based Other.	1,504,300	36.6	333,300	22.1	1,837,600	36.3
Nonhome-based	766,700	18.7	211,400	27.6	978,100	19.3
School.	192,200	4.7	48,700	25.3	240,900	4.7
Total	4,102,600	100.0	963,900	23.5	5,066,500	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 142

DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Driver Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Home-based Work	840,800	29.2	245,300	29.2	1,086,100	29.1
Home-based Shopping . .	444,500	15.4	124,000	28.0	568,500	15.3
Home-based Other.	976,300	33.8	265,700	27.2	1,242,000	33.3
Nonhome-based	555,700	19.3	188,400	33.9	744,100	20.0
School.	67,400	2.3	18,900	28.0	86,300	2.3
Total	2,884,700	100.0	842,300	29.2	3,727,000	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

30.3 million miles in 2000, an increase of nearly 51 percent. About 76 percent of this increase could be expected to occur on the regional freeway system, where such travel could be expected to increase from about 6.2 million miles in 1972 to about 13.9 million miles in 2000, an increase of about 124 percent. The anticipated arterial vehicle miles of travel on an average weekday under this alternative plan combination are identified by county and facility type in Table 144. The anticipated average daily traffic volumes on the arterial street and highway system in the Region by 2000 are shown on Map 26.

Given the arterial street and highway system improvements proposed under this alternative plan within the urbanized areas of the Region, particularly the regional freeway system expansion, and given also the transit facility and service improvements proposed under this alternative plan, the number of miles of arterial street and highway facilities operating over design capacity could be expected to decrease from about 166 miles in 1972 to about 63 miles in 2000, a decrease of about 103 miles, or 62 percent. The number of miles of arterial facilities operating near design capacity would increase from about 152 miles in 1972 to nearly 350 miles in 2000, an increase of nearly 198 miles, or 131 percent. The locations of those arterial facilities that would operate at or above capacity under assumed year 2000 conditions given this combination of plan alternatives are identified on Map 27. Important arterial facilities in the Milwaukee urbanized area that could be expected to operate at or beyond congestion levels, even given the proposed freeway improvements, include all or portions of IH 94, IH 894, IH 43, Capitol Drive, N. 76th Street, Hampton Avenue, Silver Spring Drive, and E. Locust Street. Beyond the Milwaukee urbanized area such key facilities as IH 94 in Waukesha County, STH 33 and STH 60 in Washington County, STH 38 and STH 32 in Racine County, and STH 32 and STH 50 in Kenosha County could be expected to operate at or near congestion levels. The number of miles of arterial street and highway facilities operating under, at, or over design capacity are identified by county for the existing 1972 base year and the 2000 plan design year in Table 145.

Allocation of the transit travel demand generated under the controlled centralization land use plan to the transit-supported highway alternative transportation system plan indicates that, in the Milwaukee urbanized area, revenue passengers could be expected to increase from about 177,800 per average weekday, or 52.4 million per year in 1972, to about 300,900 per average weekday, or 87.2 million per year in 2000, an increase of about 123,100 per average weekday, or 34.8 million per year, or about 67 percent. The annual number of transit

Table 143

DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Vehicle Class	Total Vehicle Trips Generated on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Automobile						
Internal	2,884,700	84.0	842,300	29.2	3,727,000	83.9
External[a]	111,900	3.2	51,900	46.4	163,800	3.7
Other[b]	34,200	1.0	11,800	34.5	46,000	1.0
Subtotal	3,030,800	88.2	906,000	29.9	3,936,800	88.6
Truck						
Internal	383,600	11.2	93,600	24.4	477,200	10.8
External	13,800	0.4	4,700	34.1	18,500	0.4
Other[b]	6,000	0.2	2,500	41.7	8,500	0.2
Subtotal	403,400	11.8	100,800	25.0	504,200	11.4
Total	3,434,200	100.0	1,006,800	29.3	4,441,000	100.0

[a] *Includes light trucks, i.e., those under 6,000 pounds gross weight.*

[b] *Includes vehicle trips made by persons residing in group quarters and by nonresidents of the Region.*

Source: SEWRPC.

Table 144

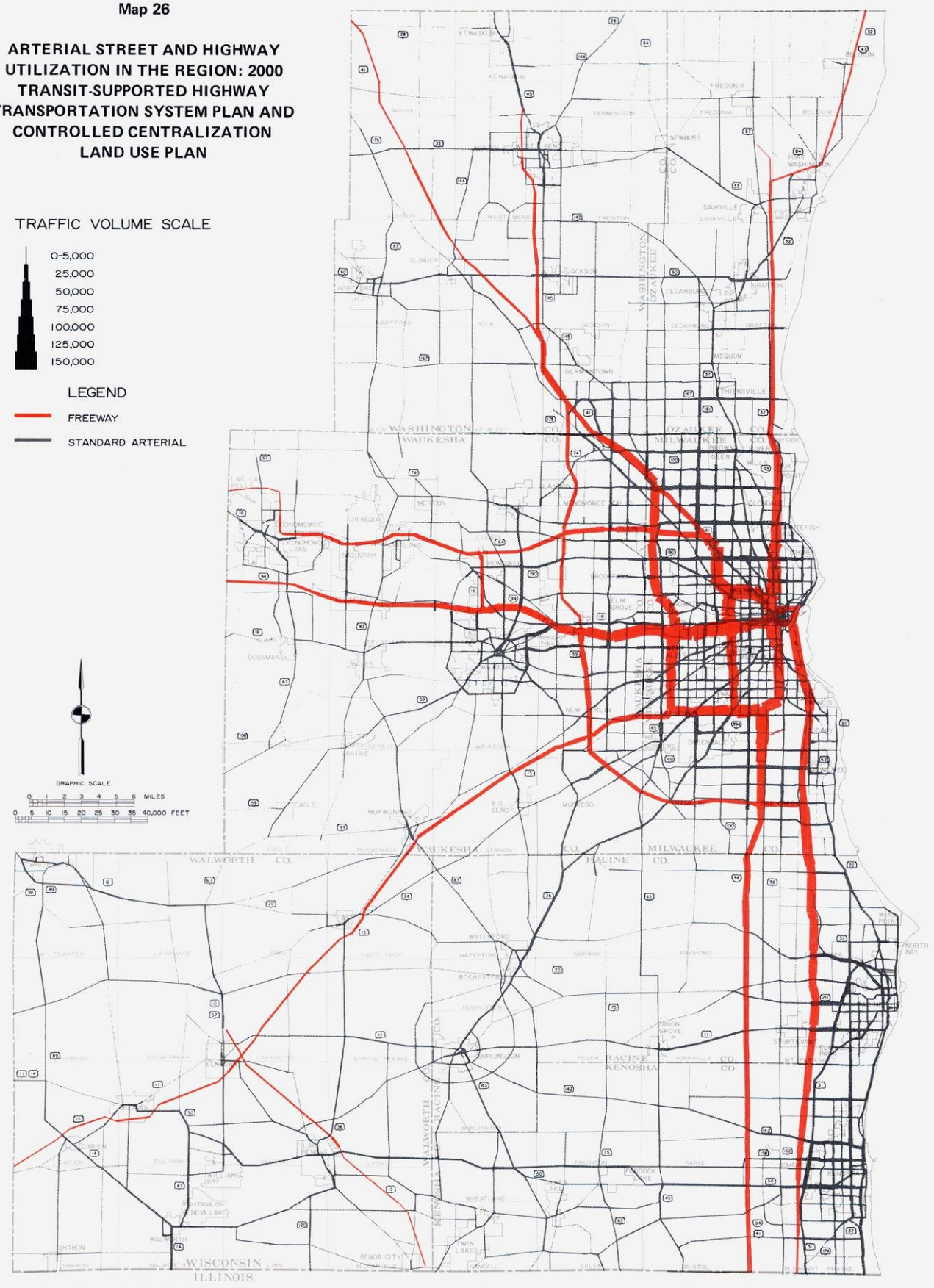
VEHICLE MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 1972 AND 2000
CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

County	Arterial Vehicle Miles of Travel on An Average Weekday (thousands)					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha						
Freeway	382	26.8	423	110.7	805	29.7
Standard Arterial	1,046	73.2	861	82.3	1,907	70.3
Subtotal	1,428	100.0	1,284	89.9	2,712	100.0
Milwaukee						
Freeway	3,977	37.2	3,001	75.5	6,978	53.6
Standard Arterial	6,718	62.8	- 667	- 9.9	6,051	46.4
Subtotal	10,695	100.0	2,334	21.8	13,029	100.0
Ozaukee						
Freeway	223	26.2	319	143.0	542	37.2
Standard Arterial	627	73.8	289	46.1	916	62.8
Subtotal	850	100.0	608	71.5	1,458	100.0
Racine						
Freeway	415	22.9	797	192.0	1,212	39.6
Standard Arterial	1,398	77.1	453	32.4	1,851	60.4
Subtotal	1,813	100.0	1,250	68.9	3,063	100.0
Walworth						
Freeway	56	6.4	412	735.7	468	26.9
Standard Arterial	817	93.6	455	55.7	1,272	73.1
Subtotal	873	100.0	867	99.3	1,740	100.0
Washington						
Freeway	190	16.5	648	341.1	838	41.2
Standard Arterial	961	83.5	237	24.7	1,198	58.8
Subtotal	1,151	100.0	885	76.9	2,036	100.0
Waukesha						
Freeway	970	29.3	2,095	216.0	3,065	48.9
Standard Arterial	2,344	70.7	857	36.6	3,201	51.1
Subtotal	3,314	100.0	2,952	89.1	6,266	100.0
Southeastern Wisconsin Region						
Freeway	6,213	30.9	7,695	123.9	13,908	45.9
Standard Arterial	13,911	69.1	2,485	17.9	16,396	54.1
Total	20,124	100.0	10,180	50.6	30,304	100.0

Source: SEWRPC.

Map 26

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN

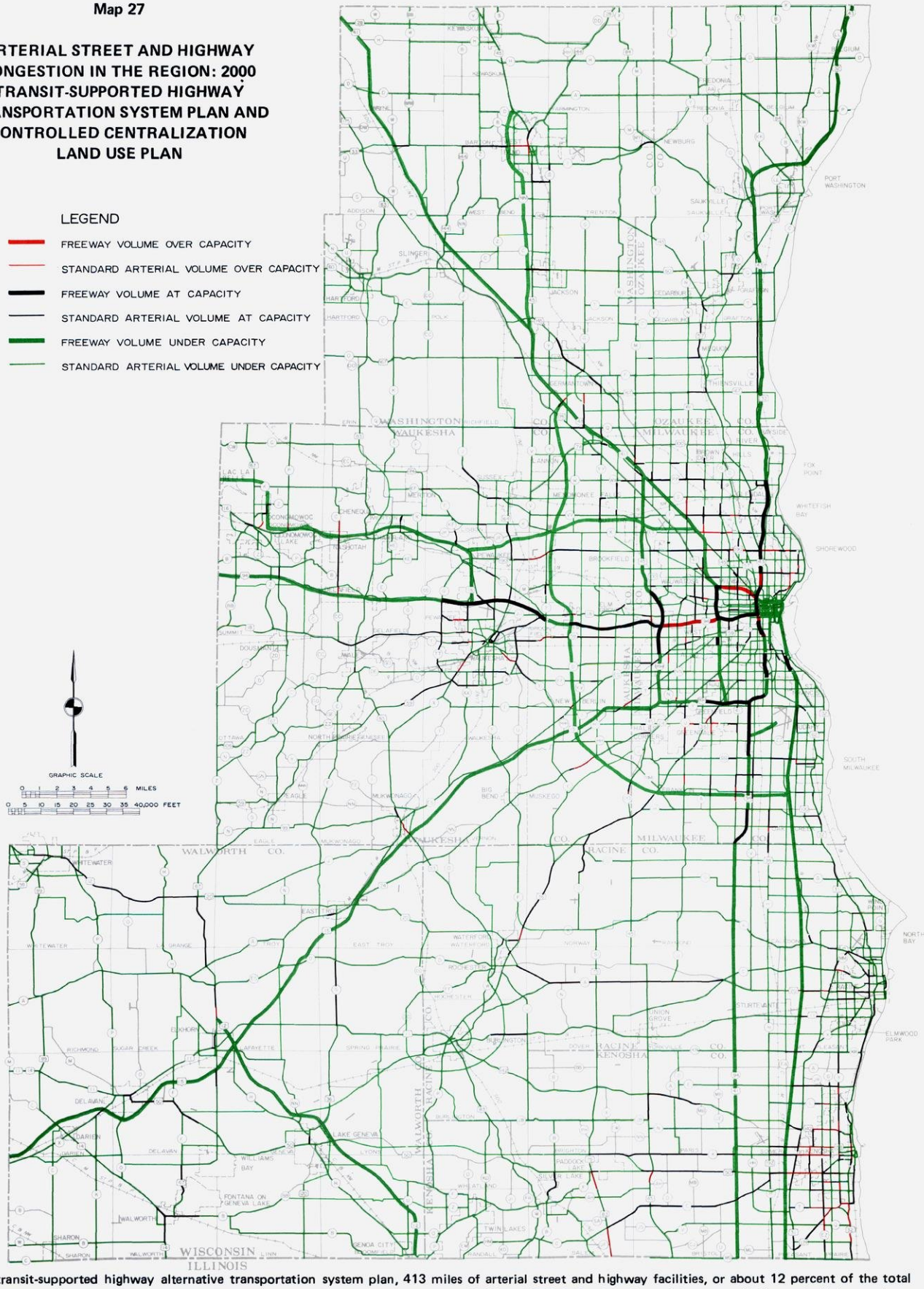


Arterial street and highway system utilization in the Region in the year 2000 may be expected to increase to over 30 million vehicle miles of travel on an average weekday under the transit-supported highway alternative transportation system plan, an increase of 10 million vehicle miles, or about 51 percent, over 1972. About 14 million vehicle miles of travel, or 46 percent of the total, could be expected to occur on the freeway system, as opposed to 31 percent in 1972.

Source: SEWRPC.

Map 27

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN AND CONTROLLED CENTRALIZATION LAND USE PLAN



Under the transit-supported highway alternative transportation system plan, 413 miles of arterial street and highway facilities, or about 12 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent, of the total arterial system were operating at or over design capacity.

Source: SEWRPC.

Table 145

ARTERIAL STREET AND HIGHWAY SERVICE LEVELS IN THE REGION BY COUNTY: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

County	Existing 1972						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	243.1	9.0	14.7	9.7	22.0	13.3	279.8
Milwaukee	601.4	22.4	71.8	47.2	61.0	36.8	734.2
Ozaukee	234.7	8.7	10.1	6.6	5.5	3.3	250.3
Racine	310.0	11.5	19.1	12.6	20.3	12.3	349.4
Walworth	400.7	14.9	2.7	1.8	4.8	2.9	408.2
Washington	320.4	11.9	9.7	6.4	9.1	5.5	339.2
Waukesha	581.8	21.6	23.8	15.7	42.9	25.9	648.5
Total	2,692.1	100.0	151.9	100.0	165.6	100.0	3,009.6

County	Planned Increment						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent Change	Miles	Percent Change	Miles	Percent Change	Total Miles
Kenosha	24.0	9.9	55.3	376.2	- 1.0	- 4.5	78.3
Milwaukee	92.2	15.3	29.2	40.7	- 36.8	- 60.3	84.6
Ozaukee	64.8	27.6	0.1	1.0	- 5.5	- 100.0	59.4
Racine	65.4	21.1	17.6	92.1	- 17.8	- 87.7	65.2
Walworth	27.6	6.9	31.8	1,177.8	- 4.3	- 89.6	55.1
Washington	95.0	29.7	6.2	63.9	- 5.8	- 63.7	95.4
Waukesha	71.7	12.3	58.0	243.7	- 31.7	- 73.9	98.0
Total	440.7	16.4	198.2	130.5	- 102.9	- 62.1	536.0

County	Total 2000						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	267.1	8.5	70.0	20.0	21.0	33.5	358.1
Milwaukee	693.6	22.1	101.0	28.8	24.2	38.6	818.8
Ozaukee	299.5	9.6	10.2	2.9	0.0	0.0	309.7
Racine	375.4	12.0	36.7	10.5	2.5	4.0	414.6
Walworth	428.3	13.7	34.5	9.9	0.5	0.8	463.3
Washington	415.4	13.2	15.9	4.5	3.3	5.3	434.6
Waukesha	653.5	20.9	81.8	23.4	11.2	17.8	746.5
Total	3,132.8	100.0	350.1	100.0	62.7	100.0	3,545.6

[a] *Volume-to-capacity ratio 0.00-0.90; fully adequate and safest operational levels.*

[b] *Volume-to-capacity ratio 0.91-1.10; adequate operational level.*

[c] *Volume-to-capacity ratio over 1.10; congested at times.*

Source: SEWRPC.

rides per capita in the Milwaukee urbanized area may be expected to increase from nearly 50 in 1972 to 61 in 2000 (see Table 146).

In the Kenosha urbanized area, as shown in Table 147, the annual number of transit revenue passengers is expected to increase from about 503,000 in 1972 to about 6.7 million in 2000, an increase of about 6.2 million, or 1,226 percent. The annual number of rides per capita would increase from about six in 1972 to about 52 in 2000.

In the Racine urbanized area, the annual number of transit revenue passengers would be expected to increase from about 526,000 in 1972 to about 7.6 million in 2000, an increase of about 7.1 million, or 1,345 percent. The annual number of rides per capita would increase from about five in 1972 to about 52 in 2000.

System Development Cost

The estimated capital costs of carrying out the transit-supported highway transportation system plan under the land use development assumptions contained in the controlled centralization land use plan are identified in Table 148. The total cost of preserving, improving, and expanding the arterial street and highway system is estimated at about $2.5 billion. The estimated cost of preserving, improving, and expanding the mass transit systems in the three urbanized areas is estimated at about $347 million. The total estimated cost of preserving, improving, and expanding the street and highway system, including nonarterial streets, and the transit system is estimated at about $3.5 billion.

"NO BUILD" TRANSPORTATION SYSTEM PLAN—CONTROLLED DECENTRALIZATION LAND USE PLAN

Earlier sections of this chapter have described the two new alternative regional land use plans prepared for the new plan design year 2000. In general, the controlled decentralization plan differed from the controlled centralization plan primarily in that it provided for more lower density urban development than did the latter plan, and was based upon a significantly different distribution of regional population, a distribution under

Table 146

TRANSIT SYSTEM PERFORMANCE IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment Number	Planned Increment Percent Change	Total 2000
Population				
Urbanized Area	1,267,400	241,700	19.1	1,509,100
Service Area	1,043,600	393,000	37.7	1,436,600
Urbanized Area Population Served	1,043,600	393,000	37.7	1,436,600
Percent Urbanized Area Population Served	82.3	--	--	95.2
Nonurbanized Area Population Served	--	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	1,410	51,430	3,647.5	52,840
Secondary	--[a]	--	--	52,410
Tertiary	60,670	46,000	75.8	106,670
Total	62,080	149,590	241.0	211,920
Daily Seat Miles	3,220,640	7,375,360	229.0	10,596,000
Daily Revenue Passengers	177,800	123,100	69.2	300,900
Daily Passenger Miles	1,175,700	645,400	54.9	1,821,100
Passengers Per Vehicle Mile	2.9	--	--	1.4
Percent Utilization—Seat Miles Provided to Passenger Miles Used	36.5	--	--	17.2
Annual Revenue Passengers	52,417,800	34,843,200	66.5	87,261,000
Rides Per Capita	50.2	--	--	60.7

[a] *Included in tertiary.*

Source: SEWRPC.

Table 147

TRANSIT SYSTEM PERFORMANCE IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Population				
Urbanized Area	86,500	48,700	56.3	135,200
Service Area	83,900	44,500	53.0	128,400
Urbanized Area Population Served	83,900	44,500	53.0	128,400
Percent Urbanized Area Population Served	97.0	--	--	95.0
Nonurbanized Area Population Served	-	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	--	--	--	--
Secondary	-	--	--	--
Tertiary	1,140	3,630	318.4	4,770
Total	1,140	3,630	318.4	4,770
Daily Seat Miles	43,300	171,350	395.7	214,650
Daily Revenue Passengers	2,800	20,200	721.4	23,000
Daily Passenger Miles	9,610	43,790	455.7	53,400
Passengers Per Vehicle Mile	2.5	--	--	4.8
Percent Utilization—Seat Miles Provided to Passenger Miles Used	22.2	--	--	24.9
Annual Revenue Passengers	503,200	6,166,800	1,225.5	6,670,000
Rides Per Capita	6.0	--	--	51.9
Racine Urbanized Area				
Population				
Urbanized Area	115,200	34,000	29.5	149,200
Service Area	100,600	45,400	45.1	146,000
Urbanized Area Population Served	100,600	45,400	45.1	146,000
Percent Urbanized Area Population Served	87.3	--	--	97.9
Nonurbanized Area Population Served	-	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	-	--	--	--
Secondary	-	--	--	--
Tertiary	1,560	4,860	311.5	6,420
Total	1,560	4,860	311.5	6,420
Daily Seat Miles	29,600	259,300	876.0	288,900
Daily Revenue Passengers	3,100	23,100	745.2	26,200
Daily Passenger Miles	10,920	52,380	479.7	63,300
Passengers Per Vehicle Mile	2.0	--	--	4.1
Percent Utilization—Seat Miles Provided to Passenger Miles Used	36.9	--	--	21.9
Annual Revenue Passengers	525,700	7,072,300	1,345.3	7,598,000
Rides Per Capita	5.2	--	--	52.0

Source: SEWRPC.

Table 148

ESTIMATED TRANSPORTATION SYSTEM PRESERVATION, IMPROVEMENT AND EXPANSION, AND OPERATION AND MAINTENANCE COST IN THE REGION: 2000 CONTROLLED CENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

System Component	Capital Cost		
	System Preservation (dollars)	System Improvement and Expansion (dollars)	Total (dollars)
Streets and Highways			
Arterial	229,897,000	2,281,923,400	2,511,820,400
Nonarterial	171,149,000	439,410,000	610,559,000
Subtotal	401,046,000	2,721,333,400	3,122,379,400
Transit			
Transitways	--	98,110,000	98,110,000
Exclusive Lanes	--	12,075,000	12,075,000
Stations and Terminals	4,852,000	55,215,000	60,067,000
Offices and Shops	13,750,000	--	13,750,000
Operating and Maintenance Equipment	86,325,000	77,025,000	163,350,000
Subtotal	104,927,000	242,425,000	347,352,000
Total	505,973,000	2,963,758,400	3,469,731,400

Source: SEWRPC.

which the population of Milwaukee County would decrease by about 150,000 persons from its 1970 level, with a resultant population increase in the remaining six counties of the Region.

Although the two alternative land use plans represent quite different designs, many of the major trip generators would continue to be located within the Region in their existing locations, while others would be located in the same areas under either of the two alternative regional land use plans. Consequently, much travel demand generated may be expected to continue to be served by the existing arterial street and highway and transit facility networks even though the loading and consequently the capacity characteristics may vary under each alternative land use and transportation system plan combination.

For this reason, the alternative transportation system plans developed to serve the controlled centralization land use plan were used as a basis for the further development of alternative transportation system plans to serve the controlled decentralization land use plan.

The arterial street and highway system selected for inclusion in the initial base year transportation system was previously described. This same arterial street and highway system was evaluated for the controlled decentralization land use plan. The system is identified on Map 14, while the number of miles of existing and committed arterial street and highway facilities in the Region by arterial facility type in the "no build" system plan are identified on a county-by-county basis in Table 99. As noted earlier, the planned increment under this alternative transportation system plan includes only those new surface arterial streets and highways proposed to be opened to traffic during the period 1972 through mid-1975, as well as a very few selected "committed" freeway facilities. On a regional basis, the total arterial street and highway system would thus increase only slightly over the 1972 level, from about 3,010 miles to about 3,279 miles, an increment of 269 miles, or about 9 percent (see Table 149).

The transit systems for the Milwaukee, Kenosha, and Racine urbanized areas under the "no build" transportation system plan were similarly described earlier in this chapter. Certain committed transit improvements in the Milwaukee urbanized area were assumed, as were improvements identified for the Kenosha and Racine urbanized areas in published transit development programs. The postulated "no build" transit network for the Milwaukee urbanized area is shown on Map 15, while the similar networks for the Kenosha and Racine urbanized areas are shown on Map 16. Because of the differing population distributions assumed for the two alternative regional land use plans, the requirements for transit vehicles under the "no build" transportation system plan, when modified to serve the controlled decentralization plan, will differ from those developed

Table 149

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Kenosha County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.1	4.3	--	--	12.1	3.6
8-lane	--	--	--	--	--	--
Subtotal	12.1	4.3	--	--	12.1	3.6
Standard Arterial						
2-lane	243.6	87.1	42.6	17.5	286.2	86.3
4-lane	24.1	8.6	9.2	38.2	33.3	10.0
6-lane	--	--	--	--	--	--
Subtotal	267.7	95.7	51.8	19.4	319.5	96.4
County Subtotal	279.8	100.0	51.8	18.5	331.6	100.0
Milwaukee County						
Freeway						
4-lane	12.7	1.7	1.4	11.0	14.1	1.9
6-lane	49.0	6.7	3.6	7.3	52.6	7.0
8-lane	2.1	0.3	--	--	2.1	0.3
Subtotal	63.8	8.7	5.0	7.8	68.8	9.2
Standard Arterial						
2-lane	339.5	46.2	- 20.5	- 6.0	319.0	42.6
4-lane	268.7	36.6	- 30.3	- 11.3	238.4	31.9
6-lane	62.2	8.5	59.7	96.0	121.9	16.3
Subtotal	670.4	91.3	8.9	1.3	679.3	90.8
County Subtotal	734.2	100.0	13.9	1.9	748.1	100.0
Ozaukee County						
Freeway						
4-lane	10.8	4.3	16.6	153.7	27.4	9.0
6-lane	--	--	--	--	--	--
8-lane	--	--	--	--	--	--
Subtotal	10.8	4.3	16.6	153.7	27.4	9.0
Standard Arterial						
2-lane	233.0	93.1	34.8	14.9	267.8	88.1
4-lane	6.5	2.6	2.4	36.9	8.9	2.9
6-lane	--	--	--	--	--	--
Subtotal	239.5	95.7	37.2	15.5	276.7	91.0
County Subtotal	250.3	100.0	53.8	21.5	304.1	100.0

Table 149 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Racine County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.0	3.4	--	--	12.0	3.2
8-lane	--	--	--	--	--	--
Subtotal	12.0	3.4	--	--	12.0	3.2
Standard Arterial						
2-lane	303.5	86.9	24.1	7.9	327.6	86.7
4-lane	28.0	8.0	1.1	3.9	29.1	7.7
6-lane	5.9	1.7	3.1	52.5	9.0	2.4
Subtotal	337.4	96.6	28.3	8.4	365.7	96.8
County Subtotal	349.4	100.0	28.3	8.1	377.7	100.0
Walworth County						
Freeway						
4-lane	19.1	4.7	31.3	163.9	50.4	11.2
6-lane	--	--	--	--	--	--
8-lane	--	--	--	--	--	--
Subtotal	19.1	4.7	31.3	163.9	50.4	11.2
Standard Arterial						
2-lane	379.4	92.9	10.7	2.8	390.1	86.6
4-lane	9.7	2.4	0.4	4.1	10.1	2.2
6-lane	--	--	--	--	--	--
Subtotal	389.1	95.3	11.1	2.9	400.2	88.8
County Subtotal	408.2	100.0	42.4	10.4	450.6	100.0
Washington County						
Freeway						
4-lane	0.4	0.1	1.9	475.0	2.3	0.6
6-lane	6.4	1.9	--	--	6.4	1.7
8-lane	--	--	--	--	--	--
Subtotal	6.8	2.0	1.9	27.9	8.7	2.3
Standard Arterial						
2-lane	305.6	90.1	44.5	14.6	350.1	90.6
4-lane	26.8	7.9	1.0	3.7	27.8	7.2
6-lane	--	--	--	--	--	--
Subtotal	332.4	98.0	45.5	13.7	377.9	97.7
County Subtotal	339.2	100.0	47.4	14.0	386.6	100.0

Table 149 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Waukesha County						
Freeway						
4-lane	29.1	4.5	16.0	55.0	45.1	6.6
6-lane	8.7	1.3	4.2	48.3	12.9	1.9
8-lane	--	--	--	--	--	--
Subtotal	37.8	5.8	20.2	53.5	58.0	8.5
Standard Arterial						
2-lane	565.5	87.2	7.0	1.2	572.5	84.3
4-lane	41.3	6.4	3.1	7.5	44.4	6.5
6-lane	3.9	0.6	1.0	25.6	4.9	0.7
Subtotal	610.7	94.2	11.1	1.8	621.8	91.5
County Subtotal	648.5	100.0	31.3	4.8	679.8	100.0
Southeastern Wisconsin Region						
Freeway						
4-lane	72.1	2.4	67.2	93.2	139.3	4.2
6-lane	88.2	2.9	7.8	8.8	96.0	2.9
8-lane	2.1	0.1	--	--	2.1	0.1
Subtotal	162.4	5.4	75.0	46.2	237.4	7.2
Standard Arterial						
2-lane	2,370.1	79.3	143.2	6.0	2,513.3	76.7
4-lane	405.1	13.0	- 13.1	- 3.2	392.0	12.0
6-lane	72.0	2.3	63.8	88.6	135.8	4.1
Subtotal	2,847.2	94.6	193.9	6.8	3,041.1	92.8
Region Total	3,009.6	100.0	268.9	8.9	3,278.5	100.0

Source: SEWRPC.

earlier for the controlled centralization land use plan. Accordingly, Tables 150 and 151 present the transit facility requirements for the Milwaukee and the Kenosha and Racine urbanized areas, respectively, under the "no build" transportation system plan and the controlled decentralization land use plan. In general, fewer transit vehicles will be required within the three urbanized areas of the Region because of the further decentralization of population which would occur under the controlled decentralization land use plan. Table 152 presents data on the transit station characteristics in the Milwaukee urbanized area for this alternative.

Assignment of Travel to Highway and Transit Networks: An analysis of the performance of the existing base year transportation system, in effect the "no build" alternative transportation system plan, under probable future land use and travel conditions was undertaken with the aid of the traffic simulation models described in Chapter IV of this volume. By applying these models, travel demand for the plan design year 2000 was developed for the land use pattern proposed under the controlled decentralization land use plan and assigned to the "no build" alternative arterial street and highway and transit system networks.

Automobile Availability: Given transportation system development in accordance with the "no build" alternative transportation system plan and land use development in accordance with the controlled decentralization land use plan, the number of automobiles available in the Region may be expected to increase from about 705,000 in 1972 to about 1,051,000 in 2000, an increase of about 346,000, or 49 percent. This compares with an approxi-

Table 150

MASS TRANSIT FACILITIES IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972		Planned Increment		2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Round Trip Route Miles						
Primary	150	14.1	121	80.6	271	17.4
Secondary	56	5.3	-42	-75.0	14	0.9
Tertiary	855	80.6	420	49.1	1,275	81.7
Total	1,061	100.0	499	47.0	1,560	100.0
Special Facilities	Miles		Miles	Percent Change	Miles	
Exclusive Right-of-Way	0		0	--	0	
Exclusive Lanes on Streets	0		0	--	0	
Vehicle Requirements	Number		Number	Percent Change	Number	
Peak Period	442		-72	-16.3	370	
Midday Period	220		-18	-8.2	202	

Source: SEWRPC.

Table 151

TRANSIT FACILITIES IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Transit Round Trip Route Miles				
Primary	--	--	--	--
Secondary	--	--	--	--
Tertiary	59	41.0	69.4	100.0
Vehicle Requirements				
Peak Period	12	6.0	50.0	18.0
Midday Period	6	12.0	200.0	18.0
Racine Urbanized Area				
Transit Route Miles				
Primary	--	--	--	--
Secondary	--	--	--	--
Tertiary	81	52.4	64.7	133.4
Vehicle Requirements				
Peak Period	10	16.0	160.0	26.0
Midday Period	10	16.0	160.0	26.0

Source: SEWRPC.

Table 152

TRANSIT STATION CHARACTERISTICS BY PRIMARY TRANSIT SERVICE CORRIDOR
2000 CONTROLLED DECENTRALIZATION LAND USE AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Station Identification				Type of Transit Service				Passenger Facilities			
Number[a]	Location	Civil Division	Station Status	Primary	Secondary	Tertiary	Collection-Distribution	Parking	Shelter	Buses Per Peak Hour in Peak Direction	Parking Spaces Required
	Existing and Proposed Stations										
1	North-South Freeway and College Avenue	City of Milwaukee	Existing	X		X		X	X	3	300
2	North-South Freeway and Silver Spring Drive	City of Glendale	Existing	X		X		X	X	2	190
3	North-South Freeway and Brown Deer Road	Village of River Hills	Existing	X		X		X	X	10	250
4	East-West Freeway and Barker Road	Town of Brookfield	Existing	X		X		X	X	6	200
5	Zoo Freeway and Watertown Plank Road	City of Wauwatosa	Proposed	X		X		X	X	6	500
6	North-South Freeway and Morgan Avenue	City of Milwaukee	Proposed	X		X		X	X	2	500
	Existing Parking Lots										
7	N. 103rd Street and W. Silver Spring Drive	City of Milwaukee	Proposed	X		X		X	X	6	200
8	N. 124th Street and W. Capitol Drive	City of Brookfield	Existing	X		X		X	X	3	100
9	N. Mayfair Road and W. Center Street	City of Wauwatosa	Existing	X		X		X	X	2	200
10	S. 108th Street and W. Cleveland Avenue	City of West Allis	Existing	X		X		X	X	2	100
11	S. 76th Street and W. Cold Spring Road	City of Greenfield	Existing	X		X		X	X	3	100
12	S. 27th Street and Layton Avenue	City of Greenfield	Existing	X		X		X	X	2	100
13	N. 76th Street and Brown Deer Road	City of Milwaukee	Existing	X		X		X	X	10	200
14	N. Green Bay Road and Brown Deer Road	Village of Brown Deer	Existing	X		X		X	X	10	125
15	S. 108th Street and Abbott Avenue	Village of Hales Corners	Existing	X		X		X	X	5	50
16	East-West Freeway and S. 84th Street	City of Milwaukee	Proposed	X		X		X	X	6	200

[a] *See Map 15.*

Source: SEWRPC.

mately 23 percent increase in resident population over the same period of time. The number of persons per automobile would, then, be expected to continue to decline, from 2.57 in 1972 to 2.11 in 2000, a decline of nearly 20 percent (see Table 153). The regional forecast of automobiles available in the year 2000, as noted earlier, is 1,168,000, or about 11 percent more than the number anticipated under this alternative plan.

Person Trip Generation: Given transportation system development in accordance with the "no build" alternative transportation system plan and land use development in accordance with the controlled decentralization land use plan, internal person trips may be expected to increase from nearly 4.5 million trips per average weekday in 1972 to about 5.7 million such trips in 2000, an increase of about 1.2 million trips, or about 29 percent. This increase in internal trip production may be compared with an approximately 23 percent increase in resident population and 46 percent in automobile availability over the same period of time. Probable future internal person trip production within the Region by trip purpose under this alternative plan combination is indicated in Table 154 and compared to existing trip production. The largest proportionate increase in internal person tripmaking is expected to occur in the school tripmaking category, which is expected to increase by nearly 38 percent. The home-based work trips are expected to increase by about 28 percent over the same 25-year plan design period. The average number of internal person trips generated per capita may be expected to increase from about 2.5 in 1972 to about 2.6 in 2000, while the average number of internal person trips generated per household can be expected to increase from about 7.9 to about 8.4.

Table 153

AUTOMOBILE AVAILABILITY WITHIN THE REGION: 1972 AND 2000 CONTROLLED
DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population	1,810,700	408,600	22.6	2,219,300
Automobiles Available	704,600	346,400	49.2	1,051,000
Persons Per Automobile	2.57	- 0.5	- 19.5	2.11

Source: SEWRPC.

Mode of Travel: The distribution of internal trips within the Region by mode of travel under the controlled decentralization land use plan and the "no build" transportation system plan is summarized in Table 155. Average weekday transit trip production within the Region may be expected to decrease by about 20 percent, from 184,000 trips in 1972, or 53.4 million trips per year, to about 148,000 trips in 2000, or 42.8 million trips per year. The proportion of total internal travel generated within the Region in 2000 served by transit would decline somewhat, from about 4.1 percent in 1972 to about 2.9 percent in 2000. Over the same time period, auto driver travel could be expected to increase by nearly 35 percent, from about 2.9 million trips in 1972 to nearly 3.9 million trips in 2000.

The relative use of transit and automobile under this combination of alternative plans is indicated by trip purpose category in Tables 156 and 157. Transit trip production would decrease most significantly in the home-based shopping tripmaking category, where a decline of nearly 21 percent, representing nearly 3,900 transit trips, is anticipated. School transit trips are anticipated to decrease significantly, by about 8,500 trips, representing a decline of about 16 percent. This is due to the decreasing population in the urbanized areas of the Region assumed under the controlled decentralization land use plan. Home-based work transit trips are estimated to decrease by about 15 percent, from nearly 71,000 in 1972 to about 60,000 trips in 2000.

Under this combination of land use and transportation plan alternatives, it is estimated that a total of about 3.9 million internal automobile driver trips would be generated within the Region on an average weekday in 2000. This represents an increase of about 35 percent over the 1972 level of nearly 2.9 million such trips. The anticipated increase in internal automobile driver trips

Table 154

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	1,055,500	23.7	296,300	28.1	1,351,800	23.5
Home-based Shopping	673,600	15.1	177,200	26.3	850,800	14.8
Home-based Other	1,532,600	34.3	451,600	29.5	1,984,200	34.6
Nonhome-based	779,800	17.5	195,800	24.7	975,600	17.0
School	418,900	9.4	157,800	37.7	576,700	10.1
Total	4,460,400	100.0	1,278,700	28.7	5,739,100	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 155

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Mode of Travel	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Automobile Driver	2,884,700	64.7	999,900	34.7	3,884,600	67.7
Automobile Passenger	1,217,900	27.3	197,100	16.2	1,415,000	24.6
Transit Passenger	184,200	4.1	- 36,500	- 19.8	147,700	2.6
School Bus Passenger	173,600	3.9	118,200	68.1	291,800	5.1
Total	4,460,400	100.0	1,278,700	28.7	5,739,100	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

by trip purpose category is identified in Table 158, while the anticipated increase in internal automobile person trips within the Region is shown in Table 157.

Total vehicle trip production on an average weekday under this combination of alternative plans is estimated to increase by nearly 34 percent, from about 3.4 million vehicle trips in 1972 to bout 4.6 million in 2000. As shown in Table 159, the largest absolute increases in vehicle trip production are anticipated to occur in internal automobile and truck trips, while the largest percentage increases in vehicle trip production are anticipated in the external automobile and other truck trip categories. The proportion of trips by vehicle class would not, however, change significantly from 1972 to 2000 under this alternative plan combination.

System Performance

Allocation of the vehicle travel demand generated under the controlled decentralization land use plan to the "no build" alternative transportation system plan indicates that vehicle miles of travel on the arterial street and highway system may be expected to increase from about 20.1 million per average weekday in 1972 to nearly 32.1 million in 2000, an increase of about 60 percent. Much of the increase in vehicle miles of travel could be expected to occur on the regional freeway system, where such travel could be expected to increase from about 6.2 million miles in 1972 to about 11.3 million miles in 2000, an increase of about 81 percent. The anticipated arterial vehicle miles of travel on an average weekday under this alternative plan combination are identified by county and facility type in Table 160. The anticipated

Table 156

DISTRIBUTION OF INTERNAL TRANSIT TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	70,900	38.5	- 10,900	- 15.4	60,000	40.6
Home-based Shopping	18,800	10.2	- 3,900	- 20.7	14,900	10.1
Home-based Other	28,300	15.4	- 3,600	- 12.7	24,700	16.7
Nonhome-based	13,100	7.1	- 9,600	- 73.2	3,500	2.4
School	53,100	28.8	- 8,500	- 16.0	44,600	30.2
Total	184,200	100.0	- 36,500	36.1	147,700	100.0

[a]*Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 157

DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	984,600	24.0	307,200	31.2	1,291,800	24.4
Home-based Shopping	654,800	16.0	181,100	27.7	835,900	15.8
Home-based Other	1,504,300	36.6	455,200	30.2	1,959,500	37.0
Nonhome-based	766,700	18.7	205,400	27.0	972,100	18.3
School	192,200	4.7	48,100	25.0	240,300	4.5
Total	4,102,600	100.0	1,197,000	29.2	5,299,600	100.0

[a]*Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 158

DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Driver Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Home-based Work	840,800	29.2	310,100	36.9	1,150,900	29.6
Home-based Shopping	444,500	15.4	149,400	33.6	593,900	15.3
Home-based Other	976,300	33.8	341,800	35.0	1,318,100	33.9
Nonhome-based	555,700	19.3	180,600	32.5	736,300	19.0
School	67,400	2.3	18,000	26.7	85,400	2.2
Total	2,884,700	100.0	999,900	34.7	3,884,600	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 159

DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Vehicle Class	Total Vehicle Trips Generated on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Automobile						
Internal	2,884,700	84.0	999,900	34.7	3,884,600	84.2
External[a]	111,900	3.2	62,800	56.1	174,700	3.8
Other[b]	34,200	1.0	14,200	41.5	48,400	1.1
Subtotal	3,030,800	88.2	1,076,900	35.6	4,107,700	89.1
Truck						
Internal	383,600	11.2	93,100	24.3	476,700	10.3
External	13,800	0.4	4,900	35.5	18,700	0.4
Other[b]	6,000	0.2	2,800	46.7	8,800	0.2
Subtotal	403,400	11.8	100,800	25.0	504,200	10.9
Total	3,434,200	100.0	1,117,700	34.3	4,611,900	100.0

[a] *Includes light trucks, i.e., those under 6,000 pounds gross weight.*

[b] *Includes vehicle trips made by persons residing in group quarters and by nonresidents of the Region.*

Source: SEWRPC.

average daily traffic volumes on the arterial street and highway systems in the Region in 2000 are shown on Map 28.

The impact of the anticipated travel increase on the base year arterial street and highway system is reflected in the anticipated number of miles of that system projected to operate at or over design capacity in the year 2000 (see Table 161 and Map 29). In 1972 there were nearly 166 miles of arterial streets and highways operating over design capacity. By 2000 the number of miles operating over design capacity may be expected to increase to about 533, an increase of 367 miles, or about 222 percent. Similarly, the number of arterial miles operating at design capacity, which totaled about 152 in 1972, may be expected to increase to 586 by the year 2000, an increase

Table 160

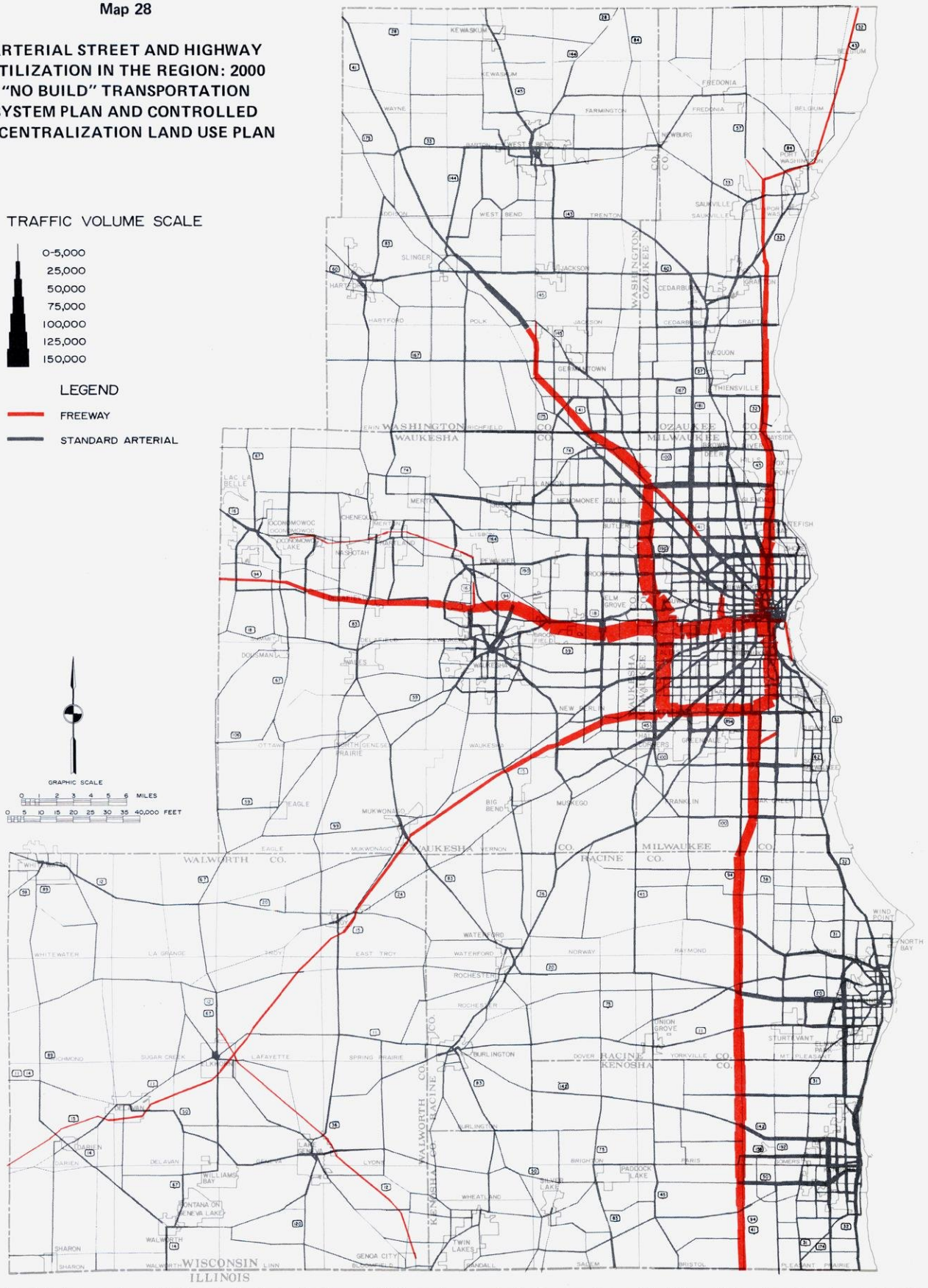
VEHICLE MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM BY COUNTY: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

County	Arterial Vehicle Miles of Travel on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha						
Freeway	382	26.8	460	120.4	842	26.9
Standard Arterial	1,046	73.2	1,245	119.0	2,291	73.1
Subtotal	1,428	100.0	1,705	119.4	3,133	100.0
Milwaukee						
Freeway	3,977	37.2	1,611	40.5	5,588	44.8
Standard Arterial	6,718	62.8	171	2.5	6,889	55.2
Subtotal	10,695	100.0	1,782	16.7	12,477	100.0
Ozaukee						
Freeway	223	26.2	452	202.7	675	33.5
Standard Arterial	627	73.8	712	113.6	1,339	66.5
Subtotal	850	100.0	1,164	136.9	2,014	100.0
Racine						
Freeway	415	22.9	397	95.7	812	25.0
Standard Arterial	1,398	77.1	1,044	74.7	2,442	75.0
Subtotal	1,813	100.0	1,441	79.5	3,254	100.0
Walworth						
Freeway	56	6.4	430	767.9	486	26.3
Standard Arterial	817	93.6	547	67.0	1,364	73.7
Subtotal	873	100.0	977	112.0	1,850	100.0
Washington						
Freeway	190	16.5	281	147.9	471	19.0
Standard Arterial	961	83.5	1,044	108.6	2,005	81.0
Subtotal	1,151	100.0	1,325	115.1	2,476	100.0
Waukesha						
Freeway	970	29.3	1,414	145.8	2,384	34.5
Standard Arterial	2,344	70.7	2,177	92.9	4,521	65.5
Subtotal	3,314	100.0	3,591	108.4	6,905	100.0
Southeastern Wisconsin Region						
Freeway	6,213	30.9	5,045	81.2	11,258	35.1
Standard Arterial	13,911	69.1	6,940	49.9	20,851	64.9
Total	20,124	100.0	11,985	59.6	32,109	100.0

Source: SEWRPC.

Map 28

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 "NO BUILD" TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Arterial street and highway system utilization in the Region in the year 2000 may be expected to increase to over 32 million vehicle miles of travel on an average weekday under the "no build" alternative transportation system plan, an increase of nearly 12 million vehicle miles, or about 60 percent, over 1972. About 11 million vehicle miles of travel, or 35 percent of the total, could be expected to occur on the freeway system, as opposed to 31 percent in 1972.

Source: SEWRPC.

Table 161

ARTERIAL STREET AND HIGHWAY SERVICE LEVELS IN THE REGION BY COUNTY: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

County	Existing 1972						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	243.1	9.0	14.7	9.7	22.0	13.3	279.8
Milwaukee	601.4	22.4	71.8	47.2	61.0	36.8	734.2
Ozaukee	234.7	8.7	10.1	6.6	5.5	3.3	250.3
Racine	310.0	11.5	19.1	12.6	20.3	12.3	349.4
Walworth	400.7	14.9	2.7	1.8	4.8	2.9	408.2
Washington	320.4	11.9	9.7	6.4	9.1	5.5	339.2
Waukesha	581.8	21.6	23.8	15.7	42.9	25.9	648.5
Total	2,692.1	100.0	151.9	100.0	165.6	100.0	3,009.6

County	Planned Increment						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent Change	Miles	Percent Change	Miles	Percent Change	Total Miles
Kenosha	- 79.2	-32.6	70.3	478.2	60.7	275.9	51.8
Milwaukee	- 79.8	-13.2	55.5	77.3	38.0	62.3	13.9
Ozaukee	- 22.7	- 9.7	43.6	431.7	32.9	598.2	53.8
Racine	- 78.1	-25.2	51.1	267.5	55.3	272.4	28.3
Walworth	2.8	0.7	28.2	1,044.4	11.4	237.5	42.4
Washington	- 65.3	-20.4	69.0	711.3	43.7	480.2	47.4
Waukesha	-210.1	-36.1	116.0	487.4	125.4	292.3	31.3
Total	-532.2	-19.8	433.7	285.5	367.4	221.8	268.9

County	Total 2000						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	163.9	7.6	85.0	14.5	82.7	15.5	331.6
Milwaukee	521.8	24.2	127.3	21.7	99.0	18.6	748.1
Ozaukee	212.0	9.8	53.7	9.2	38.4	7.2	304.1
Racine	231.9	10.7	70.2	12.0	75.6	14.2	377.7
Walworth	403.5	18.7	30.9	5.3	16.2	3.0	450.6
Washington	255.1	11.8	78.7	13.4	52.8	9.9	386.6
Waukesha	371.7	17.2	139.8	23.9	168.3	31.6	679.8
Total	2,159.9	100.0	585.6	100.0	533.0	100.0	3,278.5

[a] *Volume-to-capacity ratio 0.00-0.90; fully adequate and safest operational levels.*

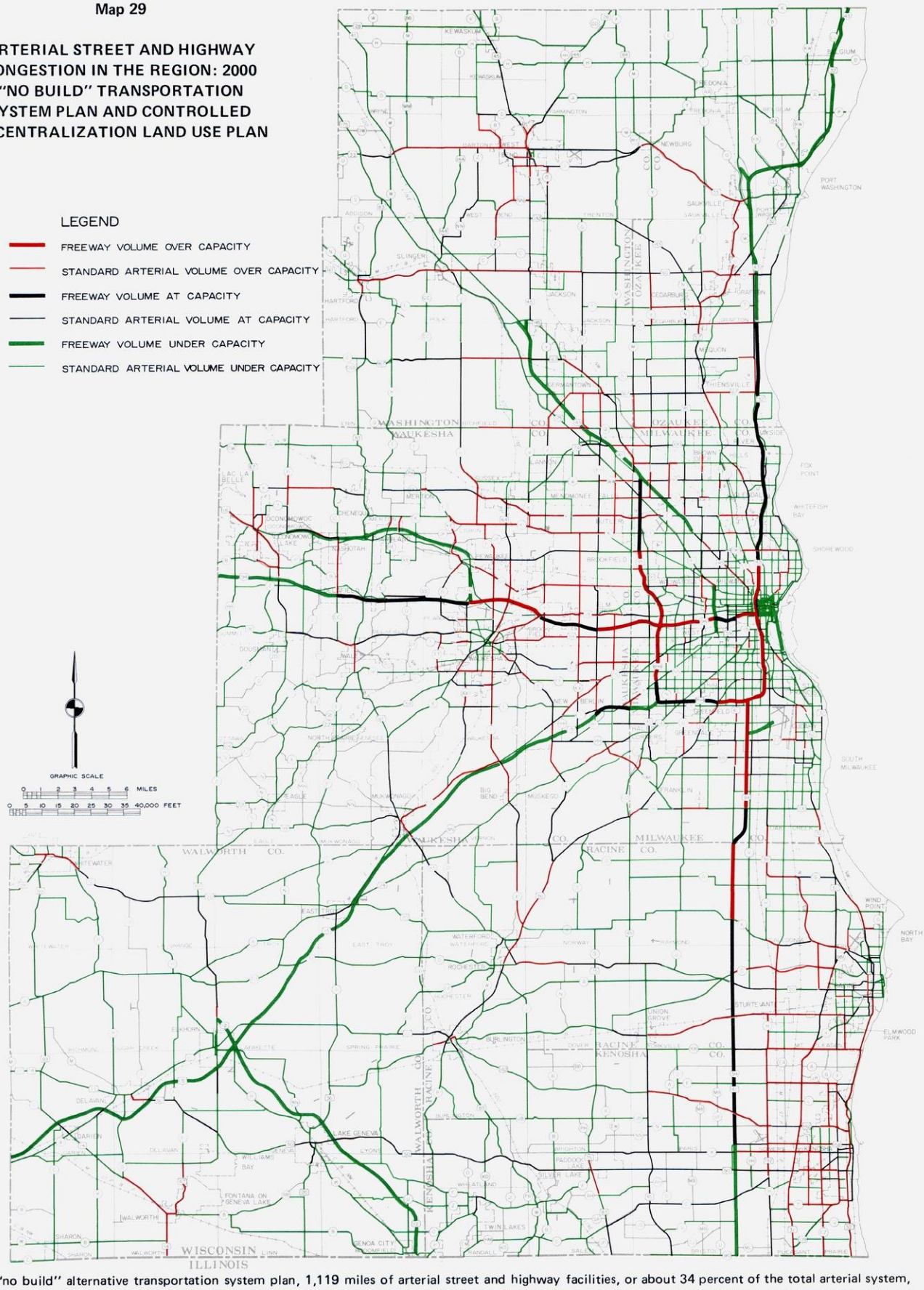
[b] *Volume-to-capacity ratio 0.91-1.10; adequate operational level.*

[c] *Volume-to-capacity ratio over 1.10; congested at times.*

Source: SEWRPC.

Map 29

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 "NO BUILD" TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Under the "no build" alternative transportation system plan, 1,119 miles of arterial street and highway facilities, or about 34 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent, of the total arterial system were operating at or over design capacity.

Source: SEWRPC.

of about 434 miles, or about 286 percent. As indicated on Map 29, the congested miles of arterial facility occur not only on the regional freeway system, but also on many of the standard arterial streets and highways.

Allocation of the transit travel demands generated under the controlled decentralization land use plan to the "no build" alternative transportation system plan indicates that, in the Milwaukee urbanized area, revenue passengers could be expected to decrease from about 177,800 per average weekday, or 52.4 million per year in 1972, to about 129,400 per average weekday, or 37.5 million per yer in 2000, a decrease of about 48,000 per average weekday, or 14.9 million per year, or 28 percent. The annual number of transit rides per capita in the Milwaukee urbanized area may be expected to decrease from nearly 50 in 1972 to 40 in 2000 (see Table 162).

In the Kenosha urbanized area, as shown in Table 163, the annual number of transit revenue passengers is expected to increase from about 503,000 in 1972 to about 1.8 million in 2000, an increase of about 1.3 million, or 252 percent. The annual number of rides per capita would increase from about six in 1972 to about 14 in 2000.

In the Racine urbanized area, the number of annual transit revenue passengers would be expected to increase from about 526,000 in 1972 to about 3.5 million in 2000, an increase of about 3 million, or 562 percent. The annual number of rides per capita would increase from about five in 1972 to about 27 in 2000.

System Development Cost

The estimated capital costs of carrying out the "no build" transportation system plan under the land use development assumptions contained in the controlled decentralization land use plan are identified in Table 164. The total cost of preserving and improving the arterial street and highway system is estimated at about $751 million. The cost of preserving and improving the mass transit systems in the three urbanized areas is estimated at about $76.5 million. The total estimated cost of preserving and improving the street and highway system, including nonarterial streets, and the transit system is estimated at about $1.6 billion.

Table 162

TRANSIT SYSTEM PERFORMANCE IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population				
Urbanized Area	1,267,400	130,600	10.3	1,398,000
Service Area	1,043,600	- 98,600	- 9.4	945,000
Urbanized Area Population Served	1,043,600	- 98,600	- 9.4	945,000
Percent Urbanized Area Population Served	82.3	--	--	67.6
Nonurbanized Area Population Served	--	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	1,410	3,770	267.4	5,180
Secondary	--[a]	--	--	--[a]
Tertiary	60,670	- 12,980	- 21.4	47,690
Total	62,080	- 9,210	- 14.8	52,870
Daily Seat Miles	3,220,640	- 577,140	- 17.9	2,643,500
Daily Revenue Passengers	177,800	- 48,400	- 27.2	129,400
Daily Passenger Miles	1,175,700	- 724,300	- 61.6	451,400
Passengers Per Vehicle Mile	2.9	--	--	2.4
Percent Utilization—Seat Miles Provided to Passenger Miles Used	36.5	--	--	17.1
Annual Revenue Passengers	52,417,800	- 14,891,800	- 28.4	37,526,000
Rides Per Capita	50.2	--	--	39.7

[a] *Included in tertiary.*

Source: SEWRPC.

Table 163

TRANSIT SYSTEM PERFORMANCE IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Population				
Urbanized Area	86,500	63,200	73.1	149,700
Service Area	83,900	40,900	48.7	124,800
Urbanized Area Population Served	83,900	40,200	47.9	124,100
Percent Urbanized Area Population Served	97.0	--	--	82.3
Nonurbanized Area Population Served	-	--	--	700
Utilization				
Daily Vehicle Miles				
Primary	-	--	--	--
Secondary	-	--	--	--
Tertiary	1,140	660	57.9	1,800
Total	1,140	660	57.9	1,800
Daily Seat Miles	43,300	37,700	87.1	81,000
Daily Revenue Passengers	2,800	3,300	117.9	6,100
Daily Passenger Miles	9,610	2,790	29.0	12,400
Passengers Per Vehicle Mile	2.5	--	--	3.4
Percent Utilization—Seat Miles Provided to Passenger Miles Used	22.2	--	--	15.3
Annual Revenue Passengers	503,200	1,265,800	251.6	1,769,000
Rides Per Capita	6.0	--	--	14.2
Racine Urbanized Area				
Population				
Urbanized Area	115,200	37,300	32.4	152,500
Service Area	100,600	27,300	27.1	127,900
Urbanized Area Population Served	100,600	27,300	27.1	127,900
Percent Urbanized Area Population Served	87.3	--	--	83.9
Nonurbanized Area Population Served	-	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	-	--	--	--
Secondary	--	--	--	--
Tertiary	1,560	1,640	105.1	3,200
Total	1,560	1,640	105.1	3,200
Daily Seat Miles	29,600	114,400	386.5	144,000
Daily Revenue Passengers	3,100	8,900	287.1	12,000
Daily Passenger Miles	10,920	9,780	89.6	20,700
Passengers Per Vehicle Mile	2.0	--	--	3.8
Percent Utilization—Seat Miles Provided to Passenger Miles Used	36.9	--	--	14.4
Annual Revenue Passengers	525,700	2,954,300	562.0	3,480,000
Rides Per Capita	5.2	--	--	27.2

Source: SEWRPC.

Table 164

ESTIMATED TRANSPORTATION SYSTEM CAPITAL COSTS IN THE REGION: 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND "NO BUILD" TRANSPORTATION SYSTEM PLAN

System Component	Capital Cost		
	System Preservation (dollars)	System Improvement and Expansion (dollars)	Total (dollars)
Streets and Highways			
Arterial	335,351,000	415,959,000	751,310,000
Nonarterial	177,237,000	578,644,000	755,881,000
Subtotal	512,588,000	994,603,000	1,507,191,000
Transit			
Transitways	--	--	--
Exclusive Lanes	--	--	--
Stations and Terminals	--	1,400,000	1,400,000
Offices and Shops	5,125,000	--	5,125,000
Operating and Maintenance Equipment	69,925,000	--	69,925,000
Subtotal	75,050,000	1,400,000	76,450,000
Total	587,638,000	996,003,000	1,583,641,000

Source: SEWRPC.

HIGHWAY-SUPPORTED TRANSPORTATION SYSTEM PLAN—CONTROLLED DECENTRALIZATION LAND USE PLAN

The highway-supported transit alternative transportation system plan postulated to support and serve the controlled decentralization land use plan is quite similar to that proposed to support and serve the controlled centralization plan described earlier. Capital investment emphasizes providing transit service improvements in the Milwaukee urbanized area in order to limit within that area further investment in urban arterial street and highway improvements to those requiring no or very minimal right-of-way acquisition and only limited residential, commercial, and industrial displacement. As for transit facilities, the differences between this highway-supported transit system plan and the one earlier described are the following: 1) deletion of the South Transitway, the Park West Transitway, and the Stadium South Transitway; 2) not extending beyond W. Hampton Avenue the East Side Transitway along the partially Milwaukee County-owned abandoned Chicago and North Western Railroad right-of-way; and 3) reducing local tertiary transit service in the Cities of Franklin and Oak Creek in Milwaukee County. Other than those changes, the transit portion of this highway-supported transit alternative is identical to that described earlier, including public policy changes in the Milwaukee urbanized area to establish a 25 cent base fare and increase downtown Milwaukee all day parking costs. The transit networks proposed under this alternative are identified on Maps 30 and 31, and the transit facility characteristics relating to those networks are identified in Tables 165, 166, 167, and 168.

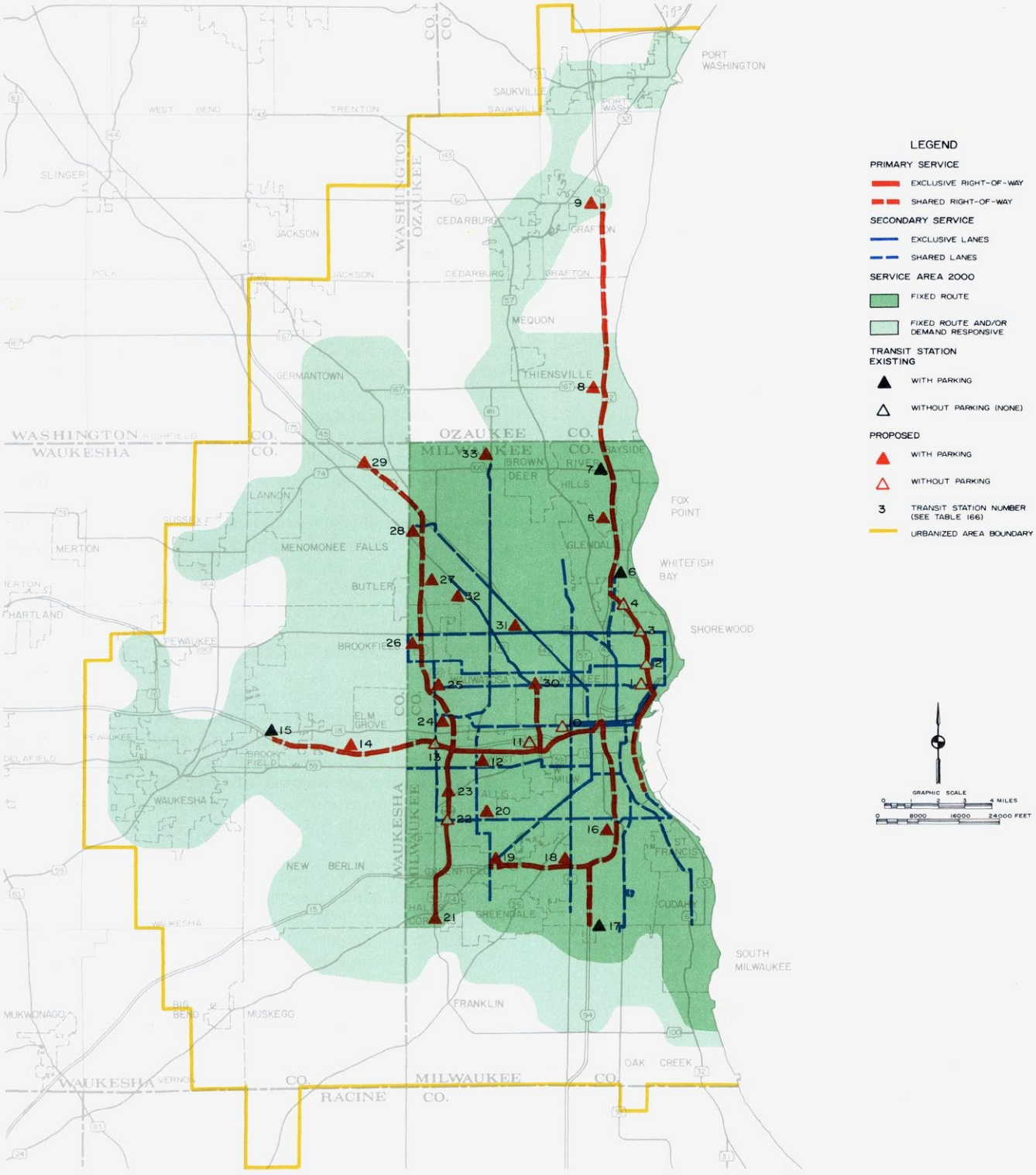
The arterial street and highway system proposed under the transit intensive alternative also is similar to that described earlier. The network is identical, while the improvements identified to various portions of the network have been varied to meet the anticipated traffic demand (see Map 32 and Table 169). The number of miles of freeways would increase from 162 in 1972 to 278 in 2000, an increment of 116 miles, or nearly 71 percent. The number of miles of four-lane standard arterial streets would increase by 381, or 94 percent, from 405 miles in 1972 to 786 miles in 2000, while the number of miles of six-lane arterials would increase by 78, or 108 percent, from 72 miles in 1972 to 150 in 2000.

Assignment of Travel to Highway and Transit Networks

An analysis of the performance of the postulated highway-supported transit alternative plan under probable future land use and travel conditions was undertaken with the aid of the traffic simulation models described in Chapter IV of this volume. Through application of these models, travel demand for the plan design year was developed for the land use pattern proposed under the controlled decentralization land use plan and assigned to the highway-supported transit alternative arterial street and highway and transit system networks.

Map 30

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 2000 HIGHWAY-SUPPORTED TRANSIT ALTERNATIVE TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN

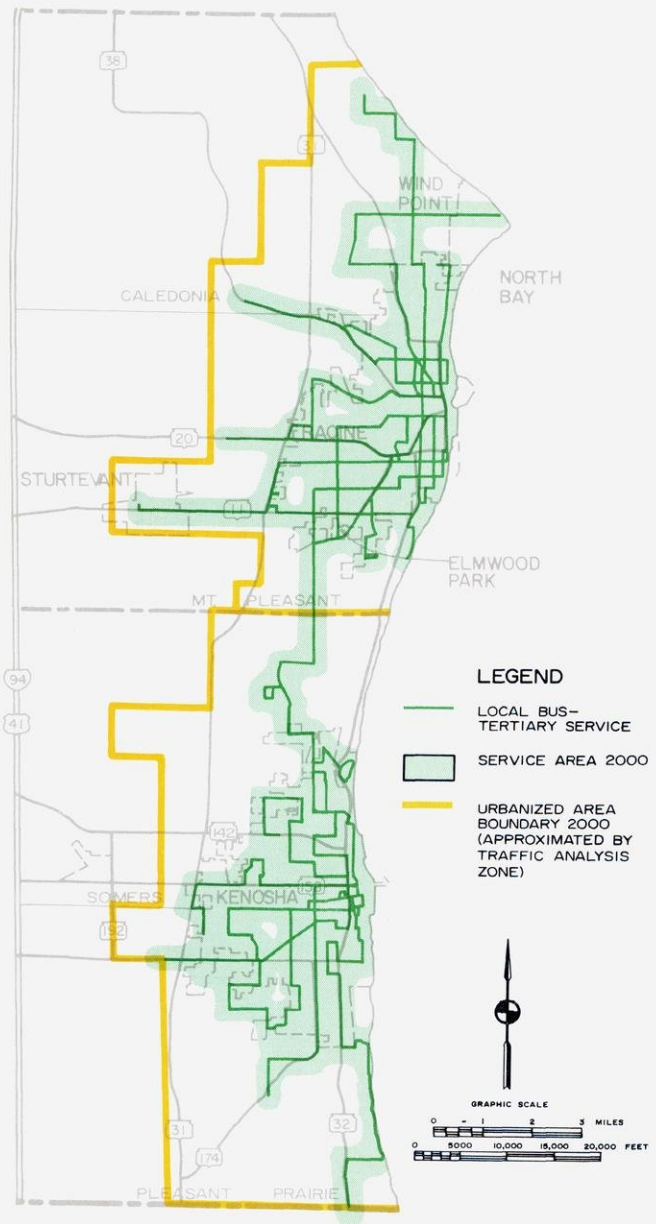


Under the highway-supported transit alternative transportation system plan, transit service would be provided over 3,076 round-trip route miles of transit line in the Milwaukee urbanized area; of this total, 1,051 route miles would provide primary service, 354 route miles secondary service, and 1,671 route miles tertiary service. The system would require the operation of about 1,342 buses during peak ridership periods. This would represent an increase of 2,015 round-trip route miles and 900 buses over 1972. The plan also recommends the provision of 33 public transit stations, an increase of 29 stations over 1972, and of demand responsive service to low-density urban residential areas.

Source: SEWRPC.

Map 31

TRANSIT SYSTEM IN THE KENOSHA AND RACINE URBANIZED AREAS: 2000 HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Under the highway-supported transit alternative transportation system plan, the transit systems for the Kenosha and Racine urbanized areas would consist of approximately 116 round-trip route miles of transit line in the Kenosha urbanized area and 157 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 29 buses in the Kenosha urbanized area and 36 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 57 round-trip route miles and 17 buses in the Kenosha area and 76 route miles and 26 buses in the Racine area over 1972.

Source: SEWRPC.

Automobile Availability: Given transportation system development in accordance with the highway-supported transit alternative transportation system plan and land use development in accordance with the controlled decentralization land use plan, the number of automobiles available in the Region may be expected to increase from about 705,000 in 1972 to 994,000 in 2000, an increase of about 289,400, or 41 percent. This compares with an approximately 23 percent increase in resident population over the same time period. The number of persons per automobile would, then, be expected to continue to decline from 2.57 in 1972 to 2.23 in 2000, a decline of about 13 percent (see Table 170). The regional forecast of automobiles available in the year 2000, as noted earlier, is 1,168,000, or about 18 percent more than the number anticipated under this alternative plan.

Person Trip Generation: Given transportation system development in accordance with the highway-supported transit alternative transportation system plan and land use development in accordance with the controlled decentralization land use plan, internal person trips may be expected to increase from nearly 4.5 million trips per average weekday in 1972 to about 5.7 million such trips in 2000, an increase of about 1.2 million trips, or 27 percent. This increase in internal trip production may be compared with an approximately 23 percent increase in resident population and 41 percent in automobile availability over the same period of time. Probable future internal person trip production within the Region by trip purpose under this alternative plan combination is indicated in Table 171 and compared to existing trip production. The largest proportionate increase in internal person tripmaking is expected to occur in the school tripmaking category, which is expected to increase by nearly 38 percent. Home-based work trips are expected to increase by about 26 percent over the same 25-year plan design period. The average number of internal person trips generated per capita may be expected to increase from about 2.5 in 1972 to about 2.6 in 2000, while the average number of internal person trips generated per household can be expected to increase from about 7.9 to about 8.3.

Mode of Travel: The distribution of internal person trips within the Region by mode of travel under the controlled decentralization land use plan and the highway-supported transit transportation system plan is summarized in Table 172. Average weekday transit trip production within the Region may be expected to increase by about 212 percent, from 184,000 trips in 1972, or 53.4 million trips per year, to about 575,000 trips in 2000, or 166.8 million trips per year, thus reversing the historic decline in transit use that began after World War II and returning transit ridership levels to those experienced in 1954. The proportion of total internal travel generated within the Region in 2000 served by transit would, accordingly, rise significantly from about 4 percent in 1972 to about 10 percent in 2000. Even with this increase in transit ridership, however, auto driver travel could be expected to increase by about 22 percent, from about 2.9 million trips in 1972 to about 3.5 million trips in 2000.

Table 165

MASS TRANSIT FACILITIES IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972		Planned Increment		2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Round Trip Route Miles						
Primary	150	14.1	901	600.6	1,051	34.2
Secondary	56	5.3	298	532.1	354	11.5
Tertiary	855	80.6	816	95.4	1,671	54.3
Total	1,061	100.0	2,015	189.9	3,076	100.0
Special Facilities	Miles		Miles	Percent Change	Miles	
Exclusive Right-of-Way	--		20.2	100.0	20.2	
Exclusive Lanes on Streets	--		40.8	100.0	40.8	
Vehicle Requirements	Number		Number	Percent Change	Number	
Peak Period	442		900	203.6	1,342	
Midday Period	220		559	286.4	850	

Source: SEWRPC.

Table 166

TRANSIT STATION CHARACTERISTICS BY PRIMARY TRANSIT SERVICE CORRIDOR: 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Transit Station Identification				Type of Transit Service				Passenger Facilities			
Number[a]	Location	Civil Division	Station Status	Primary	Secondary	Tertiary	Collection-Distribution	Parking	Shelter	Buses Per Peak Hour in Peak Direction	Parking Spaces Required
1	East Side Transitway and North Avenue	City of Milwaukee	Proposed	X	X	X			X	71	--
2	East Side Transitway and Locust Street	City of Milwaukee	Proposed	X	X	X			X	71	--
3	East Side Transitway and Capitol Drive	Village of Shorewood	Proposed	X	X	X			X	57	--
4	East Side Transitway and Hampton Avenue	City of Glendale and Village of Whitefish Bay	Proposed	X	X	X			X	57	--
5	North-South Freeway and Good Hope Road	City of Glendale	Proposed	X		X		X	X	12	250
6	North-South Freeway and Silver Spring Drive	City of Glendale	Existing	X	X	X	X	X	X	6	1,200
7	North-South Freeway and Brown Deer Road	Village of River Hills	Existing	X		X	X	X	X	8	1,200
8	North-South Freeway and Mequon Road	City of Mequon	Proposed	X		X	X	X	X	12	800
9	North-South Freeway and Ulao Road (CTH Q)	Town of Grafton	Proposed	X			X	X	X	12	600
10	East-West Transitway and 32nd Street	City of Milwaukee	Proposed	X		X			X	138	--
11	East-West Transitway and Veterans Administration	City of Milwaukee	Proposed	X					X	7	--
12	East-West Transitway and 84th Street	City of Milwaukee	Proposed	X	X	X		X	X	29	1,200
13	East-West Transitway and 108th Street	City of West Allis	Proposed	X	X	X			X	34	--
14	East-West Freeway and Moorland Road	City of Brookfield	Proposed	X		X	X	X	X	9	400
15	East-West Freeway and Barker Road	Town of Brookfield	Existing	X		X	X	X	X	25	600
16	North-South Freeway and Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	X	20	1,200
17	North-South Freeway and College Avenue	City of Milwaukee	Existing	X		X	X	X	X	9	400
18	Airport Freeway and 27th Street	City of Milwaukee and City of Greenfield	Proposed	X	X	X	X	X	X	7	500
19	Airport Freeway and 76th Street	City of Greenfield	Proposed	X	X	X		X	X	11	800
20	S. 76th Street and Oklahoma Avenue	City of Milwaukee and City of West Allis	Proposed		X	X		X	X	21	400
21	Zoo Transitway and Janesville Road	Village of Hales Corners	Proposed	X		X	X	X	X	15	600
22	Zoo Transitway and Oklahoma Avenue	City of Milwaukee and City of West Allis	Proposed	X	X	X			X	15	--
23	Zoo Transitway and Lincoln Avenue	City of West Allis	Proposed	X		X	X	X	X	9	1,200
24	Zoo Freeway and Watertown Plank Road	City of Wauwatosa	Proposed	X	X	X	X	X	X	12	500
25	Zoo Freeway and North Avenue	City of Wauwatosa	Proposed	X	X	X	X	X	X	12	1,200
26	Zoo Freeway and Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	X	10	1,000
27	Zoo Freeway and Silver Spring Drive	City of Milwaukee	Proposed	X		X	X	X	X	7	400
28	Zoo Freeway and Good Hope Road	City of Milwaukee	Proposed	X		X	X	X	X	8	400
29	Fond du Lac Freeway and Main Street	Village of Menomonee Falls	Proposed	X		X	X	X	X	12	500
30	N. 46th Street and North Avenue	City of Milwaukee	Proposed	X	X	X		X	X	20	1,200
31	N. 55th Street and Capitol Drive	City of Milwaukee	Proposed		X	X		X	X	48	1,200
32	Timmerman Airport	City of Milwaukee	Proposed		X	X		X	X	20	900
33	N. 76th Street and Brown Deer Road	City of Milwaukee	Proposed		X	X		X	X	6	600

[a] *See Map 30.*

Source: SEWRPC.

Table 167

EXCLUSIVE MASS TRANSIT LANES ON ARTERIAL STREET FACILITIES IN MILWAUKEE COUNTY: CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Arterial Street		Exclusive Secondary Transit Lane			
Name	Limits	Direction	Duration	Number of Transit Vehicles (Buses) in Peak Hours	Remarks
N. Third Street and Green Bay Avenue	W. Keefe Avenue - W. Michigan Street	Southbound	6:00 a.m. - 9:00 a.m.	41	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	52	
S. 16th Street	W. Forest Home Avenue - W. Clybourn Street	Northbound	6:00 a.m. - 9:00 a.m.	21	Removal of curb parking
		Southbound	3:00 p.m. - 6:00 p.m.	30	
N. 27th Street	W. Capitol Drive - W. St. Paul Avenue	Northbound and Southbound	6:00 a.m. - 6:00 p.m.	54	Removal of curb parking
N. 76th Street	W. Capital Drive - W. Good Hope Road	Southbound	6:00 a.m. - 9:00 a.m.	17	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	30	
Capitol Drive	N. 76th Street - N. Oakland Avenue	Eastbound and Westbound	6:00 a.m. - 6:00 p.m.	69	Removal of curb parking and center median
Farwell Avenue	E. North Avenue - E. Ogden Avenue	Southbound	6:00 a.m. - 6:00 p.m.	54	Removal of curb parking
Fond du Lac Avenue	N. 17th Street - W. Hampton Avenue	Southbound	6:00 a.m. - 9:00 a.m.	23	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	32	
Forest Home Avenue	S. 16th Street - W. Oklahoma Avenue	Northbound	6:00 a.m. - 9:00 a.m.	18	Removal of curb parking
		Southbound	3:00 p.m. - 6:00 p.m.	28	
Kenwood Boulevard	N. Oakland Avenue - N. Downer Avenue	Westbound	6:00 a.m. - 6:00 p.m.	141	Removal of curb parking
Lisbon and Appleton Avenues	N. 46th Street - W. Hampton Avenue	Southbound	6:00 a.m. - 9:00 a.m.	19	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	24	
Locust Street	W. Hopkins Street - N. Oakland Avenue	Eastbound	6:00 a.m. - 9:00 a.m.	32	Removal of curb parking
		Westbound	3:00 p.m. - 6:00 p.m.	33	
Prospect Avenue	E. Wisconsin Avenue - E. North Avenue	Northbound	6:00 a.m. - 6:00 p.m.	54	Removal of curb parking
Wells Street	N. Prospect Avenue - N. 35th Street	Westbound	24 hours	53	Removal of curb parking and median construction
Wisconsin Avenue	N. 10th Street - N. Jackson Street	Eastbound and Westbound	24 hours	522	Removal of all auto traffic
Wisconsin Avenue	N. 35th Street - N. 10th Street	Eastbound	6:00 a.m. - 9:00 a.m.	38	Removal of curb parking
		Westbound	3:00 p.m. - 6:00 p.m.	39	

Source: SEWRPC.

Table 168

TRANSIT FACILITIES IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Transit Round Trip Route Miles				
Primary	-	--	--	--
Secondary	--	--	--	--
Tertiary	59	57.0	96.6	116.0
Vehicle Requirements (Buses)				
Peak Period	12	17.0	141.7	29.0
Midday	6	13.0	216.7	19.0
Racine Urbanized Area				
Transit Route Miles				
Primary	--	--	--	--
Secondary	--	--	--	--
Tertiary	81	75.8	93.6	156.8
Vehicle Requirements				
Peak Period	10	26.0	260.0	36.0
Midday	10	15.0	150.0	25.0

Source: SEWRPC.

The relative utilization of transit and automobile under this combination of alternative plans is indicated by trip purpose category in Tables 173 and 174. Significant increases in transit trip production of 444 percent and 744 percent, respectively, are estimated to occur in the home-based shopping and home-based other tripmaking categories. School transit trips are expected to decline significantly by about 16 percent, with such decline representing about 8,500 transit trips. Home-based work transit trips are estimated to increase by nearly 115 percent, from nearly 71,000 trips in 1972 to about 152,700 trips in 2000.

Under this combination of land use and transportation plan alternatives, an estimated total of about 3.5 million internal automobile driver trips would be generated within the Region on an average weekday in 2000. This represents an increase of about 22 percent over the 1972 level of nearly 2.9 million such trips. The anticipated increases in internal automobile driver trips by trip purpose category are identified in Table 175, while the anticipated increases in internal automobile person trips within the Region are shown in Table 174.

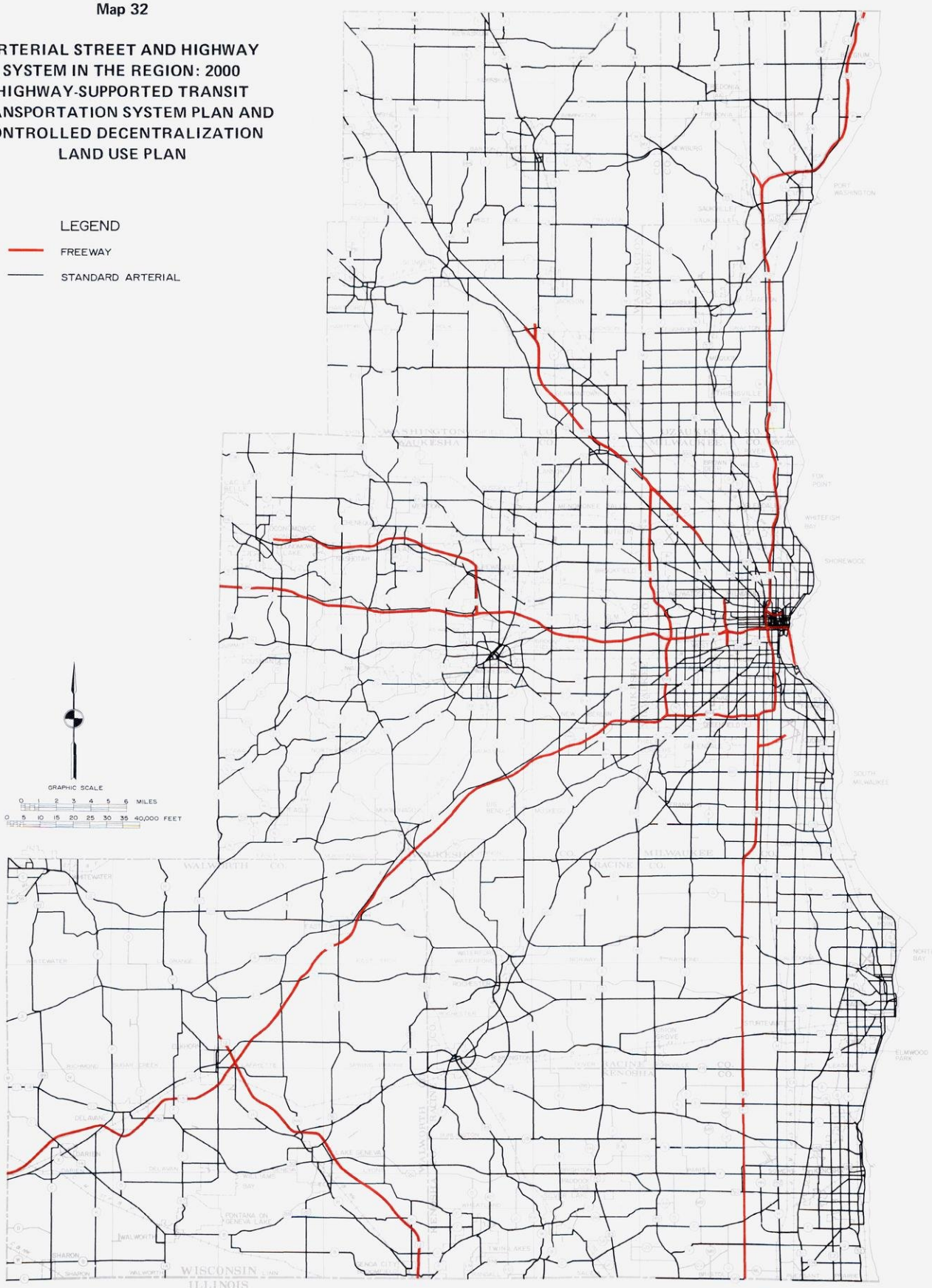
Total vehicle trip production on an average weekday under this combination of alternative plans is estimated to increase by about 24 percent, from about 3.4 million vehicle trips in 1972 to about 4.3 million in 2000. As shown in Table 176, the largest absolute increases in vehicle trip production are anticipated to occur in internal automobile and internal truck trips, while the largest percentage increases in vehicle trip production are anticipated in the external automobile and other truck trip categories. The proportion of trips by vehicle class would not, however, change significantly from 1972 to 2000 under this alternative plan combination.

System Performance

Allocation of the vehicle travel demand generated under the controlled decentralization land use plan to the highway-supported transit alternative transportation system plan indicates that vehicle miles of travel on the arterial street and highway system may be expected to increase from about 20.1 million per average weekday in 1972 to about 28.6 million in 2000, an increase of about 42 percent. About one-half of this increase may be expected to occur on the regional freeway system,

Map 32

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Under the highway-supported transit alternative transportation system plan, arterial street and highway system mileage within the Region would total about 3,436 miles by the year 2000, an increase of 426 miles, or about 14 percent over 1972. Freeways would comprise 278 miles, or 8 percent, of the total arterial system in the year 2000, an increase of 116 miles over 1972.

Source: SEWRPC.

Table 169

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Kenosha County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.1	4.3	--	--	12.1	3.5
8-lane	--	--	--	--	--	--
Subtotal	12.1	4.3	--	--	12.1	3.5
Standard Arterial						
2-lane	243.6	87.1	- 31.0	- 12.7	212.6	61.5
4-lane	24.1	8.6	62.7	260.2	86.8	25.1
6-lane	--	--	34.4	--	34.4	9.9
Subtotal	267.7	95.7	66.1	24.7	333.8	96.5
County Subtotal	279.8	100.0	66.1	23.7	345.9	100.0
Milwaukee County						
Freeway						
4-lane	12.7	1.7	1.4	11.0	14.1	1.8
6-lane	49.0	6.7	3.6	7.3	52.6	6.8
8-lane	2.1	0.3	--	--	2.1	0.3
Subtotal	63.8	8.7	5.0	7.8	68.8	8.9
Standard Arterial						
2-lane	339.5	46.2	- 108.1	- 31.8	231.4	30.0
4-lane	268.7	36.6	138.6	51.6	407.3	52.7
6-lane	62.2	8.5	2.7	4.3	64.9	8.4
Subtotal	670.4	91.3	33.2	5.0	703.6	91.1
County Subtotal	734.2	100.0	38.2	5.2	772.4	100.0
Ozaukee County						
Freeway						
4-lane	10.8	4.3	16.6	153.7	27.4	8.8
6-lane	--	--	--	--	--	--
8-lane	--	--	--	--	--	--
Subtotal	10.8	4.3	16.6	153.7	27.4	8.8
Standard Arterial						
2-lane	233.0	93.1	15.1	6.5	248.1	80.1
4-lane	6.5	2.6	26.6	409.2	33.1	10.7
6-lane	--	--	1.1	--	1.1	0.4
Subtotal	239.5	95.7	42.8	17.9	282.3	91.2
County Subtotal	250.3	100.0	59.4	23.7	309.7	100.0

Table 169 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Racine County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.0	3.4	--	--	12.0	3.0
8-lane	--	--	--	--	--	--
Subtotal	12.0	3.4	--	--	12.0	3.0
Standard Arterial						
2-lane	303.5	86.9	- 21.9	- 7.2	281.6	71.1
4-lane	28.0	8.0	61.3	218.9	89.3	22.5
6-lane	5.9	1.7	7.4	125.4	13.3	3.4
Subtotal	337.4	96.6	46.8	13.9	384.2	97.0
County Subtotal	349.4	100.0	46.8	13.4	396.2	100.0
Walworth County						
Freeway						
4-lane	19.1	4.7	31.3	163.9	50.4	10.9
6-lane	--	--	--	--	--	--
8-lane	--	--	--	--	--	--
Subtotal	19.1	4.7	31.3	163.9	50.4	10.9
Standard Arterial						
2-lane	379.4	92.9	4.7	1.2	384.1	82.9
4-lane	9.7	2.4	19.1	196.9	28.8	6.2
6-lane	--	--	--	--	--	--
Subtotal	389.1	95.3	23.8	6.1	412.9	89.1
County Subtotal	408.2	100.0	55.1	13.5	463.3	100.0
Washington County						
Freeway						
4-lane	0.4	0.1	35.6	8,900.0	36.0	8.3
6-lane	6.4	1.9	--	--	6.4	1.5
8-lane	--	--	--	--	--	--
Subtotal	6.8	2.0	35.6	522.2	42.4	9.8
Standard Arterial						
2-lane	305.6	90.1	33.8	11.0	339.4	78.3
4-lane	26.8	7.9	12.1	45.1	38.9	9.0
6-lane	--	--	12.8	--	12.8	2.9
Subtotal	332.4	98.0	58.7	17.7	391.1	90.2
County Subtotal	339.2	100.0	94.3	27.8	433.5	100.0

Table 169 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Waukesha County						
Freeway						
4-lane	29.1	4.5	23.0	79.2	52.1	7.3
6-lane	8.7	1.3	4.2	48.3	12.9	1.8
8-lane	-	-	--	--	--	--
Subtotal	37.8	5.8	27.2	72.0	65.0	9.1
Standard Arterial						
2-lane	565.5	87.2	- 41.3	- 7.3	524.2	73.4
4-lane	41.3	6.4	60.8	147.2	102.1	14.3
6-lane	3.9	0.6	19.3	494.9	23.2	3.2
Subtotal	610.7	94.2	38.8	6.4	649.5	90.9
County Subtotal	648.5	100.0	66.0	10.2	714.5	100.0
Southeastern Wisconsin Region						
Freeway						
4-lane	72.1	2.4	107.9	149.7	180.0	5.2
6-lane	88.2	2.9	7.8	8.9	96.0	2.8
8-lane	2.1	0.1	--	--	2.1	0.1
Subtotal	162.4	5.4	115.7	71.3	278.1	8.1
Standard Arterial						
2-lane	2,370.1	78.7	- 148.7	- 6.3	2,221.4	64.7
4-lane	405.1	13.5	381.2	94.1	786.3	22.9
6-lane	72.0	2.4	77.7	107.9	149.7	4.3
Subtotal	2,847.2	94.6	310.2	10.9	3,157.4	91.9
Region Total	3,009.6	100.0	425.9	14.2	3,435.5	100.0

Source: SEWRPC.

Table 170

AUTOMOBILE AVAILABILITY WITHIN THE REGION: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population	1,810,700	408,600	22.6	2,219,300
Automobiles Available	704,600	289,400	41.1	994,000
Persons Per Automobile	2.57	- 0.34	- 13.2	2.23

Source: SEWRPC.

Table 171

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	1,055,500	23.7	278,100	26.3	1,333,600	23.5
Home-based Shopping	673,600	15.1	172,100	25.5	845,700	14.9
Home-based Other	1,532,600	34.3	429,200	28.0	1,961,800	34.5
Nonhome-based	779,800	17.5	182,400	23.4	962,200	17.0
School	418,900	9.4	157,800	37.7	576,700	10.1
Total	4,460,400	100.0	1,219,600	27.3	5,680,000	100.0

[a]*Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 172

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Mode of Travel	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Automobile Driver	2,884,700	64.7	640,000	22.2	3,524,700	62.1
Automobile Passenger	1,217,900	27.3	70,500	5.8	1,288,400	22.7
Transit Passenger	184,200	4.1	390,900	212.2	575,100	10.1
School Bus Passenger	173,600	3.9	118,200	68.1	291,800	5.1
Total	4,460,400	100.0	1,219,600	27.3	5,680,000	100.0

[a]*Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 173

DISTRIBUTION OF INTERNAL TRANSIT TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Transit Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	70,900	38.5	81,800	115.4	152,700	26.5
Home-based Shopping	18,800	10.2	83,500	444.1	102,300	17.8
Home-based Other	28,300	15.4	210,600	744.2	238,900	41.5
Nonhome-based	13,100	7.1	23,500	179.4	36,600	6.4
School	53,100	28.8	- 8,500	- 16.0	44,600	7.8
Total	184,200	100.0	390,900	212.2	575,100	100.0

[a]*Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 174

DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	984,600	24.0	196,300	20.0	1,180,900	24.5
Home-based Shopping	654,800	16.0	88,600	13.6	743,400	15.5
Home-based Other	1,504,300	36.6	218,600	12.1	1,722,900	35.8
Nonhome-based	766,700	18.7	158,900	20.7	925,600	19.2
School	192,200	4.7	48,100	25.0	240,300	5.0
Total	4,102,600	100.0	710,500	17.3	4,813,100	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 175

DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Driver Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Home-based Work	840,800	29.2	217,600	26.9	1,058,400	30.0
Home-based Shopping	444,500	15.4	83,700	18.8	528,200	15.0
Home-based Other	976,300	33.8	175,600	18.0	1,151,900	32.7
Nonhome-based	555,700	19.3	145,100	26.1	700,800	19.9
School	67,400	2.3	18,000	26.7	85,400	2.4
Total	2,884,700	100.0	640,000	22.2	3,524,700	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

where such travel would increase from about 6.2 million miles in 1972 to about 10.2 million miles in 2000, an increase of about 64 percent. The anticipated arterial vehicle miles of travel on an average weekday under this alternative plan combination are identified by county and facility type in Table 177. The anticipated average daily traffic volumes on the arterial street and highway system in the Region by the year 2000 are shown on Map 33.

Even with the extensive transit facility and service improvements postulated under this alternative within the urbanized areas of the Region, the anticipated increase in the vehicle travel would produce nearly a doubling in the number of miles of arterial street and highway facilities operating at or over design capacity. In 1972, there were about 318 miles of arterial street and highway facilities operating at or over capacity; by the year 2000, about 773 miles of arterial facilities could be expected

Table 176

DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Vehicle Class	Total Vehicle Trips Generated on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Automobile						
Internal	2,884,700	84.0	640,000	22.2	3,524,700	82.9
External[a]	111,900	3.2	62,800	56.1	174,700	4.1
Other[b]	34,200	1.0	14,200	41.5	48,400	1.1
Subtotal	3,030,800	88.2	717,000	23.7	3,747,800	88.1
Truck						
Internal	383,600	11.2	93,100	24.3	476,700	11.2
External	13,800	0.4	4,900	35.5	18,700	0.5
Other[b]	6,000	0.2	2,800	46.7	8,800	0.2
Subtotal	403,400	11.8	100,800	25.0	504,200	11.9
Total	3,434,200	100.0	817,800	23.8	4,252,000	100.0

[a] *Includes light trucks, i.e., those under 6,000 pounds gross weight.*

[b] *Includes vehicle trips made by persons residing in group quarters and by nonresidents of the Region.*

Source: SEWRPC.

to operate at or above congestion levels, a 143 percent increase (see Table 178). The locations of those arterial facilities that could be expected to operate at or above capacity under the design year conditions given this combination of plan alternatives are identified on Map 34. Important arterial facilities in the Milwaukee urbanized area that may be expected to operate at or beyond congestion levels include the Airport, the East-West, the North-South, and the Zoo Freeways; W. Capitol Drive, W. Hampton Avenue, W. Silver Spring Drive, Ryan Road, E. and W. Locust Street, N. 60th Street, and N. 68th Street. Beyond the Milwaukee urbanized area, such key facilities as STH 50, IH 94, STH 31, STH 32, CTH F, STH 60, STH 33, and STH 20, CTH A in Waukesha County, and CTH A in Racine County would be adversely affected.

Allocation of the transit travel demand generated under the controlled decentralization land use plan to the highway-supported transit alternative transportation system plan indicates that, in the Milwaukee urbanized area, revenue passengers could be expected to increase from about 177,800 per average weekday, or 52.4 million per year in 1972, to about 523,000 per average weekday, or 151.7 million per year in 2000, an increase of about 345,000 per average weekday, or 99.3 million per year, or 194 percent. The annual number of transit rides per capita in the Milwaukee urbanized area may be expected to increase from nearly 49 in 1972 to 117 in 2000 (see Table 179).

In the Kenosha urbanized area, as shown in Table 180, the annual number of transit revenue passengers is expected to increase from about 503,000 in 1972 to about 7.1 million in 2000, an increase of about 6.6 million, or 1,306 percent. The annual number of rides per capita would increase from about six in 1972 to about 54 in 2000.

In the Racine urbanized area, the annual number of transit revenue passengers would be expected to increase from about 526,000 in 1972 to about 7.7 million in 2000, an increase of about 7.2 million, or 1,373 percent. The annual number of rides per capita would increase from about five in 1972 to about 53 in 2000.

Table 177

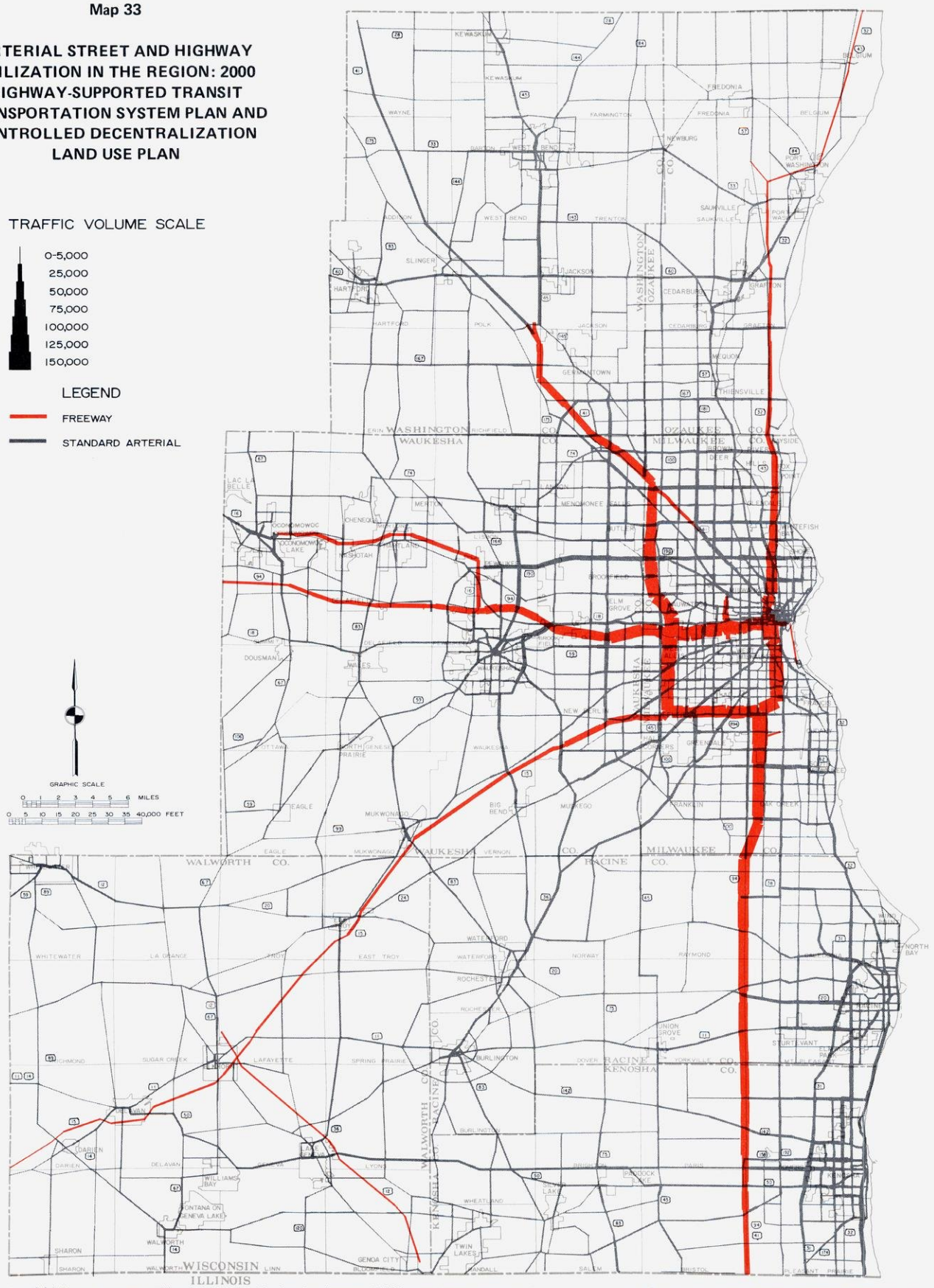
VEHICLE MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

County	Arterial Vehicle Miles of Travel on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha						
Freeway	382	26.8	137	35.9	519	17.3
Standard Arterial	1,046	73.2	1,430	136.7	2,476	82.7
Subtotal	1,428	100.0	1,567	109.7	2,995	100.0
Milwaukee						
Freeway	3,977	37.2	964	24.2	4,941	47.8
Standard Arterial	6,718	62.8	- 1,317	- 19.6	5,401	52.2
Subtotal	10,695	100.0	- 353	- 3.3	10,342	100.0
Ozaukee						
Freeway	223	26.2	217	97.3	440	27.3
Standard Arterial	627	73.8	544	86.8	1,171	72.7
Subtotal	850	100.0	761	89.5	1,611	100.0
Racine						
Freeway	415	22.9	447	107.7	862	27.2
Standard Arterial	1,398	77.1	912	65.2	2,310	72.8
Subtotal	1,813	100.0	1,359	75.0	3,172	100.0
Walworth						
Freeway	56	6.4	439	783.9	495	27.3
Standard Arterial	817	93.6	500	61.2	1,317	72.7
Subtotal	873	100.0	939	107.6	1,812	100.0
Washington						
Freeway	190	16.5	721	379.5	911	36.7
Standard Arterial	961	83.5	613	63.8	1,574	63.3
Subtotal	1,151	100.0	1,334	115.9	2,485	100.0
Waukesha						
Freeway	970	29.3	1,068	110.1	2,038	32.8
Standard Arterial	2,344	70.7	1,824	77.8	4,168	67.2
Subtotal	3,314	100.0	2,892	87.3	6,206	100.0
Southeastern Wisconsin Region						
Freeway	6,213	30.9	3,993	64.3	10,206	35.7
Standard Arterial	13,911	69.1	4,506	32.4	18,417	64.3
Total	20,124	100.0	8,499	42.2	28,623	100.0

Source: SEWRPC.

Map 33

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Arterial street and highway system utilization in the Region in the year 2000 may be expected to increase to nearly 29 million vehicle miles of travel on an average weekday under the highway-supported transit alternative transportation system plan, an increase of over eight million vehicle miles, or about 42 percent, over 1972. About 10 million vehicle miles of travel, or 36 percent of the total, could be expected to occur on the freeway system, as opposed to 31 percent in 1972.

Source: SEWRPC.

Table 178

ARTERIAL STREET AND HIGHWAY SERVICE LEVELS IN THE REGION BY COUNTY: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

County	Existing 1972						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	243.1	9.0	14.7	9.7	22.0	13.3	279.8
Milwaukee	601.4	22.4	71.8	47.2	61.0	36.8	734.2
Ozaukee	234.7	8.7	10.1	6.6	5.5	3.3	250.3
Racine	310.0	11.5	19.1	12.6	20.3	12.3	349.4
Walworth	400.7	14.9	2.7	1.8	4.8	2.9	408.2
Washington	320.4	11.9	9.7	6.4	9.1	5.5	339.2
Waukesha	581.8	21.6	23.8	15.7	42.9	25.9	648.5
Total	2,692.1	100.0	151.9	100.0	165.6	100.0	3,009.6

County	Planned Increment						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent Change	Miles	Percent Change	Miles	Percent Change	Total Miles
Kenosha	-68.3	-28.1	79.1	538.1	55.3	251.4	66.1
Milwaukee	60.6	10.1	24.0	33.4	-46.4	-76.1	38.2
Ozaukee	22.9	9.7	29.1	288.1	7.4	134.5	59.4
Racine	-31.6	-10.2	67.8	355.0	10.6	52.2	46.8
Walworth	4.9	1.2	49.4	1,829.6	0.8	16.7	55.1
Washington	39.4	12.3	43.5	448.4	11.4	125.3	94.3
Waukesha	-57.3	-9.8	137.8	579.0	-14.5	-33.8	66.0
Total	-29.4	-1.1	430.7	283.5	24.6	14.8	425.9

County	Total 2000						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	174.8	6.6	93.8	16.1	77.3	40.6	345.9
Milwaukee	662.0	24.9	95.8	16.5	14.6	7.7	772.4
Ozaukee	257.6	9.7	39.2	6.7	12.9	6.8	309.7
Racine	278.4	10.4	86.9	14.9	30.9	16.3	396.2
Walworth	405.6	15.2	52.1	8.9	5.6	2.9	463.3
Washington	359.8	13.5	53.2	9.1	20.5	10.8	433.5
Waukesha	524.5	19.7	161.6	27.8	28.4	14.9	714.5
Total	2,662.7	100.0	582.6	100.0	190.2	100.0	3,435.5

[a] *Volume-to-capacity ratio 0.00-0.90; fully adequate and safest operational levels.*

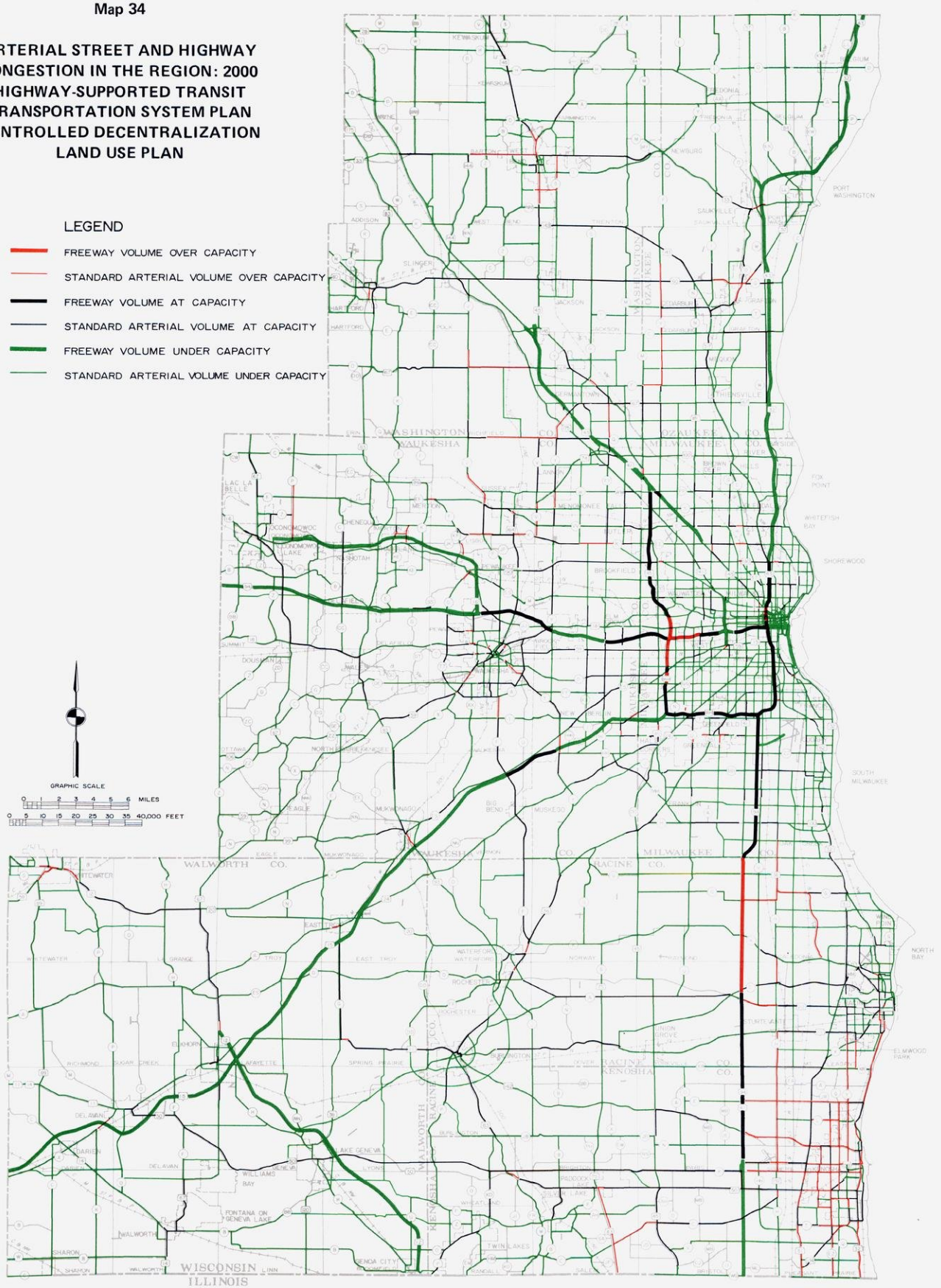
[b] *Volume-to-capacity ratio 0.91-1.10; adequate operational level.*

[c] *Volume-to-capacity ratio over 1.10; congested at times.*

Source: SEWRPC.

Map 34

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN CONTROLLED DECENTRALIZATION LAND USE PLAN



Under the highway-supported transit alternative transportation system plan, 773 miles of arterial street and highway facilities, or about 22 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, were operating at or over design capacity.

Source: SEWRPC.

Table 179

TRANSIT SYSTEM PERFORMANCE IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population				
Urbanized Area	1,267,400	130,600	10.3	1,398,000
Service Area	1,043,600	254,000	24.3	1,297,600
Urbanized Area Population Served	1,043,600	254,000	24.3	1,297,600
Percent Urbanized Area Population Served	82.3	--	--	92.8
Nonurbanized Area Population Served	--	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	1,410	62,380	4,424.1	63,790
Secondary	--[a]	--	--	63,970
Tertiary	60,670	58,670	96.7	119,340
Total	62,080	185,020	298.0	247,100
Daily Seat Miles	3,220,640	9,134,360	283.6	12,355,000
Daily Revenue Passengers	177,800	345,200	194.2	523,000
Daily Passenger Miles	1,175,700	2,162,700	183.9	3,338,400
Passengers Per Vehicle Mile	2.9	-	-	2.1
Percent Utilization—Seat Miles Provided to Passenger Miles Used	35.6	-	--	27.0
Annual Revenue Passengers	52,417,800	99,252,200	189.3	151,670,000
Rides Per Capita	50.2	-	-	116.9

[a] *Included in tertiary.*

Source: SEWRPC.

System Development Cost

The estimated capital costs of carrying out the highway-supported transit transportation system plan under the land use development assumptions contained in the controlled decentralization land use plan are identified in Table 181. The total cost of preserving, improving, and expanding the arterial street and highway system is estimated at about $1.7 billion. The cost of preserving, improving, and expanding the mass transit systems in the three urbanized areas is estimated at about $360.5 million. The total estimated cost of preserving, improving, and expanding the street and highway system, including nonarterial streets, and the transit system is estimated at about $2.7 billion.

TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN—CONTROLLED DECENTRALIZATION LAND USE PLAN

The transit-supported highway alternative transportation system plan postulated to support and serve the controlled decentralization land use plan is very similar to that proposed to support and serve the controlled centralization land use plan. The arterial street and highway network, as shown on Map 35, is essentially the same as that postulated earlier, with certain changes in the location and magnitude of proposed improvements. The changes in miles of arterial streets and highways by

Table 180

TRANSIT SYSTEM PERFORMANCE IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Population				
Urbanized Area	86,500	63,200	73.1	149,700
Service Area	83,900	47,800	57.0	131,700
Urbanized Area Population Served	83,900	47,200	56.3	131,100
Percent Urbanized Area Population Served	97.0	--	--	87.6
Nonurbanized Area Population Served	-	--	--	600
Utilization				
Daily Vehicle Miles				
Primary	-	-	--	--
Secondary	--	--	--	--
Tertiary	1,140	3,630	318.4	4,770
Total	1,140	3,630	318.4	4,770
Daily Seat Miles	43,300	171,350	395.7	214,650
Daily Revenue Passengers	2,800	21,600	771.4	24,400
Daily Passenger Miles	9,610	46,190	480.6	55,800
Passengers Per Vehicle Mile	2.5	-	--	5.1
Percent Utilization--Seat Miles Provided to Passenger Miles Used	22.2	--	--	26.0
Annual Revenue Passengers	503,200	6,572,800	1,306.2	7,076,000
Rides Per Capita	6.0	--	--	53.7
Racine Urbanized Area				
Population				
Urbanized Area	115,200	37,300	32.4	152,500
Service Area	100,600	47,000	46.7	147,600
Urbanized Area Population Served	100,600	47,000	46.7	147,600
Percent Urbanized Area Population Served	87.3	--	--	96.8
Nonurbanized Area Population Served	-	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	--	--	--	--
Secondary	-	--	--	--
Tertiary	1,560	4,860	311.5	6,420
Total	1,560	4,860	311.5	6,420
Daily Seat Miles	29,600	259,300	876.0	288,900
Daily Revenue Passengers	3,100	23,600	761.3	26,700
Daily Passenger Miles	10,920	56,280	515.4	67,200
Passengers Per Vehicle Mile	2.0	--	--	4.2
Percent Utilization - Seat Miles Provided to Passenger Miles Used	36.9	--	--	23.3
Annual Revenue Passengers	525,700	7,217,300	1,372.9	7,743,000
Rides Per Capita	5.2	--	--	52.5

Source: SEWRPC.

Table 181

ESTIMATED TRANSPORTATION SYSTEM CAPITAL COSTS IN THE REGION: 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND HIGHWAY-SUPPORTED TRANSIT TRANSPORTATION SYSTEM PLAN

System Component	Capital Cost		
	System Preservation (dollars)	System Improvement and Expansion (dollars)	Total (dollars)
Streets and Highways			
Arterial	228,383,000	1,423,008,400	1,651,391,400
Nonarterial	175,683,000	559,147,000	734,830,000
Subtotal	404,066,000	1,982,155,400	2,386,221,400
Transit			
Transitways	--	102,460,000	102,460,000
Exclusive Lanes	-	12,075,000	12,075,000
Stations and Terminals	4,852,000	41,337,000	46,189,000
Offices and Shops	15,242,000	--	15,242,000
Operating and Maintenance Equipment	87,325,000	97,200,000	184,525,000
Subtotal	107,419,000	253,072,000	360,491,000
Total	511,485,000	2,235,227,400	2,746,712,400

Source: SEWRPC.

facility type, including an identification of the change in number of miles of facilities by the number of lanes provided, is set forth in Table 182.

With respect to the transit system, minor changes have also been effected to adjust the transit system improvements and services to the proposed population distribution and land use development assumptions contained in the controlled decentralization land use plan. The proposed transit network for the Milwaukee urbanized area under this alternative is identified on Map 36, and the facility characteristics attendant to that network are identified in Tables 183, 184, and 185. Similarly, the proposed transit networks for the Kenosha and Racine urbanized areas are identified on Map 37, and the attendant facility requirements are set forth in Table 186.

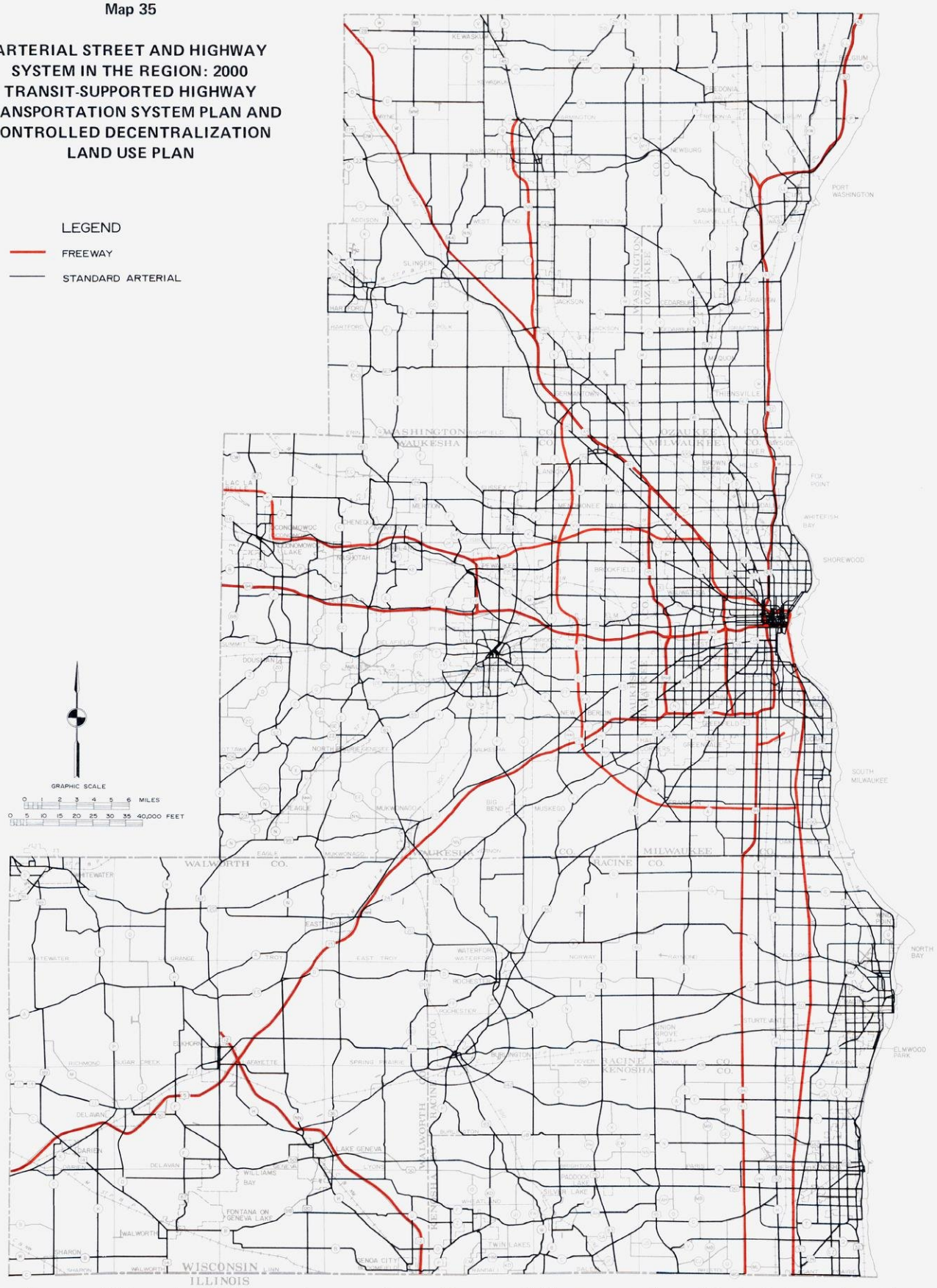
Assignment of Travel to Highway and Transit Networks: An analysis of the performance of the postulated transit-supported highway alternative plan under probable future land use and travel conditions was undertaken with the aid of the traffic simulation models described in Chapter IV of this volume. Through application of these models, travel demand for the plan design year 2000 was developed for the land use pattern proposed under the controlled decentralization land use plan and assigned to the transit-supported highway alternative street and highway and transit system networks.

Automobile Availability: Given transportation system development in accordance with the transit-supported highway alternative transportation system plan and land use development in accordance with the controlled decentralization land use plan, it is estimated that the number of automobiles available in the Region may be expected to increase from about 705,000 in 1972 to 1,001,000 in 2000, an increase of about 296,000, or 42 percent. This compares with an approximately 23 percent increase in resident population over the same time period. The number of persons per automobile would, then, be expected to continue to decline from 2.57 in 1972 to 2.22 in 2000, a decline of nearly 14 percent (see Table 187). The regional forecast of automobiles available in the year 2000, as noted earlier, is 1,168,000, or about 16 percent more than the number anticipated under this alternative plan.

Person Trip Generation: Given transportation system development in accordance with the transit-supported highway alternative transportation system plan and land use development in accordance with the controlled decentralization land use plan, internal person trips may be expected to increase from nearly 4.5 million trips per average weekday in 1972 to nearly 5.7 million such trips in 2000, an increase of 1.2 million trips, or 28 percent. This increase in the internal trip production may be compared with an approximately 23 percent increase

Map 35

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Under the transit-supported highway alternative transportation system plan, arterial street and highway system mileage within the Region would total about 3,546 miles by the year 2000, an increase of 536 miles, or about 18 percent over 1972. Freeways would comprise 375 miles, or 11 percent, of the total arterial system in the year 2000, an increase of 212 miles over 1972.

Source: SEWRPC.

Table 182

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Kenosha County						
Freeway						
4-lane	--	--	--	--	--	--
6-lane	12.1	4.3	12.2	101.7	24.3	6.8
8-lane	--	--	--	--	--	--
Subtotal	12.1	4.3	12.2	101.7	24.3	6.8
Standard Arterial						
2-lane	243.6	87.1	- 20.5	- 8.4	223.1	62.3
4-lane	24.1	8.6	56.8	235.7	80.9	22.6
6-lane	--	--	29.8	--	29.8	8.3
Subtotal	267.7	95.7	66.1	24.7	333.8	93.2
County Subtotal	279.8	100.0	78.3	27.9	358.1	100.0
Milwaukee County						
Freeway						
4-lane	12.7	1.7	- 0.1	- 0.8	12.6	1.5
6-lane	49.0	6.7	36.3	74.1	85.3	10.4
8-lane	2.1	0.3	6.7	319.0	8.8	1.1
Subtotal	63.8	8.7	42.9	67.2	106.7	13.0
Standard Arterial						
2-lane	339.5	46.2	- 74.1	- 21.8	265.4	32.4
4-lane	268.7	36.6	125.7	46.8	394.4	48.2
6-lane	62.2	8.5	- 9.9	- 15.9	52.3	6.4
Subtotal	670.4	91.3	41.7	6.2	712.1	87.0
County Subtotal	734.2	100.0	84.6	11.5	818.8	100.0
Ozaukee County						
Freeway						
4-lane	10.8	4.3	16.6	153.7	27.4	8.8
6-lane	--	--	--	--	--	--
8-lane	--	--	--	--	--	--
Subtotal	10.8	4.3	16.6	153.7	27.4	8.8
Standard Arterial						
2-lane	233.0	93.1	10.9	4.5	243.4	78.6
4-lane	6.5	2.6	32.4	498.5	38.9	12.6
6-lane	--	--	--	--	--	--
Subtotal	239.5	95.7	42.8	17.9	282.3	91.2
County Subtotal	250.3	100.0	59.4	23.7	309.7	100.0

Table 182 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Racine County						
Freeway						
4-lane	–	–	--	--	--	--
6-lane	12.0	3.4	12.1	100.8	24.1	5.8
8-lane	--	–	--	--	--	--
Subtotal	12.0	3.4	12.1	100.8	24.1	5.8
Standard Arterial						
2-lane	303.5	86.9	- 0.4	- 0.1	303.1	73.1
4-lane	28.0	8.0	54.8	195.7	82.8	20.0
6-lane	5.9	1.7	- 1.3	- 22.0	4.6	1.1
Subtotal	337.4	96.6	53.1	15.7	390.5	94.2
County Subtotal	349.4	100.0	65.2	18.7	414.6	100.0
Walworth County						
Freeway						
4-lane	19.1	4.7	31.3	163.9	50.4	10.9
6-lane	–	–	--	--	--	--
8-lane	–	–	--	--	--	--
Subtotal	19.1	4.7	31.3	163.9	50.4	10.9
Standard Arterial						
2-lane	379.4	92.9	4.7	1.2	384.1	82.9
4-lane	9.7	2.4	19.1	196.9	28.8	6.2
6-lane	--	–	--	--	--	--
Subtotal	389.1	95.3	23.8	6.1	412.9	89.1
County Subtotal	408.2	100.0	55.1	13.5	463.3	100.0
Washington County						
Freeway						
4-lane	0.4	0.1	37.2	9,300.0	37.6	8.6
6-lane	6.4	1.9	--	--	6.4	1.5
8-lane	–	–	--	--	--	--
Subtotal	6.8	2.0	37.2	39.0	44.0	10.1
Standard Arterial						
2-lane	305.6	90.1	38.0	12.4	343.6	79.1
4-lane	26.8	7.9	12.6	47.0	39.4	9.1
6-lane	–	–	7.6	--	7.6	1.7
Subtotal	332.4	98.0	58.2	17.5	390.6	89.9
County Subtotal	339.2	100.0	95.4	28.1	434.6	100.0

Table 182 (continued)

Arterial Facility Type	Arterial Streets and Highways					
	Existing 1972		Planned Increment		Total 2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Waukesha County						
Freeway						
4-lane	29.1	4.5	38.7	133.0	67.8	9.1
6-lane	8.7	1.3	21.2	243.7	29.9	4.0
8-lane	-	-	--	--	--	--
Subtotal	37.8	5.8	59.9	158.5	97.7	13.1
Standard Arterial						
2-lane	565.5	87.2	- 35.0	- 6.2	530.5	71.1
4-lane	41.3	6.4	70.3	170.2	111.6	14.9
6-lane	3.9	0.6	2.8	71.8	6.7	0.9
Subtotal	610.7	94.2	38.1	6.2	648.8	86.9
County Subtotal	648.5	100.0	98.0	15.1	746.5	100.0
Southeastern Wisconsin Region						
Freeway						
4-lane	72.1	2.4	123.7	171.6	195.8	5.5
6-lane	88.2	2.9	81.8	92.8	170.0	4.8
8-lane	2.1	0.1	6.7	319.0	8.8	0.3
Subtotal	162.4	5.4	212.2	130.7	374.6	10.6
Standard Arterial						
2-lane	2,370.1	78.7	- 76.9	- 3.2	2,293.2	64.7
4-lane	405.1	13.5	371.7	91.8	776.8	21.9
6-lane	72.0	2.4	29.0	40.3	101.0	2.8
Subtotal	2,847.2	94.6	323.8	11.4	3,171.0	89.4
Region Total	3,009.6	100.0	536.0	17.8	3,545.6	100.0

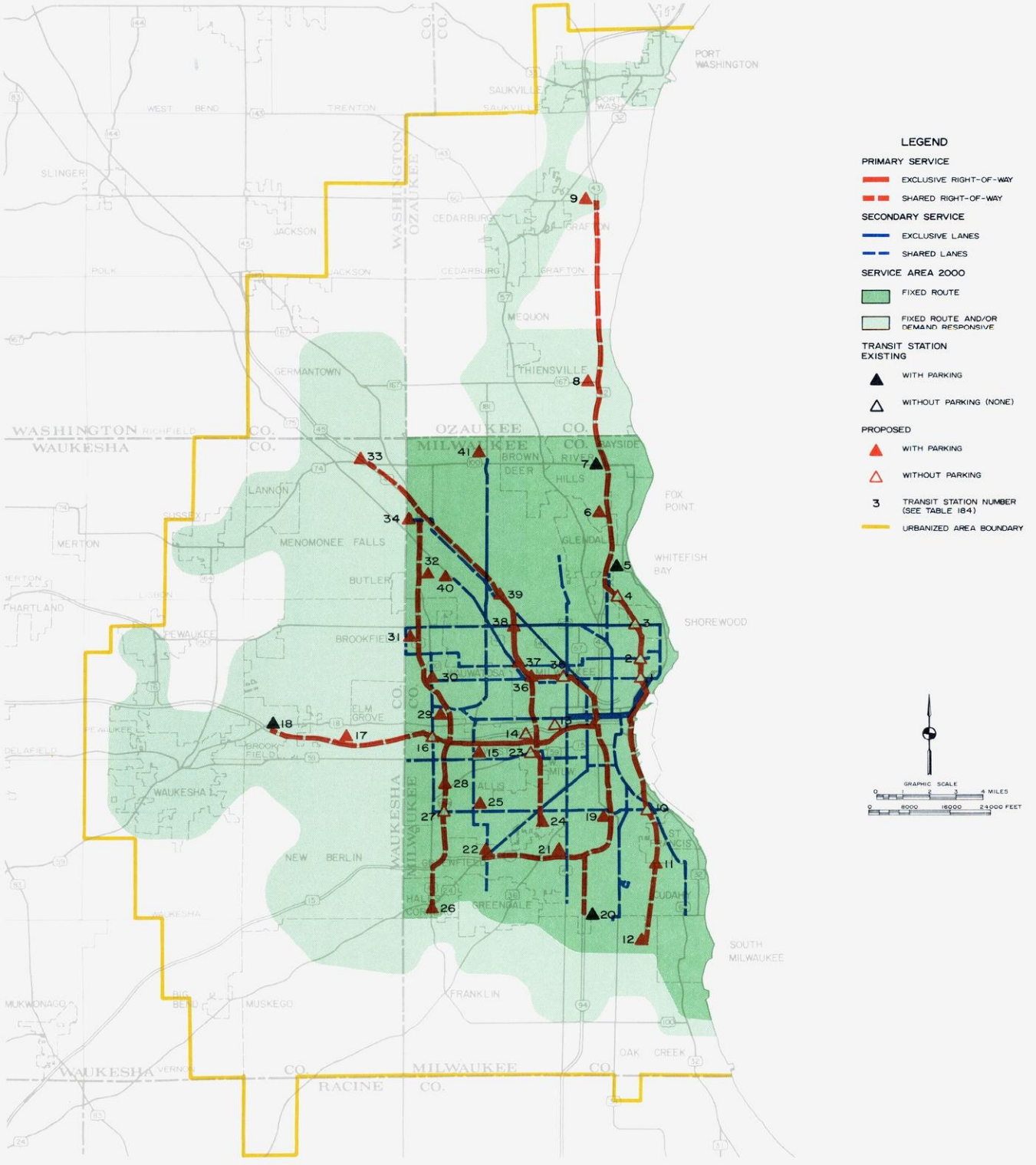
Source: SEWRPC.

in resident population and a 42 percent increase in automobile availability over the same period of time. Probable future internal person trip production within the Region by trip purpose under this alternative plan combination is indicated in Table 188, and compared to existing trip production. The largest proportionate increase in internal person tripmaking is expected to occur in the school tripmaking category, which is expected to increase by nearly 38 percent. Home-based work trips are expected to increase by nearly 27 percent over the same 25-year plan design period. The average number of internal person trips generated per capita may be expected to increase from about 2.5 in 1972 to about 2.6 in 2000, while the average number of internal person trips generated per household may be expected to increase from about 7.9 to about 8.3.

Mode of Travel: The distribution of internal person trips within the Region by mode of travel under the controlled decentralization land use plan and the transit-supported highway transportation system plan is summarized in Table 189. Average weekday transit trip production within the Region may be expected to increase by about 71 percent, from 184,000 transit trips in 1972, or 53.4 million trips per year, to about 316,000 trips in 2000, or 91.5 million trips per year, thus reversing

Map 36

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 2000 TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Under the transit-supported highway alternative transportation system plan, transit service would be provided over 3,112 round-trip route miles of transit line in the Milwaukee urbanized area, of which 1,109 route miles would provide primary service, 349 route miles secondary service, and 1,654 route miles tertiary service. The system would require the operation of about 1,134 buses during peak ridership periods. This would represent an increase of 2,051 round-trip route miles and 692 buses over 1972. The plan also recommends the provision of 41 public transit stations, an increase of 37 stations over 1972, and of demand responsive service to low-density urban residential areas.

Source: SEWRPC.

Table 183

MASS TRANSIT FACILITIES IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972		Planned Increment		2000	
	Miles	Percent of Total	Miles	Percent Change	Miles	Percent of Total
Round Trip Route Miles						
Primary	150	14.1	959	639.3	1,109	35.6
Secondary	56	5.3	293	523.2	349	11.2
Tertiary	855	80.6	799	93.4	1,654	53.2
Total	1,061	100.0	2,051	193.3	3,112	100.0
Special Facilities	Miles		Miles	Percent Change	Miles	
Exclusive Right-of-Way	0		20.0	100.0	20.0	
Exclusive Lanes on Streets	0		40.8	100.0	40.8	
Vehicle Requirements	Number		Number	Percent Change	Number	
Peak Period	442		692	156.6	1,134	
Midday Period	220		470	213.6	690	

Source: SEWRPC.

the historic decline in transit use that began after World War II and returning transit ridership levels to those experienced in 1967. The proportion of total internal travel generated within the Region in 2000 served by transit would rise only slightly, from about 4.1 percent in 1972 to about 5.5 percent in 2000. Auto driver travel could be expected to increase over the same time period by nearly 29 percent, from about 2.9 million trips in 1972 to about 3.7 million trips in 2000.

The relative utilization of transit and automobile under this combination of alternative plans is indicated by trip purpose categories in Tables 190 and 191. Significant increases in transit trip production of 152 percent and 263 percent, respectively, are expected to occur in the home-based shopping and home-based other tripmaking categories. School transit trips are anticipated to decrease by about 16 percent, representing about 8,500 such trips. Home-based work transit trips are estimated to increase by about 53 percent, from nearly 71,000 trips in 1972 to about 108,000 trips in 2000.

Under this combination of land use and transportation plan alternatives, it is estimated that a total of about 3.7 million internal automobile driver trips would be generated within the Region on an average weekday in 2000. This represents an increase of about 29 percent over the 1972 level of nearly 2.9 million such trips. The anticipated increases in internal automobile driver trips by trip purpose category are identified in Table 192, while the anticipated increase in internal automobile person trips within the Region is shown in Table 191.

Total vehicle trip production on an average weekday under this combination of alternative plans is estimated to increase by about 30 percent, from about 3.5 million vehicle trips in 1972 to about 4.6 million vehicle trips in 2000. As shown in Table 193, the largest absolute increases in vehicle trip production are expected to occur in internal automobile and internal truck trips, while the largest percentage increases in vehicle trip production are anticipated in the external automobile and other truck trip categories. The proportion of trips by vehicle class would not, however, change significantly from 1972 to 2000 under this alternative plan combination.

System Performance

Allocation of the vehicle travel demand generated under the controlled decentralization land use plan to the transit-supported highway alternative transportation system plan indicates that vehicle miles of travel on the arterial street and highway system may be expected to

Table 184

TRANSIT STATION CHARACTERISTICS BY PRIMARY TRANSIT SERVICE CORRIDOR: 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Station Identification				Type of Transit Service				Passenger Facilities			
Number[a]	Location	Civil Division	Station Status	Primary	Secondary	Tertiary	Collection-Distribution	Parking	Shelter	Buses Per Peak Hour in Peak Direction	Parking Spaces Required
1	East Side Transitway and North Avenue	City of Milwaukee	Proposed	X	X	X			X	38	--
2	East Side Transitway and Locust Street	City of Milwaukee	Proposed	X	X	X			X	38	--
3	East Side Transitway and Capitol Drive	Village of Shorewood	Proposed	X	X	X			X	38	--
4	East Side Transitway and Hampton Avenue	City of Glendale and Village of Whitefish Bay	Proposed	X		X			X	38	--
5	North-South Freeway and Silver Spring Drive	City of Glendale	Existing	X	X	X		X	X	12	1,200
6	North-South Freeway and Good Hope Road	City of Glendale	Proposed	X		X	X	X	X	8	250
7	North-South Freeway and Brown Deer Road	Village of River Hills	Existing	X		X	X	X	X	7	1,200
8	North-South Freeway and Mequon Road	City of Mequon	Proposed	X		X	X	X	X	8	800
9	North-South Freeway and Ulao Road (CTH A)	Town of Grafton	Proposed	X		X	X	X	X	8	600
10	Lake Freeway and Oklahoma Avenue	City of Milwaukee	Proposed	X	X	X			X	23	
11	Lake Freeway and Layton Avenue	City of Milwaukee, Village of St. Francis, City of Cudahy	Proposed	X		X	X	X	X	12	800
12	Lake Freeway and Rawson Avenue	City of Oak Creek	Proposed	X			X	X	X	11	800
13	East-West Transitway and 32nd Street	City of Milwaukee	Proposed	X		X			X	101	--
14	East-West Transitway and Veterans Administration	City of Milwaukee	Proposed	X					X	6	--
15	East-West Transitway and 84th Street	City of Milwaukee	Proposed	X	X	X		X	X	9	1,200
16	East-West Transitway and 108th Street	City of West Allis	Proposed	X	X	X			X	21	--
17	East-West Freeway and Moorland Road	City of Brookfield	Proposed	X		X	X	X	X	8	400
18	East-West Freeway and Barker Road	Town of Brookfield	Existing	X		X	X	X	X	13	600
19	North-South Freeway and Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	X	17	1,200
20	North-South Freeway and College Avenue	City of Milwaukee	Existing	X		X	X	X	X	6	400
21	Airport Freeway and 27th Street	City of Milwaukee and City of Greenfield	Proposed	X	X	X	X	X	X	7	500
22	Airport Freeway and 76th Street	City of Greenfield	Proposed	X	X	X		X	X	11	800
23	Stadium Freeway and National Avenue	Village of West Milwaukee	Proposed	X	X	X			X	7	--
24	Stadium Freeway and Morgan Avenue	City of Milwaukee and City of Greenfield	Proposed	X		X	X	X	X	7	600
25	S. 76th Street and Oklahoma Avenue	City of Milwaukee and City of West Allis	Proposed		X	X		X	X	17	400
26	108th Street and Janesville Road	Village of Hales Corners	Proposed	X		X	X	X	X	9	600
27	Zoo Freeway and Oklahoma Avenue	City of Milwaukee and City of West Allis	Proposed	X	X	X			X	9	--
28	Zoo Freeway and Lincoln Avenue	City of West Allis	Proposed	X		X	X	X	X	9	1,200
29	Zoo Freeway and Watertown Plank Road	City of Wauwatosa	Proposed	X	X	X	X	X	X	10	500
30	Zoo Freeway and North Avenue	City of Wauwatosa	Proposed	X	X	X	X	X	X	12	1,200
31	Zoo Freeway and Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	X	10	1,000
32	Zoo Freeway and Silver Spring Drive	City of Milwaukee	Proposed	X		X	X	X	X	6	400
33	Fond du Lac Freeway and Main Street	Village of Menomonee Falls	Proposed	X		X	X	X	X	9	500
34	Zoo Freeway and Good Hope Road	City of Milwaukee	Proposed	X	X	X	X	X	X	6	400
35	Northwest Transitway and 27th Street	City of Milwaukee	Proposed	X	X	X			X	39	--
36	N. 46th Street and North Avenue	City of Milwaukee	Proposed	X	X	X		X	X	52	1,200
37	Northwest Transitway and Center Street	City of Milwaukee	Proposed	X	X	X		X	X	39	800
38	Northwest Transitway and Capitol Drive	City of Milwaukee	Proposed	X	X	X		X	X	39	1,200
39	Northwest Transitway and Hampton Avenue	City of Milwaukee	Proposed	X		X	X	X	X	39	1,200
40	Timmerman Airport	City of Milwaukee	Proposed		X	X		X	X	13	900
41	N. 76th Street and Brown Deer Road	City of Milwaukee	Proposed	X	X	X		X	X	30	600

[a] *See Map 30.*

Source: SEWRPC.

Table 185

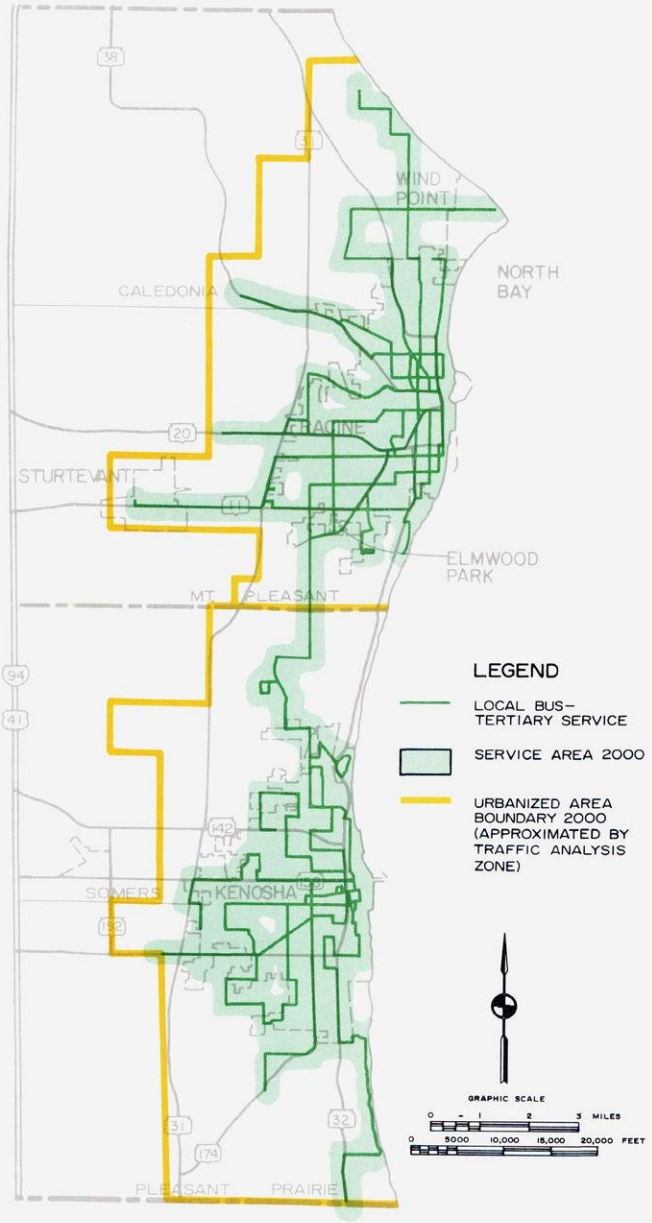
EXCLUSIVE MASS TRANSIT LANES ON ARTERIAL STREET FACILITIES IN MILWAUKEE COUNTY: CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Arterial Street		Exclusive Secondary Transit Lane			
Name	Limits	Direction	Duration	Number of Transit Vehicles (Buses) in Peak Hours	Remarks
N. Third Street and Green Bay Avenue	W. Keefe Avenue - W. Michigan Street	Southbound	6:00 a.m. - 9:00 a.m.	40	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	42	
S. 16th Street	W. Forest Home Avenue - W. Clybourn Street	Northbound	6:00 a.m. - 9:00 a.m.	20	Removal of curb parking
		Southbound	3:00 p.m. - 6:00 p.m.	24	
N. 27th Street	W. Capitol Drive - W. St. Paul Avenue	Northbound and Southbound	6:00 a.m. - 6:00 p.m.	40	Removal of curb parking
N. 76th Street	W. Capitol Drive - W. Good Hope Road	Southbound	6:00 a.m. - 9:00 a.m.	31	Removal of curb parking
		Northbound	3:00 p.m.- 6:00 p.m.	46	
Capitol Drive	N. 76th Street - N. Oakland Avenue	Eastbound and Westbound	6:00 a.m. - 6:00 p.m.	33	Removal of curb parking and center median
Farwell Avenue	E. North Avenue - E. Ogden Avenue	Southbound	6:00 a.m. - 6:00 p.m.	47	Removal of curb parking
Fond du Lac Avenue	N. 17th Street - W. Hampton Avenue	Southbound	6:00 a.m. - 9:00 a.m.	24	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	19	
Forest Home Avenue	S. 16th Street - W. Oklahoma Avenue	Northbound	6:00 a.m. - 9:00 a.m.	19	Removal of curb parking
		Southbound	3:00 p.m. - 6:00 p.m.	19	
Kenwood Boulevard	N. Oakland Avenue - N. Downer Avenue	Westbound	6:00 a.m. - 6:00 p.m.	112	Removal of curb parking
Lisbon and Appleton Avenues	N. 46th Street - W. Hampton Avenue	Southbound	6:00 a.m. - 9:00 a.m.	16	Removal of curb parking
		Northbound	3:00 p.m. - 6:00 p.m.	17	
Locust Street	W. Hopkins Street - N. Oakland Avenue	Eastbound	6:00 a.m. - 9:00 a.m.	30	Removal of curb parking
		Westbound	3:00 p.m. - 6:00 p.m.	31	
Prospect Avenue	E. Wisconsin Avenue - E. North Avenue	Northbound	6:00 a.m. - 6:00 p.m.	47	Removal of curb parking
Wells Street	N. Prospect Avenue	Westbound	24 hours	63	Removal of curb parking and median construction
Wisconsin Avenue	N. 10th Street - N. Jackson Street	Eastbound and Westbound	24 hours	475	Removal of all auto traffic
Wisconsin Avenue	N. 35th Street - N. 10th Street	Eastbound	6:00 a.m.- 9:00 a.m.	93	Removal of curb parking
		Westbound	3:00 p.m.- 6:00 p.m.	93	

Source: SEWRPC.

Map 37

TRANSIT SYSTEM IN THE KENOSHA AND RACINE URBANIZED AREAS: 2000 TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Under the transit-supported highway alternative transportation system plan, the transit systems for the Kenosha and Racine urbanized areas would consist of approximately 116 round-trip route miles of transit line in the Kenosha urbanized area and 157 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 29 buses in the Kenosha urbanized area and 36 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 57 round-trip route miles and 17 buses in the Kenosha area and 76 route miles and 26 buses in the Racine area over 1972.

Source: SEWRPC.

increase from about 20.1 million per average weekday in 1972 to about 30.6 million in 2000, an increase of about 52 percent. About 68 percent of this increase may be expected to occur on the regional freeway system, where such travel may be expected to increase from about 6.2 million miles in 1972 to about 13.3 million miles in 2000, an increase of 115 percent. The anticipated arterial vehicle miles of travel on an average weekday under this alternative plan combination are identified by county and facility type in Table 194. The anticipated average daily traffic volumes on the arterial street and highway system in the Region by the year 2000 are shown on Map 38.

As shown in Table 195, the number of miles of arterial streets and highway facilities that could be expected to operate at or over design capacity under this combination of plan alternatives is expected to increase from about 318 miles in 1972 to about 552 miles in 2000, an increase of about 234 miles, or 74 percent. The locations of those arterial facilities that could be expected to operate at or above design capacity under assumed year 2000 conditions given this combination of alternative plan alternatives are identified on Map 39. Important arterial facilities in the Milwaukee urbanized area that may be expected to operate at or beyond congestion levels include the East-West and the North-South Freeways, W. Silver Spring Drive, W. Capitol Drive, N. 76th Street, and CTH A in Waukesha County. Beyond the Milwaukee urbanized area such key facilities as STH 33, STH 60, STH 36, CTH A in Racine County, STH 11, STH 50, and STH 31 would be adversely affected.

Allocation of the transit travel demand generated under the controlled decentralization land use plan to the transit-supported highway alternative transportation system plan indicates that, in the Milwaukee urbanized area, revenue passengers could be expected to increase from about 177,800 per average weekday, or 52.4 million per year, in 1972, to about 264,000 per average weekday, or 76.4 million per year in 2000, an increase of about 86,000 per average weekday, or 24.0 million per year, or 46 percent. The annual number of transit rides per capita in the Milwaukee urbanized area may be expected to increase from nearly 50 in 1972 to about 59 in 2000 (see Table 196).

In the Kenosha urbanized area, as shown in Table 197, the annual number of transit revenue passengers is expected to increase from about 503,000 in 1972 to about 7.1 million in 2000, an increase of about 6.6 million, or 1,306 percent. The annual number of rides per capita would increase from about six in 1972 to about 54 in 2000.

In the Racine urbanized area, the annual number of transit revenue passengers would be expected to increase from about 526,000 in 1972 to about 7.7 million in 2000, an increase of about 7.2 million, or 1,373 percent. The annual number of rides per capita would increase from about five in 1972 to about 53 in 2000.

Table 186

TRANSIT FACILITIES IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Facility Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Transit Round Trip Route Miles				
Primary	-	--	--	--
Secondary	--	--	--	--
Tertiary	59	57.0	96.6	116.0
Vehicle Requirements				
Peak Period	12	17.0	141.7	29.0
Midday	6	13.0	216.7	19.0
Racine Urbanized Area				
Transit Route Miles				
Primary	--	--	--	--
Secondary	-	--	--	--
Tertiary	81	75.8	93.6	156.8
Vehicle Requirements				
Peak Period	10	26.0	260.0	36.0
Midday	10	15.0	150.0	25.0

Source: SEWRPC.

Table 187

AUTOMOBILE AVAILABILITY WITHIN THE REGION: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population	1,810,700	409,300	22.6	2,219,300
Automobiles Available	704,600	295,900	42.0	1,000,500
Persons Per Automobile	2.57	- 0.35	- 13.6	2.22

Source: SEWRPC.

Table 188

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	1,055,500	23.7	280,100	26.5	1,335,600	23.5
Home-based Shopping	673,600	15.1	172,600	25.6	846,200	14.9
Home-based Other	1,532,600	34.3	432,400	28.2	1,965,000	34.6
Nonhome-based	779,800	17.5	183,700	23.6	963,500	16.9
School	418,900	9.4	157,800	37.7	576,700	10.1
Total	4,460,400	100.0	1,226,600	27.5	5,687,000	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 189

DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Mode of Travel	Internal Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Automobile Driver	2,884,700	64.7	843,500	29.2	3,728,200	65.6
Automobile Passenger	1,217,900	27.3	133,500	11.0	1,351,400	23.8
Transit Passenger	184,200	4.1	131,400	71.3	315,600	5.5
School Bus Passenger	173,600	3.9	118,200	68.1	291,800	5.1
Total	4,460,400	100.0	1,226,600	27.5	5,687,000	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 190

DISTRIBUTION OF INTERNAL TRANSIT TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Transit Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	70,900	38.5	37,300	52.6	108,200	34.3
Home-based Shopping	18,800	10.2	28,600	152.1	47,400	15.0
Home-based Other	28,300	15.4	74,300	262.5	102,600	32.5
Nonhome-based	13,100	7.1	- 300	- 2.3	12,800	4.1
School	53,100	28.8	- 8,500	- 16.0	44,600	14.1
Total	184,200	100.0	131,400	71.7	315,600	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 191

DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Person Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Home-based Work	984,600	24.0	242,800	24.7	1,227,400	24.2
Home-based Shopping . .	654,800	16.0	144,000	22.0	798,800	15.7
Home-based Other.	1,504,300	36.6	358,100	23.8	1,862,400	36.7
Nonhome-based	766,700	18.7	184,000	24.0	950,700	18.7
School.	192,200	4.7	48,100	25.0	240,300	4.7
Total	4,102,600	100.0	977,000	23.8	5,079,600	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 192

DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Trip Purpose Category	Internal Automobile Driver Trips Generated on An Average Weekday[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Home-based Work	840,800	29.2	258,400	30.7	1,099,200	29.5
Home-based Shopping . .	444,500	15.4	124,500	28.0	569,000	15.3
Home-based Other.	976,300	33.8	276,600	28.3	1,252,900	33.6
Nonhome-based	555,700	19.3	166,000	29.9	721,700	19.3
School.	67,400	2.3	18,000	26.7	85,400	2.3
Total	2,884,700	100.0	843,500	29.2	3,728,200	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 193

DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Vehicle Class	Total Vehicle Trips Generated on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Change
Automobile						
Internal	2,884,700	84.0	851,200	29.5	3,735,900	83.7
External[a]	111,900	3.2	62,800	56.1	174,700	3.9
Other[b].	34,200	1.0	14,200	41.5	48,400	1.1
Subtotal	3,030,800	88.2	928,200	30.6	3,959,000	88.7
Truck						
Internal	383,600	11.2	93,100	24.3	476,700	10.7
External.	13,800	0.4	4,900	35.5	18,700	0.4
Other[b].	6,000	0.2	2,800	46.7	8,800	0.2
Subtotal	403,400	11.8	100,800	25.0	504,200	11.3
Total	3,434,200	100.0	1,029,000	30.0	4,463,200	100.0

[a] *Includes light trucks, i.e., those under 6,000 pounds gross weight.*

[b] *Includes vehicle trips made by persons residing in group quarters and by nonresidents of the Region.*

Source: SEWRPC.

System Development Cost

The estimated capital costs of carrying out the transit-supported highway transportation system plan under the land use development assumptions contained in the controlled decentralization land use plan are identified in Table 198. The total cost of preserving, improving, and expanding the arterial street and highway system is estimated at about $2.6 billion. The cost of preserving, improving, and expanding the mass transit systems in the three urbanized areas is estimated at about $343.7 million. The total estimated cost of preserving, improving, and expanding the street and highway system, including nonarterial streets, and the transit system is estimated at about $3.6 billion.

SUMMARY

This chapter has presented a description of certain regional land use and development alternatives for southeastern Wisconsin to the year 2000. These regional development alternatives were prepared in response to the finding that further population growth, redistribution, and attendant urbanization in southeastern Wisconsin appear inevitable even though the rates and magnitude of such growth, redistribution, and attendant urbanization have declined somewhat in recent years. Two new regional land use plans were prepared and are described here: a controlled centralization land use plan and a controlled decentralization land use plan. For each of these alternative land use plans, two alternative transportation plans were prepared and are also described here: a highway-supported transit alternative plan and a transit-supported highway alternative plan—along with an analysis in each case of a "no build" alternative. Both the highway-supported transit and transit-supported highway alternative plans contain significant proposals for arterial street and highway and transit facility improvements. The "labels" attached to these alternatives refer only to the relative degree to which transit and highway improvements in the Milwaukee urbanized area were relied upon in the selection of design solutions.

Controlled Centralization Land Use Plan

The controlled centralization alternative regional land use plan is conceptually identical to the controlled existing trend alternative land use plan that became the adopted 1990 regional land use plan under the initial regional land use-transportation study. While relying on the urban land market to determine in large measure the location, intensity, and character of future urban development, the plan proposes to regulate in the public interest the effect of the market in order to provide for a more orderly, efficient, compact development pattern. Under

Table 194

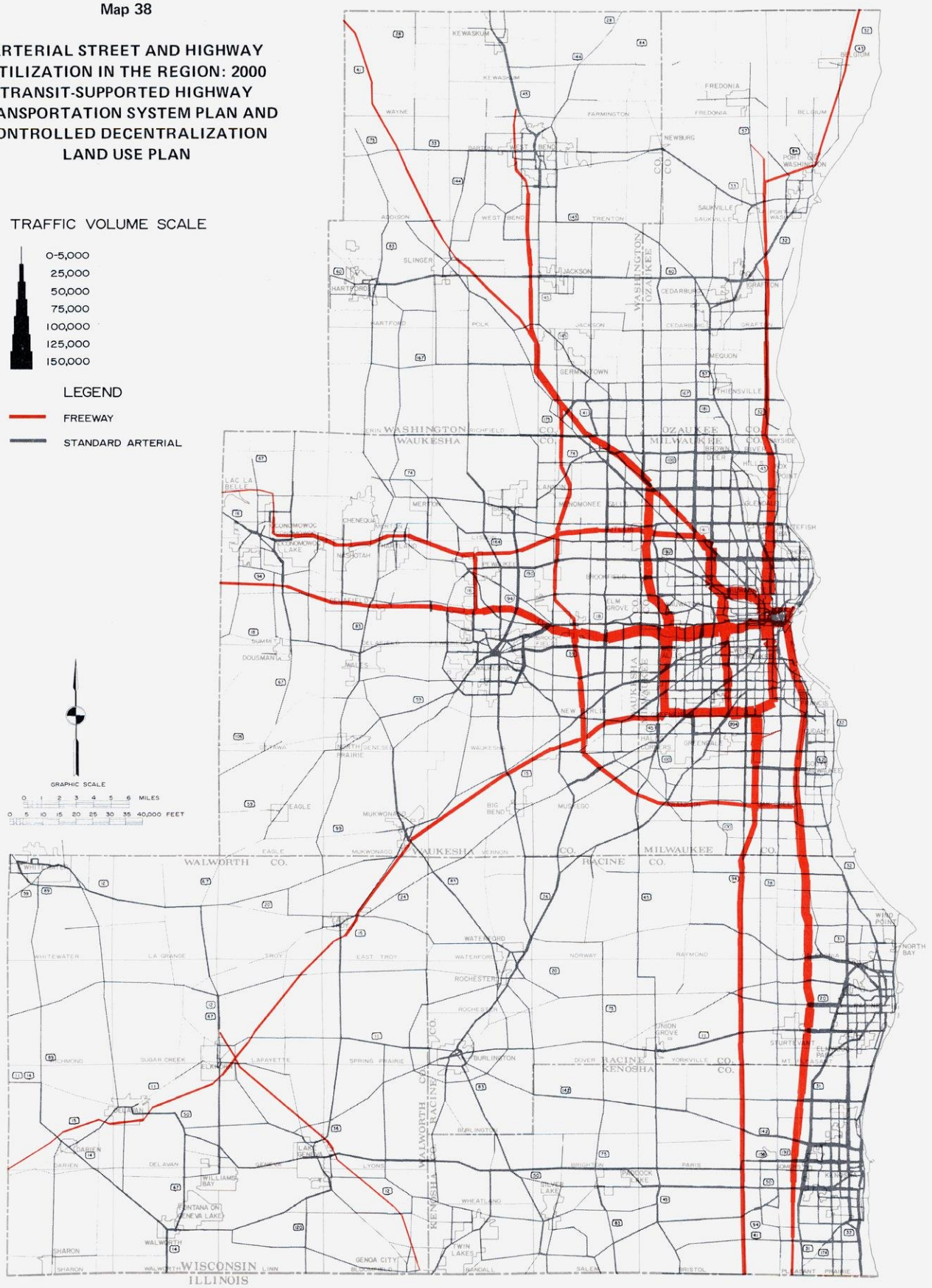
VEHICLE MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 1972 AND 2000
CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

County	Arterial Vehicle Miles of Travel on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha						
Freeway	382	26.8	456	119.4	838	27.3
Standard Arterial	1,046	73.2	1,187	113.5	2,233	72.7
Subtotal	1,428	100.0	1,643	115.1	3,071	100.0
Milwaukee						
Freeway	3,977	37.2	2,363	59.4	6,340	54.9
Standard Arterial	6,718	62.8	- 1,520	- 22.6	5,198	45.1
Subtotal	10,695	100.0	843	7.9	11,538	100.0
Ozaukee						
Freeway	223	26.2	359	161.0	582	32.6
Standard Arterial	627	73.8	579	92.3	1,206	67.4
Subtotal	850	100.0	938	110.4	1,788	100.0
Racine						
Freeway	415	22.9	728	175.4	1,143	36.5
Standard Arterial	1,398	77.1	587	42.0	1,985	63.5
Subtotal	1,813	100.0	1,315	72.5	3,128	100.0
Walworth						
Freeway	56	6.4	419	748.2	475	25.5
Standard Arterial	817	93.6	572	70.0	1,389	74.5
Subtotal	873	100.0	991	113.5	1,864	100.0
Washington						
Freeway	190	16.5	655	344.7	845	35.4
Standard Arterial	961	83.5	579	60.2	1,540	64.6
Subtotal	1,151	100.0	1,234	107.2	2,385	100.0
Waukesha						
Freeway	970	29.3	2,149	221.5	3,119	46.0
Standard Arterial	2,344	70.7	1,314	56.1	3,658	54.0
Subtotal	3,314	100.0	3,463	104.5	6,777	100.0
Southeastern Wisconsin Region						
Freeway	6,213	30.9	7,129	114.7	13,342	43.7
Standard Arterial	13,911	69.1	3,298	23.7	17,209	56.3
Total	20,124	100.0	10,427	51.8	30,551	100.0

Source: SEWRPC.

Map 38

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Arterial street and highway system utilization in the Region in the year 2000 may be expected to increase to nearly 31 million vehicle miles of travel on an average weekday under the transit-supported highway alternative transportation system plan, an increase of over 10 million vehicle miles, or about 52 percent, over 1972. About 13 million vehicle miles of travel, or 44 percent of the total, could be expected to occur on the freeway system, as opposed to 31 percent in 1972.

Source: SEWRPC.

Table 195

ARTERIAL STREET AND HIGHWAY SERVICE LEVELS IN THE REGION BY COUNTY: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

County	Existing 1972						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	243.1	9.0	14.7	9.7	22.0	13.3	279.8
Milwaukee	601.4	22.4	71.8	47.2	61.0	36.8	734.2
Ozaukee	234.7	8.7	10.1	6.6	5.5	3.3	250.3
Racine	310.0	11.5	19.1	12.6	20.3	12.3	349.4
Walworth	400.7	14.9	2.7	1.8	4.8	2.9	408.2
Washington	320.4	11.9	9.7	6.4	9.1	5.5	339.2
Waukesha	581.8	21.6	23.8	15.7	42.9	25.9	648.5
Total	2,692.1	100.0	151.9	100.0	165.6	100.0	3,009.6

County	Planned Increment						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent Change	Miles	Percent Change	Miles	Percent Change	Total Miles
Kenosha	- 16.1	- 6.6	67.1	456.5	27.3	124.1	78.3
Milwaukee	150.1	25.0	- 12.3	- 17.1	- 53.2	- 87.2	84.6
Ozaukee	25.5	10.9	23.9	236.6	10.0	181.8	59.4
Racine	33.5	10.8	49.7	260.2	- 18.0	- 88.7	65.2
Walworth	6.8	1.7	51.1	1,892.6	- 2.8	- 58.3	55.1
Washington	42.7	13.3	44.3	456.7	8.4	92.3	95.4
Waukesha	58.9	10.1	63.5	266.8	- 24.4	- 56.9	98.0
Total	301.4	11.2	287.3	189.1	- 52.7	- 31.8	536.0

County	Total 2000						
	Under Design Capacity[a]		At Design Capacity[b]		Over Design Capacity[c]		
	Miles	Percent of Total	Miles	Percent of Total	Miles	Percent of Total	Total Miles
Kenosha	227.0	7.6	81.8	18.6	49.3	43.7	358.1
Milwaukee	751.5	25.1	59.5	13.6	7.8	6.9	818.8
Ozaukee	260.2	8.7	34.0	7.7	15.5	13.7	309.7
Racine	343.5	11.5	68.8	15.7	2.3	2.0	414.6
Walworth	407.5	13.6	53.8	12.2	2.0	1.8	463.3
Washington	363.1	12.1	54.0	12.3	17.5	15.5	434.6
Waukesha	640.7	21.4	87.3	19.9	18.5	16.4	746.5
Total	2,993.5	100.0	439.2	100.0	112.9	100.0	3,545.6

[a] *Volume-to-capacity ratio 0.00-0.90; fully adequate and safest operational levels.*

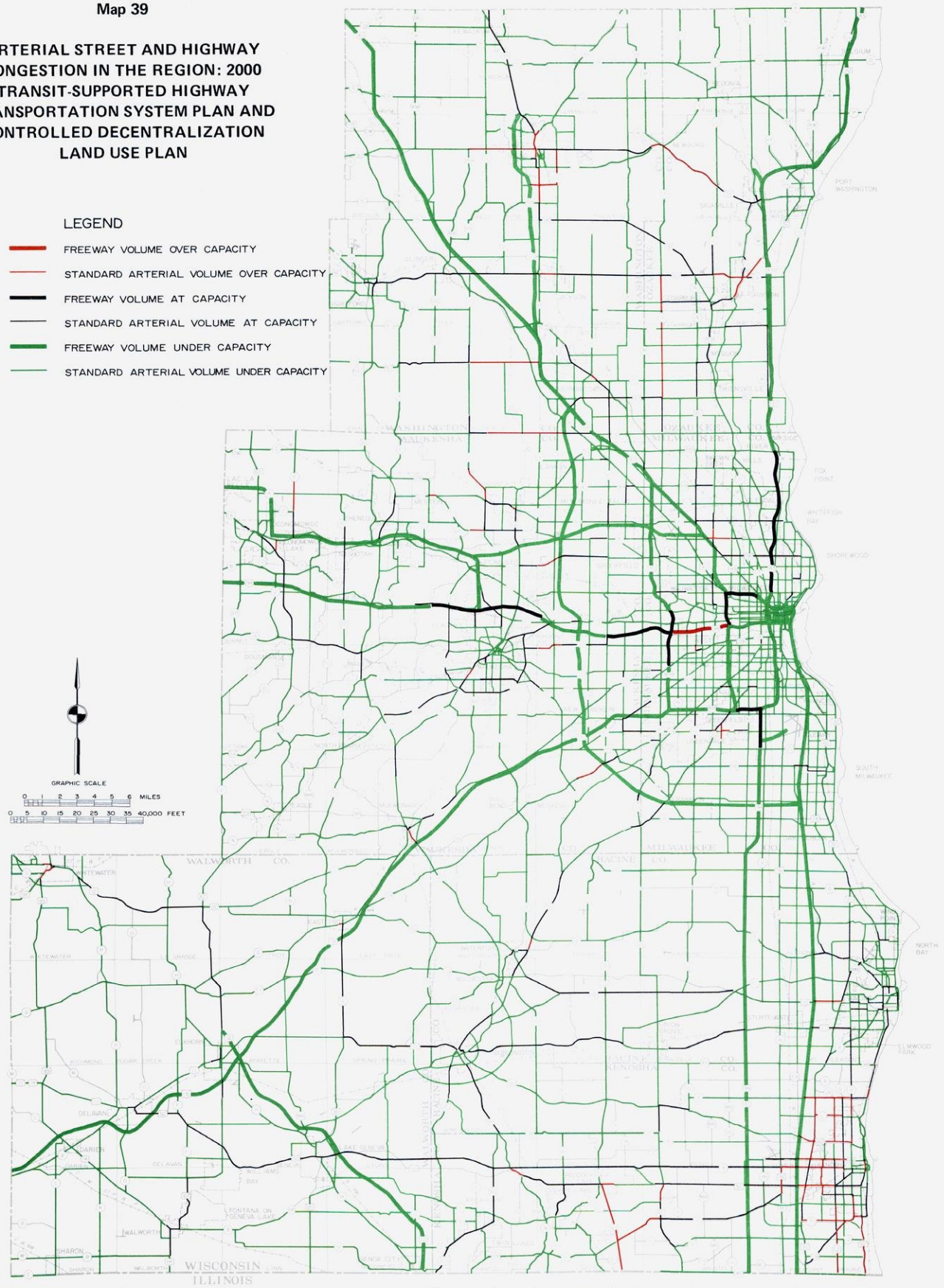
[b] *Volume-to-capacity ratio 0.91-1.10; adequate operational level.*

[c] *Volume-to-capacity ratio over 1.10; congested at times.*

Source: SEWRPC.

Map 39

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN AND CONTROLLED DECENTRALIZATION LAND USE PLAN



Under the transit-supported highway alternative transportation system plan, 552 miles of arterial street and highway facilities, or about 16 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, were operating at or over design capacity.

Source: SEWRPC.

Table 196

TRANSIT SYSTEM PERFORMANCE IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Population				
Urbanized Area	1,267,400	130,600	10.3	1,398,000
Service Area	1,043,600	253,100	24.3	1,297,300
Urbanized Area Population Served	1,043,600	253,100	24.3	1,297,300
Percent Urbanized Area Population Served	82.3	--	--	92.8
Nonurbanized Area Population Served	--	--	--	--
Utilization				
Daily Vehicle Miles				
Primary	1,410	54,140	3,839.7	55,550
Secondary	--[a]	--	--	50,480
Tertiary	60,670	50,020	82.4	110,690
Total	62,080	154,640	249.1	216,720
Daily Seat Miles	3,220,640	7,615,360	236.5	10,836,000
Daily Revenue Passengers	177,800	85,700	48.2	263,500
Daily Passenger Miles	1,175,700	476,200	40.5	1,651,900
Passengers Per Vehicle Mile	2.9	--	--	1.2
Percent Utilization Seat Miles Provided to Passenger Miles Used	36.5	--	--	15.2
Annual Revenue Passengers	52,417,800	23,997,200	45.8	76,415,000
Rides Per Capita	50.2	--	--	58.9

[a] *Included in tertiary.*

Source: SEWRPC.

this plan, new urban development would occur primarily at medium densities—that is, with new single family residential development averaging about four dwelling units per net residential acre and with new multiple family residential development averaging about 10 dwelling units per residential acre—with such development encouraged to occur in those areas of the Region readily provided with essential urban services, particularly centralized sanitary sewer, water supply, and transit services. New residential development under this alternative plan would occur largely in planned neighborhood units. New urban development would be discouraged in the delineated primary environmental corridors in order to preserve the best remaining elements of the natural resource base of southeastern Wisconsin. Finally, to the maximum extent possible, new urban development would be discouraged in the delineated prime agricultural lands, thereby preserving highly productive land for the continuing production of food and fiber.

The regional population distribution for the design year 2000 for the controlled centralization land use plan very closely approximates the county population forecasts set forth in Chapter III of this volume. Under this regional population distribution, the total resident population of the Region would increase over the 30-year period, 1970-2000, by about 463,000 persons. The population of Milwaukee County would decline by about 5,000 persons, while the collective population in the remaining six counties in the Region would increase by about 468,000 persons. Under this alternative plan, employment in the Region would increase by about 267,000 jobs, with employment in Milwaukee County increasing about 90,000 jobs and employment in the remaining six counties of the Region increasing by about 177,000 jobs.

Under the controlled centralization land use alternative, about 100 square miles of presently agricultural and other open lands would be converted to urban use,

Table 197

TRANSIT SYSTEM PERFORMANCE IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

Transit Service Characteristic	Existing 1972	Planned Increment		Total 2000
		Number	Percent Change	
Kenosha Urbanized Area				
Population				
Urbanized Area	86,500	63,200	73.1	149,700
Service Area	83,900	47,800	57.0	131,700
Urbanized Area Population Served	83,900	47,200	56.3	131,100
Percent Urbanized Area Population Served	97.0	--	--	87.6
Nonurbanized Area Population Served	-	-	--	600
Utilization				
Daily Vehicle Miles				
Primary	--	--	--	--
Secondary	-	--	--	--
Tertiary	1,140	3,630	318.4	4,770
Total	1,140	3,630	318.4	4,770
Daily Seat Miles	43,300	171,350	395.7	214,650
Daily Revenue Passengers	2,800	21,600	771.4	24,400
Daily Passenger Miles	9,610	46,190	480.6	55,800
Passengers Per Vehicle Mile	2.5	-	--	5.1
Percent Utilization—Seat Miles Provided to Passenger Miles Used	22.2	--	--	26.0
Annual Revenue Passengers	503,200	6,572,800	1,306.2	7,076,000
Rides Per Capita	6.0	--	--	53.7
Racine Urbanized Area				
Population				
Urbanized Area	115,200	37,300	32.4	152,500
Service Area	100,600	47,000	46.7	147,600
Urbanized Area Population Served	100,600	47,000	46.7	147,600
Percent Urbanized Area Population Served	87.3	--	--	96.8
Nonurbanized Area Population Served	--	-	--	--
Utilization				
Daily Vehicle Miles				
Primary	-	--	--	--
Secondary	--	--	--	--
Tertiary	1,560	4,860	311.5	6,420
Total	1,560	4,860	311.5	6,420
Daily Seat Miles	29,600	259,300	876.0	288,900
Daily Revenue Passengers	3,100	23,600	761.3	26,700
Daily Passenger Miles	10,920	56,280	515.4	67,200
Passengers Per Vehicle Mile	2.0	-	--	4.2
Percent Utilization—Seat Miles Provided to Passenger Miles Used	36.9	-	--	23.3
Annual Revenue Passengers	525,700	7,217,300	1,372.9	7,743,000
Rides Per Capita	5.2	-	--	52.5

Source: SEWRPC.

Table 198

ESTIMATED TRANSPORTATION SYSTEM CAPITAL COSTS IN THE REGION: 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN AND TRANSIT-SUPPORTED HIGHWAY TRANSPORTATION SYSTEM PLAN

System Component	Capital Cost		
	System Preservation (dollars)	System Improvement and Expansion (dollars)	Total (dollars)
Streets and Highways			
Arterial	230,630,000	2,327,624,000	2,558,254,000
Nonarterial	175,868,000	561,019,000	736,887,000
Subtotal	406,498,000	2,888,643,000	3,295,141,000
Transit			
Transitways	--	98,110,000	98,110,000
Exclusive Lanes	-	12,075,000	12,075,000
Stations and Terminals	4,852,000	55,215,000	60,067,000
Offices and Shops	13,518,000	--	13,518,000
Operating and Maintenance Equipment	86,325,000	73,575,000	159,900,000
Subtotal	104,695,000	238,975,000	343,670,000
Total	511,193,000	3,127,618,000	3,638,811,000

Source: SEWRPC.

representing an average annual rate of conversion of about 3.3 square miles. About 52 square miles would be converted to urban residential use, predominantly at medium population densities; and a total of 62 percent of all new urban residential development and 59 percent of the incremental population would be located within 20 miles of the central business district of Milwaukee. The controlled centralization plan thus would seek to discourage the diffusion of urban development throughout the outlying areas of the Region, both through maintaining rural development densities in these areas—that is, an average lot size of at least five acres for rural, single family housing development—and through encouraging higher density development in those areas of the Region that can be most readily provided with essential urban services.

Under the controlled centralization plan, a total of 22 major industrial centers and 17 major multipurpose commercial centers are proposed. In total, these centers would provide employment for about 235,000 persons and 115,000 persons, respectively, or about 42 percent of the forecast employment in the commercial and industrial employment groups. Of the 22 planned major industrial centers, 17 existed in 1970 and five are proposed new centers. These five proposed new centers are: Kenosha-West, Milwaukee-Granville, Oak Creek, Burlington, and Waukesha. Of the 17 planned major retail and service centers, 11 existed in 1970 and were developed at least to some degree; one—Northridge in the City of Milwaukee—has been developed since 1970, and five are proposed new centers—Kenosha-West, Oak Creek, Racine-West, West Bend, and Waukesha.

Under the controlled centralization plan, about 28 square miles of land would be converted to transportation land use, including lands needed for all communication and utility uses; harbor, railroad, and airport uses; truck terminals; off-street parking associated with other land use development; and streets and highways. In addition, about four square miles of land would be converted to governmental and institutional land use.

Areawide outdoor recreational needs under the controlled centralization land use plan would be accommodated at 29 major park and outdoor recreation centers. Of these 29 centers, all but two—Sugar Creek in Walworth County and Paradise Valley in Washington County—existed in 1970. One existing undeveloped center—Monches in Waukesha County—is recommended to be expanded, while eight of the existing centers are recommended to be developed—Silver Lake in Kenosha County, Bender in Milwaukee County, Meekwon and Harrington Beach in Ozaukee County, Cliffside and Ela in Racine County, Pike Lake in Washington County, and Monches in Waukesha County. The small increment proposed in recreational land of regional significance—only about 1,400 acres—is due to the significant progress made since adoption of the initial regional land use plan toward acquisition of the 12 proposed major outdoor recreation centers identified in that plan.

Under the controlled centralization land use plan, all of the remaining primary environmental corridors in the Region, totaling about 534 square miles, or about 20 percent of the total area of the Region, would be preserved and protected from urban encroachment. These primary environmental corridors consist of elongated areas which encompass the most important and highest quality elements of the natural resource base, including the best remaining surface waters and associated undeveloped floodlands and shorelands; woodlands, wetlands, and wildlife habitat; groundwater recharge areas; existing and potential park and open space sites; and scenic, historic, scientific, and cultural sites.

Agricultural and other open land uses would be reduced by about 100 square miles, of which about 80 square miles presently are in agricultural use and the remaining 20 square miles are other open urban and rural land uses. About nine square miles of prime agricultural land would be converted under the controlled centralization plan. This represents about 1.5 percent of the remaining 633 square miles of such land throughout the Region.

Under the controlled centralization plan, population density within the developed urban area of the Region would continue to decline from year 1970 level of about 4,300 persons per square mile to year 2000 level of about 3,200 persons per square mile. The current rate of decline would be reduced, however, by implementing the proposals in the controlled centralization plan to develop the majority of new residential land uses in the Region at medium instead of low densities. Under this plan, an increase in the resident population of about 26 percent would be accompanied by an increase in urban land area of about 20 percent.

Under the controlled centralization land use plan, virtually all new urban development in the Region would be served by public centralized sanitary sewer and water supply facilities. By the year 2000 under this plan, about 630 square miles, or about 92 percent of the developed area of the Region, and about 2.09 million persons, or about 94 percent of the resident population of the Region, would be so served.

Controlled Decentralization Land Use Plan

The controlled decentralization alternative regional land use plan, like the controlled centralization plan, represents a conscious continuation of historic development trends within the Region, emphasizing, however, the most recent development trends observed over the period 1963 to 1970. Under this plan, new urban development would be encouraged to take place both in areas which can be readily provided with urban services such as sanitary sewer, water supply, and transit and, following the trends in land use development over the 1963-1970 period, in areas beyond the existing and planned urban service areas covered by soils suitable for use of onsite septic tank sewage disposal systems. The latter type of development would not occur in planned neighborhood units. Like the controlled centralization plan, no new urban development would be allocated to the delineated primary environmental corridors in order to preserve the best remaining elements of the natural resource base of southeastern Wisconsin. In addition, in order to mitigate the effects of low-density suburban development on the delineated prime agricultural lands, new urban development was allocated to such lands only where existing areas of nonprime agricultural and other open lands were insufficient to accommodate the forecast residential land use demand.

The regional population distribution for the design year 2000 under this alternative plan differs from the county population forecasts set forth in Chapter III of this volume. Under this alternative regional population distribution, it was assumed that the trend in population decline in Milwaukee County observed over the period from 1970 through 1974 would continue to the year 2000. Under this assumption, the resident population of Milwaukee County by the year 2000 would approximate 900,000 persons, or about 156,000 persons less than the 1970 level, and the collective resident population in the remaining six counties of the Region would increase by about 619,000 persons. Under this alternative plan, employment in the Region would increase by about 267,000 jobs, with employment in Milwaukee County increasing by about 15,000 jobs and employment in the remaining six counties of the Region increasing by about 252,000 jobs.

Under this alternative plan, about 242 square miles of presently agricultural and other open lands would be converted to urban use, representing an average annual rate of conversion of about 8.1 square miles. About 170 square miles would be converted to urban residential use, with about 60 square miles occurring at medium population densities and the remaining 110 square miles occurring at suburban residential population densities, the latter having an average net lot area for a single family home of about two acres. A total of 27 percent of all new urban residential development and 46 percent of the incremental population under this alternative plan would be located within 20 miles of the central business district of Milwaukee. Unlike the controlled centralization plan, the controlled decentralization plan would not discourage the diffusion of urban development throughout the outlying areas of the Region, but rather would seek to accommodate such development.

Under the controlled decentralization plan, a total of 22 major industrial centers and 19 major multipurpose commercial centers are proposed. In total, these centers would provide employment for about 234,500 and 120,500 persons, respectively, for a total of about 43 percent of the forecast employment in the commercial and industrial groups. Of the 22 planned major industrial centers, 17 existed in 1970 and five are proposed new centers. These five new centers are: Kenosha-West, Cedarburg-Grafton, Oak Creek, Burlington, and Waukesha. Unlike the controlled centralization plan, the controlled decentralization plan does not propose to expand the developing industrial center in the Granville area of Milwaukee, and that center would not develop into a major regional employment center. Of the 19 planned major retail and service centers, 17 existed

in 1970 and eight are proposed new centers. Northridge in the City of Milwaukee has been built since 1970, and seven are proposed new centers: Kenosha-West, Cedarburg-Grafton, Racine, the West Bend Central Business District (CBD), Waukesha CBD, Burlington CBD, and Oconomowoc CBD. The proposed major retail and service center at Oak Creek in the controlled centralization plan would not be developed under the controlled decentralization plan.

Under the controlled decentralization plan, about 53 square miles of land would be converted to transportation land use, including lands needed for all communication and utility uses; harbor, railroad, and airport uses; truck terminals; off-street parking associated with other land use development; and streets and highways. Much of the additional land needed for transportation use under this alternative plan may be attributed to the extensive system of minor and collector streets needed to serve the very low-density residential development provided for in this alternative plan. In addition, about four square miles of land would be converted under this plan to governmental and institutional land use.

The major outdoor recreation and primary environmental corridor elements of the controlled decentralization plan are identical to those included under the controlled centralization plan. Areawide outdoor recreational needs would thus be accommodated at 29 major park and outdoor recreation centers, including two new centers—Sugar Creek in Walworth County and Paradise Valley in Washington County. All of the remaining 534 square miles of primary environmental corridor in the Region would be preserved and protected from urban encroachment.

Agricultural and other open land uses would be reduced by about 242 square miles, of which about 220 square miles are presently in agricultural use and the remaining 22 square miles in other open urban and rural land uses. About 34 square miles of prime agricultural land would be converted under the controlled decentralization plan. This represents about 6 percent of the remaining 633 square miles of such land throughout the Region.

Under the controlled decentralization land use plan, the population density within the developed urban area of the Region, reflecting existing trends, would continue to decline from a 1970 level of about 4,300 persons per square mile to a 2000 level of about 2,300 persons per square mile. Thus, under this alternative plan, the steady decline in urban density since 1920 would continue unabated under the influence of the urban land market. Under this plan an increase in resident population of about 26 percent would be accompanied by an increase in urban land area of about 46 percent.

The controlled decentralization land use plan would propose to serve about 39 percent of the new urban development and 80 percent of the incremental population in the Region with public centralized sewer and water supply service. The remaining 61 percent of new urban development and 20 percent of the incremental population would rely on private onsite sewage disposal and water supply systems. Under this plan, about 608 square miles, or about 63 percent of the developed area of the Region, and about 1.97 million persons, or about 89 percent of the resident population of the Region, would be served with public centralized sanitary sewer and water supply facilities by the year 2000.

"No Build" Transportation System Plans

One possible course of action for the provision of transportation services and facilities in the Region would be to make no major improvements to the existing transportation system, thus attempting to serve probable future travel demand within the Region entirely by means of the existing arterial street and highway and mass transit facilities. This "no build" alternative not only represents a possible policy alternative for the Region but, from a technical standpoint, becomes the point of departure for the testing and design of alternative transportation plans which do incorporate facility and service improvements.

The preparation of a "no build" alternative transportation system must incorporate a definition of an initial base year transportation system. After considering several alternative ways to define that initial base year system, the Commission and its advisory committees determined that the base year system would include, for arterial streets and highways, those arterial streets and highways completed and open to traffic as of July 1, 1975, plus the following four "committed" freeway facilities: the Rock Freeway—STH 15—from STH 12 in the City of Elkhorn to the Rock County line; IH 43 from its current terminus at STH 57 near the Village of Grafton to the Sheboygan County line; IH 794 between its present eastern terminus at N. Jackson Street in the City of Milwaukee south over the high level Milwaukee Harbor Bridge, now under construction, to a connection with the surface arterial street system at Carferry Drive; and the Airport Spur Freeway. This definition excludes all of the 17 miles of previously planned freeways approved by the Milwaukee County electorate in the November 1974 referendum. It should be noted that the decision to exclude from the "no build" alternative many arterial facilities "committed" to construction by various political and administrative actions and, indeed, some facilities for which the right-of-way has actually been acquired and cleared and facility construction initiated, is in sharp contrast to the decision in the initial study to include all "committed" facilities in the initial system to be tested.

The total arterial street and highway system in the Region would increase from about 3,010 miles in 1972 to about 3,279 miles in 2000, an increase of 269 miles, or nearly 9 percent. The number of miles of freeways would increase from 162 in 1972 to 237 in 2000, an increment of 75 miles, or 46 percent. The number of miles of four-lane standard arterials would decrease from 405 in 1972 to 392 in 2000, a decrease of 13 miles,

or about 3 percent, while the number of miles of six-lane standard arterials would increase from 72 in 1972 to 136 in 2000, an increase of 64 miles, or 89 percent.

The regional transit system for the base year was defined as the existing intraregional mass transit systems operating within the three urbanized areas of the Region—Milwaukee, Racine, and Kenosha—on July 1, 1975, in addition to restoration of service in the Milwaukee urbanized area to a level approximating that provided in 1972, as well as the addition of new primary modified rapid transit service utilizing the high level Milwaukee Harbor Bridge and serving six additional outlying park-and-ride lot and transit station locations. In the Kenosha and Racine urbanized areas, the base year transit system was assumed to include programmed improvements in service levels in terms of headways and route changes and additions as recommended in published transit development programs for these areas.

Under this base year transportation system, the number of transit round trip route miles in the Milwaukee urbanized area would increase from about 1,061 in 1972 to 1,560 in 2000, an increase of 499 miles, or 47 percent. The number of primary transit facility round trip route miles, consisting entirely of buses utilizing available freeway facilities, would increase from 150 in 1972 to 271 in 2000, an increase of 121 miles, or 81 percent. A total of 16 outlying transit stations and park-and-ride lots would be provided, four more than were provided in 1972. The number of buses required to serve the Milwaukee urbanized area under the "no build" transportation system plan and controlled centralization land use plan would approximate the fleet size used in 1972, or about 440 buses. Fewer buses—about 370—would be required to serve the controlled decentralization plan because of the reduced population and transit loadings in the Milwaukee area attendant to that plan.

In the Kenosha urbanized area, the number of round trip route miles would increase from 59 in 1972 to 100 in 2000, an increase of 41 miles, or 70 percent, while the number of buses would increase from 12 in 1972 to 18 in 2000, an increase of six, or 50 percent. In the Racine urbanized area, the number of transit round trip route miles would increase from 81 in 1972 to 133 in 2000, an increase of 52, or 65 percent, while the number of buses required would increase from 10 in 1972 to 26 in 2000, an increase of 16, or 160 percent.

The anticipated number of automobiles to be available in the year 2000 to the resident population in the Region under the "no build" alternative transportation plan would range from 1,041,000 under the controlled centralization plan, an increase of about 336,000, or 48 percent, over the 1972 level of 705,000, to 1,051,000 under the controlled decentralization land use plan, an increase of 346,000, or about 49 percent, over the 1972 level. The total number of internal person trips generated on an average weekday under the "no build" transportation plan alternative would range from 5.7 million under the controlled decentralization land use plan, an increase of about 1.2 million, or 29 percent, over the 1972 level of 4.5 million trips, to about 5.8 million under the controlled centralization land use plan, an increase of about 1.3 million, or 31 percent, over the 1972 level. Average weekday transit trips under the "no build" alternative plan could be expected to range from 148,000 under the controlled decentralization land use plan, a decrease of 36,000, or 20 percent, from the 1972 level of 184,000, to 187,000 under the controlled centralization land use plan, an increase of 3,000, or 2 percent, over the 1972 level. The proportion of total trips made by transit in the Region under the "no build" alternative plan would range from 2.6 percent under the controlled decentralization plan to 3.2 percent under the controlled centralization plan. In 1972, transit trips comprised 4.1 percent of the total such trips.

Total vehicle miles of travel on the arterial street and highway system under the "no build" alternative plan may be expected to range from 31.8 million under the controlled decentralization plan, an increase of 11.7 million, or 58 percent, over the 1972 level of 20.1 million miles, to 32.1 million under the controlled centralization plan, an increase of 12.0 million, or 60 percent, over the 1972 level. Vehicle miles of travel on the regional freeway system under the "no build" alternative plan may be expected to range from 11.7 million under the controlled centralization land use plan, an increase of 5.5 million, or 88 percent, over the 1972 level of 6.2 million, to 11.3 million under the controlled decentralization land use plan, an increase of 5.1 million, or 81 percent, over the 1972 level. The number of arterial miles that may be expected to operate over design capacity, that is, at congestion levels, under the "no build" alternative plan may be expected to range from 486 miles under the controlled centralization land use plan, an increase of 320 miles, or 194 percent over the 1972 level of 166 miles, to 533 miles under the controlled decentralization land use plan, an increase of 367 miles, or 222 percent, over the 1972 level.

In the Milwaukee urbanized area, the number of annual transit revenue passengers under the "no build" alternative plan may be expected to range from 48.9 million under the controlled centralization land use plan, a decrease of 3.5 million, or 7 percent, from the 1972 level of 52.4 million, to 37.5 million under the controlled decentralization land use plan, a decrease of 14.9 million, or 28 percent, from the 1972 level.

In the Kenosha urbanized area, the number of annual transit revenue passengers under the "no build" alternative plan may be expected to range from 1.7 million under the controlled centralization land use plan, an increase of 1.2 million, or 234 percent, over the 1972 level of 503,000, to 1.8 million under the controlled decentralization land use plan, an increase of 1.3 million, or 252 percent, over the 1972 level.

In the Racine urbanized area, the number of annual transit revenue passengers under the "no build" alternative plan may be expected to range from 3.5 million under the controlled centralization land use plan, an increase of 3 million, or 557 percent, over the 1972

level of 526,000, to 3.5 million under the controlled decentralization land use plan, an increase of 3.0 million, or 557 percent, over the 1972 level.

The estimated capital cost of carrying out the "no build" transportation system plan to serve the land use pattern proposed under the controlled centralization land use plan is $1,476.9 million, including $1,386.0 million for new and improved arterial street and highway facilities; $86.9 million for improvements to the transit system in the Milwaukee urbanized area; $1.8 million for improvements to the transit system in the Kenosha urbanized area; and $2.2 million for improvements to the transit system in the Racine urbanized area.

The estimated capital cost of carrying out the "no build" transportation system plan to serve the land use pattern proposed under the controlled decentralization land use plan is $1,583.6 million, including $1,507.2 million for new and improved arterial street and highway facilities; $72.4 million for improvements to the transit system in the Milwaukee urbanized area; $1.8 million for improvements to the transit system in the Kenosha urbanized area; and $2.2 million for improvements to the transit system in the Racine urbanized area.

Highway-Supported Transit Transportation System Plan

The highway-supported transit alternative transportation system plans developed to serve and support the controlled centralization and controlled decentralization land use plans are composed of significant improvements to the existing transit systems in the three urbanized areas in the Region and of improvements to the existing arterial street and highway system throughout the remainder of the Region. Capital investment and operating subsidies to transit are emphasized in these alternatives in order to limit further investment in urban arterial street and highway improvements to such improvements as may require no or very minimal right-of-way acquisition and only limited residential, commercial, and industrial displacement.

In the Milwaukee urbanized area, the primary level of transit service under the highway-supported transit alternative plans would be provided by transit vehicles operating over exclusive, fully grade separated rights-of-way—that is, in rapid transit service—and over available freeways—that is, in modified rapid transit service. As applied to serve the controlled centralization land use plan, the highway-supported transit alternative proposes establishment of exclusive transit rights-of-way in the major East-West travel corridor emanating from central Milwaukee County; along the partially Milwaukee County-owned and partially abandoned Chicago and North Western Railroad right-of-way in the corridor between the Milwaukee central business district and W. Brown Deer Road in the Village of Brown Deer, termed the East Side Transitway; over the abandoned electric interurban railway right-of-way paralleling the Zoo Freeway between W. Schlinger Avenue in the City of West Allis and W. Janesville Road in the Village of Hales Corners; along the Chicago and North Western Railroad right-of-way between the south end of the Milwaukee Harbor Bridge and Drexel Boulevard in the City of South Milwaukee; along the Stadium Freeway South corridor between W. National Avenue and W. Lincoln Avenue in the Village of West Milwaukee; and along the Park Freeway West corridor between the North-South Freeway and N. Sherman Boulevard in the City of Milwaukee. These transitways would total about 37 miles in length.

As applied to serve the controlled decentralization plan, the highway-supported transit alternative proposes only the construction of the major East-West, East Side, and Zoo Transitways, which would total about 20 miles in length.

The highway-supported transit alternatives also propose the creation of an exclusive network of transit vehicles operating in limited stop, express service on arterial streets in mixed traffic or on exclusive transit lanes reserved for this purpose on the arterial streets. A total of 40.8 miles of reserved lanes for such express transit service would be provided under these alternative transportation plans. The secondary express transit routes are located to provide crosstown service, as well as service oriented to the Milwaukee central business. Finally, these alternative plans also propose a tertiary level of service consisting of a grid of local bus routes operating over arterial and collector streets. In some low-density residential areas the plans propose the establishment of demand-response service. Importantly, the highway supported transit alternative plans seek to induce transit utilization through two important pricing actions: the establishment of a 25 cent base fare in the Milwaukee urbanized area and the establishment of minimum all day parking fees in the Milwaukee central business district at a level equivalent to the cost of a round trip transit fare, or 50 cents.

In the Kenosha and Racine urbanized areas, the transit systems proposed under the highway-supported transit alternative plans include, in addition to the existing systems and changes to those systems identified in published transit development programs, extensions to provide service to the anticipated year 2000 urbanized area in each case and from urbanized areas to the University of Wisconsin-Parkside Campus.

Under the highway-supported transit alternative, the number of transit round trip route miles provided in the Milwaukee urbanized area would range from 3,076 under the controlled decentralization land use plan, an increase of 2,015, or 190 percent, over the 1972 level of 1,061, to 3,130 miles under the controlled centralization land use plan, an increase of 2,069 miles, or 195 percent, over the 1972 level. The number of primary transit round trip route miles, consisting of buses utilizing the exclusive transitways and available freeway facilities, would range from 1,082 miles under the controlled centralization land use plan, an increase of 932 miles, or 621 percent, over the 1972 level of 150 miles, to 1,051 miles under the controlled decentralization land use plan, an increase of 901 miles, or 601 percent, over the 1972 level. The number of secondary, or express, transit round trip route miles under the highway-supported transit plan would

range from 357 miles under the controlled centralization land use plan, an increase of 301 miles, or 538 percent, over the 1972 level of 56 miles, to 354 miles under the controlled decentralization land use plan, an increase of 298 miles, or 532 percent, over the 1972 level.

Also in the Milwaukee urbanized area, the number of public transit stations and park-and-ride lots would range from 42 under the controlled centralization land use plan, 38 more than were provided in 1972, to 33 under the controlled decentralization land use plan, or 29 more than were provided in 1972. The number of buses required in the Milwaukee urbanized area would approximate 1,460 when the highway-supported transit plan is designed to serve the controlled centralization land use plan, an increase of 1,020, or 231 percent, over the 1972 level of 442 buses. When the highway-supported transit plan is designed to serve the controlled decentralization plan, fewer buses—about 1,340—would be required because of the reduced population and transit loadings in the Milwaukee area.

In the Kenosha urbanized area, the number of round trip route miles would increase from 59 in 1972 to 116 in 2000, an increase of 57 miles, or 98 percent, while the number of buses would increase from 12 in 1972 to 29 in 2000, an increase of 17, or 142 percent. In the Racine urbanized area, the number of transit round trip route miles would increase from 81 in 1972 to 157 in 2000, an increase of 76, or 94 percent, while the number of buses required would increase from 10 in 1972 to 36 in 2000, an increase of 26, or 260 percent.

Under the highway-supported transit alternative system plans, the arterial street and highway system would be selectively improved to assist in accommodating the future travel demand. In addition to the four "committed" freeway improvements identified under the "no build" alternative plan, improvements to the regional freeway system under the highway-supported transit alternative plan would consist of the following: the provision of additional traffic lanes along IH 43 from Silver Spring Drive north to Mequon Road; the provision of additional traffic lanes along the Stadium Freeway South from IH 94 to W. National Avenue; the construction of the West Bend Freeway; the conversion of USH 41 from an expressway to a freeway in Washington County; and completion of the conversion of USH 16 to a freeway in Waukesha County as far west as STH 67.

The total arterial street and highway system in the Region under this alternative would increase from about 3,010 miles in 1972 to about 3,436 miles in 2000, an increase of 426 miles, or nearly 14 percent. The number of miles of freeways would increase from 162 in 1972 to 278 in 2000, an increment of 116 miles, or 71 percent. The number of miles of four-lane standard arterials would range from 786 under the controlled decentralization land use plan, an increase of 381 miles, or 94 percent, over the 1972 level of 405 miles, to 747 miles under the controlled centralization land use plan, an increase of 342 miles, or 84 percent, over the 1972 level. The number of miles of six-lane standard arterials would range from 150 miles under the controlled decentralization land use plan, an increase of 78 miles, or 108 percent, over the 1972 level of 72 miles, to 140 miles under the controlled centralization land use plan, an increase of 68 miles, or 94 percent, over the 1972 level.

The anticipated number of automobiles to be available in the year 2000 to the resident population of the Region under the highway-supported transit alternative transportation plan would range from 994,000 under the controlled decentralization plan, an increase of 289,000, or 41 percent, over the 1972 level of 705,000, to 953,000 under the controlled centralization land use plan, an increase of 248,000, or 35 percent, over the 1972 level. The total number of internal person trips generated on an average weekday under the highway-supported transit alternative would approximate 5.7 million under both alternative land use plans, an increase of about 1.2 million, or 28 percent, over the 1972 level of about 4.5 million trips. Average weekday transit trips under the highway-supported transit alternative plan could be expected to range from 575,000 under the controlled decentralization land use plan, an increase of 391,000, or 212 percent, over the 1972 level of 184,000, to 693,000 under the controlled centralization land use plan, an increase of 509,000, or 276 percent, over the 1972 level. The proportion of total transit trips made by transit in the Region under the highway-supported transit alternative plan would range from 10.1 under the controlled decentralization plan to 12.2 under the controlled centralization plan. In 1972 transit trips comprised 4.1 percent of the total internal trips.

Total vehicle miles of travel on the arterial street and highway system under the highway-supported transit alternative plan may be expected to range from 28.6 million under the controlled decentralization land use plan, an increase of 8.5 million, or 42 percent, over the 1972 level of 20.1 million miles, to 28.0 million under the controlled centralization land use plan, an increase of 7.9 million, or 39 percent, over the 1972 level. Vehicle miles of travel on the regional freeway system under the highway-supported transit alternative may be expected to range from 10.3 million under the controlled centralization land use plan, an increase of 4.1 million, or 66 percent, over the 1972 level of 6.2 million, to 10.2 million under the controlled decentralizaton land use plan, an increase of 4.0 million, or 64 percent, over the 1972 level. The number of arterial miles that may be expected to operate over design capacity, that is, at congestion levels, under the highway-supported transit alternative plans may be expected to range from 190 miles under the controlled decentralization land use plan, an increase of 24 miles, or 15 percent, over the 1972 level of 166 miles, to 148 miles under the controlled centralization land use plan, a decrease of 18 miles, or 10 percent, from the 1972 level.

In the Milwaukee urbanized area, the number of annual transit revenue passengers under the highway-supported transit alternative plans may be expected to range from 186.5 million under the controlled centralization land use plan, an increase of 134.1 million, or 256 percent,

over the 1972 level of 52.4 million, to 151.7 million under the controlled decentralization land use plan, an increase of 99.3 million, or 189 percent, over the 1972 level. Under the highway-supported transit alternative plan, transit ridership under the controlled centralization plan would approximate the level achieved in 1952, while under the controlled decentralization plan, transit ridership would approximate the level achieved in 1954.

In the Kenosha urbanized area, the number of annual transit revenue passengers under the highway-supported transit alternative plan would be expected to range from 6.7 million under the controlled centralization land use plan, an increase of 6.1 million, or 1,226 percent, over the 1972 level of 503,000, to 7.1 million under the controlled decentralization land use plan, an increase of 6.6 million, or 1,306 percent, over the 1972 level. Under both highway-supported transit alternative plans, transit ridership would approximate the level achieved in 1950.

In the Racine urbanized area, the number of annual transit revenue passengers under the highway-supported transit alternative plan could be expected to range from 7.6 million under the controlled centralization land use plan, an increase of 7.1 million, or 1,345 percent over the 1972 level of 526,000, to 7.7 million under the controlled decentralization land use plan, an increase of 7.2 million, or 1,373 percent, over the 1972 level. Under both highway-supported transit alternative plans, transit ridership would approximate the level achieved in 1953.

The estimated capital cost of carrying out the highway-supported transit transportation system plan to serve the land use pattern proposed under the controlled centralization land use plan is $2,673.8 million, including $2,217.4 million for new and improved arterial street and highway facilities; $456.3 million for improvements to the transit system in the Milwaukee urbanized area; $2.6 million for improvements to the transit system in the Kenosha urbanized area, and $3.5 million for improvements to the transit system in the Racine urbanized area.

Transit-Supported Highway Transportation System Plans

The transit-supported highway alternative transportation system plans developed to serve and support the controlled centralization and controlled decentralization land use plans are composed of significant improvements to the existing transit systems in the three urbanized areas of the Region and to the existing arterial street and highway system throughout the Region. Under the transit-supported highway alternative, however, the emphasis in capital investment in the Milwaukee urbanized area would shift from heavy emphasis on providing transit facility and service improvements to greater emphasis upon further investment in arterial street and highway improvements. In addition, the transit-supported highway transportation alternatives do not embody public transit operating subsidies greater than those already provided through the establishment of a 50 cent base fare in the Milwaukee urbanized area, nor does the alternative embody actions to establish a minimum all day parking fee in the Milwaukee central business district at a level equivalent to the cost of a round trip transit fare. Beyond the Milwaukee urbanized area, the transit-supported highway transportation system plans are similar to the highway-supported transit system plans, with very few exceptions.

Under the transit-supported highway alternative system plans, the arterial street and highway system would be selectively improved to accommodate the future travel demand. In addition to those freeway improvements identified under the highway-supported transit alternative plans, improvements to the regional freeway system under the transit-supported highway alternative system plans would consist of the following: extension of the Stadium Freeway South from W. National Avenue to an interchange with the Airport Freeway; construction of a USH 16 Oconomowoc Bypass Freeway from STH 67 around the eastern and northern sides of the City of Oconomowoc; construction of an eastern extension of USH 16 as the Bay Freeway from STH 190 in the Village of Pewaukee to the Fond du Lac Freeway; construction of an extension of the Lake Freeway south from Carferry Drive in the City of Milwaukee to the Illinois State line; construction of the Airport Spur Freeway from the North-South Freeway to General Mitchell Field; completion of the Milwaukee downtown freeway loop, including the northern extension of the Lake Freeway from IH 794 to the Juneau interchange as a four-lane facility and completion of the Park Freeway east from its current terminus at N. Milwaukee Street to the Juneau interchange, also as a four-lane facility; completion of the western extension of the Park Freeway to an interchange with the Stadium Freeway in the vicinity of N. 46th Street and W. North Avenue and of the northern extension of the Stadium Freeway from its current terminus at W. Lloyd Street to and through the interchange with the Park Freeway and connecting with the Fond du Lac Freeway; and construction of a metropolitan Belt Freeway from the proposed Lake Freeway in the City of Oak Creek, west through southern Milwaukee County and north through eastern Waukesha and southern Washington Counties to an interchange with USH 41-45 in the Village of Germantown.

The total arterial street and highway system in the Region under this alternative would increase from about 3,010 miles in 1972 to about 3,546 miles in 2000, an increase of 536 miles, or 18 percent. The number of miles of freeways would increase from 162 in 1972 to 375 in 2000, an increment of 212 miles, or 131 percent. The number of miles of four-lane standard arterials would range from 777 miles under the controlled decentralization land use plan, an increase of 372 miles, or 92 percent, over the 1972 level of 405 miles, to 751 miles under the controlled centralization land use plan, an increase of 346 miles, or 85 percent, over the 1972 level. The number of miles of six-lane standard arterials would range from 102 under the controlled centralization land use plan, an increase of 30 miles, or 41 percent, from the 1972 level of 72 miles, to 101 miles under the controlled decentralization land use plan, an increase of 29 miles, or 40 percent, from the 1972 level.

In the Milwaukee urbanized area, the primary level of transit service under the transit-supported highway alternative plans would consist of transit vehicles operating over exclusive rights-of-way—that is, in rapid transit service—and over available freeways—that is, in rapid transit service—and over available freeways—that is, in modified rapid transit service. As applied to serve the controlled centralization land use plan, the transit-supported highway alternative proposes establishment of exclusive transit rights-of-way in the major East-West travel corridor emanating from central Milwaukee County; along the partially Milwaukee County-owned and abandoned Chicago and North Western Railroad right-of-way in the corridor between the Milwaukee central business district and W. Brown Deer Road in the Village of Brown Deer, termed the East Side Transitway; and along the Park Freeway West and Stadium Freeway North corridor in the City of Milwaukee. These transitways would total about 20 miles in length.

The transit-supported highway alternatives, like the highway-supported transit alternatives, also propose the creation of an exclusive network of transit lines operating in limited stop, express service on arterial streets in mixed traffic or on exclusive transit lanes reserved for this purpose on the arterial streets. A total of 40.8 miles of reserved lanes for such express transit service would be provided under these alternative transportation plans. These alternative plans also propose a tertiary level of service consisting of a grid of local bus routes operating over arterial and collector streets. In some low-density residential areas, the plans propose the establishment of demand-responsive service.

In the Kenosha and Racine urbanized areas, the transit systems proposed under the transit-supported highway alternative plans are identical to those systems proposed in the highway-supported transit alternative plans. Such systems would include changes identified in the published transit development programs plus extensions to provide service to the anticipated year 2000 urbanized area in each case.

Under the transit-supported highway alternative, the number of transit round trip route miles in the Milwaukee urbanized area would range from 3,112 under the controlled decentralization land use plan, an increase of 2,051, or 193 percent, over the 1972 level of 1,061; to 3,110 miles under the controlled centralization land use plan, an increase of 2,049 miles, or 193 percent, over the 1972 level. The number of primary transit round trip route miles, consisting of buses utilizing the exclusive transitways and available freeway facilities, would range from 1,109 miles under the controlled decentralization plan, an increase of 959 miles, or 639 percent, over the 1972 level of 150 miles, to 1,083 miles under the controlled centralization land use plan, an increase of 933, or 622 percent, over the 1972 level. The number of secondary, or express, transit round trip route miles under the transit-supported highway alternative plan would, under each of the alternative land use plans, total about 349 miles, an increase of 293 miles, or 523 percent, over the 1972 level of 56 miles.

Also in the Milwaukee urbanized area, the number of public transit stations and park-and-ride lots under each of the alternative land use plans would total 41, 37 more than were provided in 1972. The number of buses required in the Milwaukee urbanized area would approximate, when the transit-supported highway plan is designed to serve the controlled centralization land use plan, 1,161, an increase of 719, or 163 percent, over the 1972 level of 442 buses. When the transit-supported highway plan is designed to serve the controlled decentralization plan, fewer buses—about 1,134—would be required because of the reduced population and transit loadings in the Milwaukee area.

In the Kenosha urbanized area, the number of round trip transit route miles would increase from 59 in 1972 to 116, an increase of 57 miles, or 97 percent, while the number of buses would increase from 12 in 1972 to 29 in 2000, an increase of 17, or 142 percent. In the Racine urbanized area, the number of transit round trip route miles would increase from 81 in 1972 to 157 in 2000, an increase of 76, or 94 percent, while the number of buses required would increase from 10 in 1972 to 36 in 2000, an increase of 26, or 260 percent.

The anticipated number of automobiles to be available in the year 2000 to the resident population in the Region under the transit-supported highway alternative transportation system plan would range from 1,001,000 under the controlled decentralization plan, an increase of 296,000, or 42 percent, over the 1972 level of 705,000, to 955,000 under the controlled centralization plan, an increase of 250,000, or 36 percent, over the 1972 level. The total number of internal person trips generated on an average weekday under the transit-supported highway transportation plans would not differ appreciably between the two land use plans, increasing from about 4.5 million in 1972 to about 5.7 million in 2000, an increase of 1.2 million, or 28 percent. Average weekday transit trips under the transit-supported highway alternative plan could be expected to range from 351,000 under the controlled centralization plan, an increase of 167,000, or 91 percent, over the 1972 level of 184,000, to 316,000 under the controlled decentralization plan, an increase of 132,000, or 71 percent, over the 1972 level. The proportion of total trips made by transit in the Region under the transit-supported highway alternative plan would range from 5.5 percent under the controlled decentralization plan to 6.2 percent under the controlled centralization plan. In 1972, transit trips comprised 4.1 percent of the total person trips.

Total vehicle miles of travel on the arterial street and highway system under the transit-supported highway alternative plan may be expected to range from 30.3 million under the controlled centralization land use plan, an increase of 10.2 million, or 51 percent, over the 1972 level of 20.1 million miles, to 30.6 million under

the controlled decentralization land use plan, an increase of 10.5 million, or 52 percent, over the 1972 level. Vehicle miles of travel on the regional freeway system under the transit-supported highway alternative plan may be expected to range from 13.9 million under the controlled centralization land use plan, an increase of 7.7 million, or 124 percent, over the 1972 level of 6.2 million, to 13.3 million under the controlled decentralization land use plan, an increase of 7.1 million, or 115 percent, over the 1972 level.

The number of arterial miles that may be expected to operate over design capacity, that is, at congestion levels, under the transit-supported highway alternative plan may be expected to range from 113 miles under the controlled decentralization land use plan, a decrease of 53 miles, or 32 percent, from the 1972 level of 166 miles, to 63 miles under the controlled centralization land use plan, a decrease of 103 miles, or 62 percent, from the 1972 level.

In the Milwaukee urbanized area, the number of annual transit revenue passengers under the transit-supported highway alternative may be expected to range from 87.3 million under the controlled centralization land use plan, an increase of 34.9 million, or 67 percent, over the 1972 level of 52.4 million, to 76.4 million under the controlled decentralization land use plan, an increase of 24 million, or 46 percent, over the 1972 level. Under the transit-supported highway alternative plan, transit ridership under the controlled centralization plan would approximate the level achieved in 1967 while, the controlled decentralization plan, transit ridership would approximate the level achieved in 1969.

In the Kenosha urbanized area, the number of annual transit revenue passengers under the transit-supported highway alternative plan may be expected to range from 6.7 million under the controlled centralization land use plan, an increase of 6.1 million, or 1,226 percent, over the 1972 level of 503,000, to 7.1 million under the controlled decentralization land use plan, an increase of 6.6 million, or 1,306 percent, over the 1972 level. Under both transit-supported highway alterntive plans, transit ridership would approximate the level achieved in 1950.

In the Racine urbanized area, the number of annual transit revenue passengers under the transit-supported highway alternative plan may be expected to range from 7.6 million under the controlled centralization land use plan, an increase of 7.1 million, or 1,345 percent, over the 1972 level of 526,000, to 7.7 million under the controlled decentralization land use plan, an increase of 7.2 million, or 1,373 percent, over the 1972 level. Under both transit-supported highway alternative plans, transit ridership would approximate the level achieved in 1953.

The estimated capital cost of carrying out the transit-supported highway transportation system alternative plan to serve the land use pattern proposed under the controlled centralization land use plan is $3,469.7 million, including $3,122.4 million for new and improved arterial street and highway facilities; $341.2 million for improvements to the transit system in the Milwaukee urbanized area; $1.8 million for improvements to the transit system in the Kenosha urbanized area; and $2.2 million for improvements to the transit system in the Racine urbanized area.

The estimated capital cost of carrying out the transit-supported highway transportation system plan to serve the land use pattern proposed under the controlled decentralization land use plan is $3,638.8 million, including $3,295.1 million for new and improved arterial street and highway facilities; $337.6 million for improvements to the transit system in the Milwaukee urbanized area; $2.6 million for improvements to the transit system in the Kenosha urbanized area; and $3.5 million for improvements to the transit system in the Racine urbanized area.

Chapter VI

ALTERNATIVE PLAN COMPARISON AND EVALUATION

INTRODUCTION

After alternative plans have been designed, these plans must be evaluated to determine the degree to which they meet the established regional development objectives and standards formulated to serve as the criteria for plan selection. The techniques available for transportation system plan evaluation are more highly developed than those available for land use plan evaluation. Not only have traffic simulation models been developed for the quantitative test of the engineering feasibility of the transportation plans, but the transportation system development objectives and standards are more likely to be quantifiable than are the land use development objectives and standards. Moreover, the benefit-cost analysis method of evaluating investment in public works is more readily applicable to evaluation of transportation facility plans than to land use plans.

Although a benefit-cost approach may be theoretically applicable to land use plan evaluation, the method loses much of its effectiveness in such application because of the following limitations:

1. It is impractical to assign a monetary value to the many intangible benefits and costs that relate to the most important land use development objectives, and it is extremely difficult to assign monetary values to even the direct benefits and costs associated with a given land use plan.

2. Because of the relatively greater uncertainty associated with land use plan implementation than with transportation system plan implementation, there can be no assurance that the potential benefits will ever be realized, even though many of the costs associated with the development of a given land use plan may, nevertheless, be incurred through public facility and utility construction.

3. A complete benefit-cost analysis of the land use plan would require the development of benefits and costs associated with the construction of the complete public facility and utility systems associated with a given land use plan, a task beyond the budgetary limitation capabilities of public planning operations today.

To provide an alternative to the overriding criteria of system integration and benefit-cost analyses applied in evaluation of the transportation system plan and to provide a method for quantitatively evaluating the ability of both land use and transportation system plans to achieve stated development objectives, the alternative plans were scaled against the standards supporting each regional development objective. The results were evaluated by the Technical Coordinating and Advisory Committee and the Citizens Advisory Committee and by the Regional Planning Commission itself. In addition, the foregoing plan evaluation through Committee and Commission review was supplemented by using a method of plan evaluation which seeks to assign a value to each alternative plan. The method chosen overcomes, to a considerable extent, the difficulties inherent in application of system integration and benefit-cost analyses to land use plan evaluation, and is an adaptation of the rank-based expected value method used in corporate and military decisionmaking.[1] This method avoids the difficulty associated with assignment of monetary values to the benefits and costs given for alternative land use plans by limiting the plan evaluation problem to one of rank-ordering each alternative under each of the stated development objectives, since it usually is much easier to quantitatively rank the effectiveness of a given plan in achieving a given development objective than it is to attempt to assign a monetary value to the benefits accruing to attainment of the same objective.

The following sections of this chapter compare the two alternative regional land use plans at the regional, county, and planning analysis area levels; relate the two alternative regional land use plans to each of the eight regional land use development objectives set forth in Chapter II of this volume; compare the six alternative regional transportation system plans at the regional and county levels; and relate the six alternative regional transportation plans to the seven regional transportation system development objectives set forth in Chapter II of this volume. Following these comparisons and analyses, the results of the application of the rank-based expected value method of plan evaluation are presented, as are certain overriding considerations, most importantly, the air quality analyses of the regional development alternatives undertaken as part of the concurrent planning effort by the Commission to prepare a regional air quality maintenance plan.

ALTERNATIVE REGIONAL LAND USE PLAN COMPARISON—DEVELOPMENT CHARACTERISTICS

A comparison of the land use changes proposed within the Region under the controlled centralization and controlled decentralization regional land use plans, previously described in Chapter V of this volume, is provided in Table 199.[2] The controlled centralization land use plan would

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[1] *See H. Igor Ansoff, Corporate Strategy, McGraw-Hill, New York, New York, 1965.*

[2] *Land use data presented in the tables set forth in this chapter are shown to the nearest one-hundreth of an acre in order to facilitate computer processing of data. These data should be interpreted by the reader to the nearest whole acre.*

Table 199

COMPARISON OF PROPOSED LAND USE CHANGES IN THE REGION: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Land Use Category	Existing 1970		Alternative Plan Increments: 1970-2000				Alternative Plan Totals: 2000			
			Controlled Centralization		Controlled Decentralization		Controlled Centralization		Controlled Decentralization	
	Acres	Percent of Total	Acres	Percent Change	Acres	Percent Change	Acres	Percent of Total	Acres	Percent of Total
Urban Land Use										
Residential										
Urban High Density	24,388.89	1.4	996.36	4.1	- 2,548.00	- 10.4	25,385.25	1.5	21,840.89	1.3
Urban Medium Density	37,092.51	2.2	43,753.83	118.0	43,887.96	118.3	80,846.34	4.7	80,980.47	4.7
Urban Low Density	72,700.78	4.2	- 2,333.16	- 3.3	- 2,423.63	- 3.3	70,367.62	4.1	70,277.15	4.1
Suburban	22,084.21	1.3	- 9,524.44	- 43.1	64,889.35	293.8	12,559.77	0.7	86,973.56	5.1
Subtotal	156,266.39	9.1	32,892.59	21.0	103,805.68	66.4	189,158.98	11.0	260,072.07	15.2
Commercial	6,516.85	0.4	996.65	15.3	384.48	5.9	7,513.50	0.5	6,901.33	0.4
Industrial	10,038.61	0.6	3,654.40	36.4	3,847.09	38.3	13,693.01	0.8	13,885.70	0.8
Governmental[a]	16,617.57	1.0	2,640.91	15.9	2,735.41	16.5	19,258.48	1.1	19,352.98	1.1
Transportation[b]	109,406.82	6.4	18,007.28	16.5	33,788.16	30.9	127,414.10	7.4	143,194.98	8.3
Recreation[c]	28,996.10	1.7	5,825.13	20.1	5,738.07	19.8	34,821.23	2.0	34,734.17	2.0
Urban Land Use Subtotal	327,842.34	19.2	64,016.96	19.5	150,298.89	45.8	391,859.30	22.8	478,141.23	27.8
Rural Land Use										
Residential[d]	--	--	--	--	4,782.54	--	--	--	4,782.54	0.3
Agricultural										
Prime	405,203.85	23.5	- 6,035.57	- 1.5	- 22,388.62	- 5.5	399,168.28	23.2	382,815.23	22.2
Other	634,917.61	36.9	- 44,575.45	- 7.0	- 118,681.95	- 18.7	590,342.16	34.3	516,235.66	30.0
Subtotal	1,040,121.46	60.4	- 50,611.02	- 4.9	- 141,070.57	- 13.6	989,510.44	57.5	899,050.89	52.2
Other Open Lands[e]	353,136.03	20.5	- 13,405.75	- 3.8	- 14,010.67	- 4.0	339,730.28	19.7	339,125.36	19.7
Rural Land Use Subtotal	1,393,257.49	80.9	- 64,016.77	- 4.6	- 150,298.70	- 10.8	1,329,240.72	77.2	1,242,958.79	72.2
Total	1,721,099.83	100.0	--	--	--	--	1,721,100.02	100.0	1,721,100.02	100.0
Rural Lands Converted to Urban Use	--	--	64,016.96	--	151,483.03	--	--	--	--	--
Urban Lands Reverted to Unused Category[f]	--	--	--	--	1,184.14	--	--	--	--	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Existing area includes public and private recreation sites; planned incremental area includes only public recreation uses.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused rural lands, and quarries.*

[f] *Includes only commercial and industrial land uses.*

Source: SEWRPC.

propose the addition of about 64,000 acres, or about 100 square miles, to the existing stock of urban land. The controlled decentralization land use plan would propose the addition of about 151,000 acres, or about 237 square miles, to the existing stock of urban land, 137 square miles more than the controlled centralization plan. In addition, under the controlled decentralization plan about 1,200 acres of currently urban land are assumed to revert to the unused land category because of declines in the Milwaukee County population.

Residential Land Use

The greatest increase in residential land in the Region would occur under the controlled decentralization land use plan, which proposes an increase of about 104,000 acres, or about 163 square miles, an increase of about 66 percent. In contrast, the controlled centralization land use plan proposes to increase residential land by about 33,000 acres, or about 52 square miles, an increase of about 21 percent. Nearly all the new residential development under the controlled centralization plan would occur in the urban

medium-density category. In contrast, the controlled decentralization plan would provide for about the same amount of incremental land in the urban medium-density category, while converting about 65,000 acres of agricultural and open lands, or about 101 square miles, to the very low-density suburban residential category. Much of the difference in residential land conversion between the two alternative regional land use plans may be attributed to the differing regional population distributions assumed for the two plans. Under the controlled decentralization plan, the six counties in the Region outside of Milwaukee County would accommodate a population increase of about 619,000 persons, whereas under the controlled centralization plan, these same six counties would accommodate a population increment of about 468,000 persons.

Commercial Land Use

The greatest increase in commercial land use within the Region would occur under the controlled decentralization land use plan, which proposes to increase the existing stock of commercial land by about 1,100 acres, or about 17 percent. This increase would be offset, however, by an assumed reversion of about 700 acres of existing commercial land in Milwaukee County to the unused land category resulting in a net increase of about 400 acres, or a 6 percent increase over 1970 commercial land use. Under the controlled centralization land use plan, about 1,000 acres would be converted to commercial use, representing an increase of about 15 percent.

The controlled centralization plan proposes a total of 17 major retail and service centers, including 11 existing centers and six new centers. These centers would be located as follows: one existing and one new in Kenosha County; eight existing and two new in Milwaukee County; one existing and one new in Racine County; one new in Washington County; and one existing and one new in Waukesha County. The controlled decentralization plan proposes that there be a total of 19 major retail and service centers including 11 existing centers and eight new centers. These centers would be located as follows: one existing and one new in Kenosha County; eight existing and one new in Milwaukee County; one new in Ozaukee County; one existing and two new in Racine County; one new in Washington County; and one existing and two new in Waukesha County. The essential differences between the two plans with respect to the major retail and service centers are: inclusion of a new major center in Oak Creek in Milwaukee County under the controlled centralization plan and not under the controlled decentralization plan; inclusion of a new major center at Cedarburg-Grafton under the controlled decentralization plan and not under the controlled centralization plan; and the strengthening through expansion and redevelopment of four existing central business districts in outlying communities—Burlington, West Bend, Oconomowoc, and Waukesha—under the controlled decentralization plan. Two of these four districts—West Bend and Waukesha—would also be strengthened under the controlled centralization alternative land use plan.

Industrial Land Use

The controlled decentralization plan proposes to increase the industrial land stock by about 3,800 acres, representing an increase of about 38 percent, only slightly more than the 3,700 acres proposed to be converted to industrial use under the controlled centralization plan. Both plans propose a total of 22 major industrial centers in the Region. Under both the controlled centralization and controlled decentralization plans, 17 centers existed in 1970 and five are proposed new centers. Four of the five proposed new industrial centers—Kenosha West, Oak Creek, Burlington, and Waukesha—are the same for both land use plans. The major difference, then, between the two plans with respect to the major industrial centers are the inclusion of a Milwaukee-Granville center in the controlled centralization plan and not under the controlled decentralization plan and the inclusion of a proposed new major industrial center at Cedarburg-Grafton in the controlled decentralization plan and not under the controlled centralization plan.

The major industrial centers under the controlled centralization plan would be distributed by county as follows: two in Kenosha County, 13 in Milwaukee County, three in Racine County, one in Washington County, and three in Waukesha County. Under the controlled decentralization plan, the distribution of the major industrial centers by county would be as follows: two in Kenosha County, 12 in Milwaukee County, one in Ozaukee County, three in Racine County, one in Washington County, and three in Waukesha County.

Governmental and Institutional Land Use

The two alternative regional land use plans would propose to convert virtually the same amount of land to governmental and institutional land use. Under the controlled decentralization plan, about 2,700 acres would be converted to governmental and institutional use, representing a nearly 17 percent increase. Under the controlled centralization plan, about 2,600 acres would be converted, representing a 16 percent increase. Both plans provide for the additional land requirements of certain major future governmental and institutional land uses, such as the Medical Center of Southeastern Wisconsin.

Transportation, Communication, and Utility Land Uses

Under this land use category—which includes lands needed for all communication and utility uses; harbor, railroad, and airport uses; truck terminal uses; off-street parking associated with other land use development; and streets and highways—the controlled decentralization land use plan proposes to convert substantially more land over the 30-year planning period than does the controlled centralization plan. Under the controlled decentralization plan, nearly 34,000 acres, or 53 square miles, of land would be converted to transportation and related use, representing a nearly 31 percent increase in the existing stock of land in this category. In contrast, the controlled centralization plan proposes to convert only about 18,000 acres, or 28 square miles, representing nearly a 17 percent increase. Much of the difference between the two plans may be attributed to the substantially greater amount of land needed for minor and collector streets to serve the nearly 112 square miles of suburban-density residential development proposed under the controlled decentralization land use plan.

Recreation Land Use

As for the recreation land use category, the two alternative land use plans are virtually identical in the amount of land

proposed to be converted to that use over the 30-year planning period. Under the controlled centralization plan, about 5,800 acres of land would be converted to outdoor recreation use, representing an increase of slightly over 20 percent. Under the controlled decentralization plan, about 5,700 acres would be converted, representing an increase of nearly 20 percent. Both plans provide for a total of 29 major outdoor recreation facilities, including 27 existing facilities and two proposed new facilities. The 29 regional outdoor recreational centers would be distributed by county as follows: three in Kenosha County, nine in Milwaukee County, three in Ozaukee County, three in Racine County, three in Walworth County, two in Washington County, and six in Waukesha County. The two new sites are located in Walworth and Washington Counties. In addition, further land acquisition is proposed under both plans at one site in Waukesha County.

Agricultural Land Use

The greatest decrease in agricultural land use would occur under the controlled decentralization land use plan which proposes a reduction of about 141,000 acres, or 220 square miles, representing nearly 14 percent of the existing stock of such land. In contrast, the controlled centralization plan proposes a reduction in the stock of agricultural land of about 51,000 acres, or 80 square miles, representing slightly less than 5 percent of the total agricultural land. With respect to prime agricultural land, the controlled decentralization plan proposes to convert about 22,000 acres, or 34 square miles, representing nearly 6 percent of the existing stock of such land, whereas the controlled centralization plan proposes to convert about 6,000 acres, or 9 square miles, representing nearly 2 percent of the existing stock of prime agricultural land.

Other Open Lands

The controlled decentralization land use plan would convert slightly more area to urban use from the other open lands category than the controlled centralization plan. Under the controlled decentralization plan, about 14,000 acres, or 22 square miles, would be converted to urban use, representing a decline of about 4 percent in this land use category. Under the controlled centralization land use plan, about 13,000 acres, or 20 square miles, would be converted, representing a decline of slightly less than 4 percent in this land use category. It should be noted that the principal land use area subject to development within this category would be the woodlands, but that reductions in this land use category in both land use plan alternatives would occur in areas of the Region outside the primary environmental corridors. The corridor areas would remain unchanged under both alternative plans.

Public Sanitary Sewer and Water Supply Service

As indicated in Table 200, the controlled centralization plan proposes to increase the developed land area within the Region to about 688 square miles from the 1970 total of about 397 square miles. In 1970, 76 percent of the developed land area and 85 percent of the population were served by public sanitary sewerage facilities; and 65 percent of the developed land area and 79 percent of the population were served by public water supply facilities. By 2000 the controlled centralization plan proposes to serve 92 percent of the developed area and 94 percent of the total population with public sanitary sewerage and water supply facilities. The controlled decentralization plan proposes to increase the developed area to about 969 square miles, and would serve 63 percent of the developed area and 89 percent of the total population with public sanitary sewerage and water supply facilities.

Population and Employment

As indicated in Chapter V of this volume, the levels of population and employment for the Region as a whole would be the same for the two alternative plans considered. The regional population is forecast to increase by about 463,000 persons, from a 1970 population of 1,756,000 persons to a 2000 population of 2,219,000 persons; and the number

Table 200

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN THE REGION: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Area and Population	Public Sanitary Sewer Service						Public Water Supply Service					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Developed Area												
Total Square Miles	396.9	291.5	688.4	396.9	572.0	968.9	396.9	291.5	688.4	396.9	572.0	968.9
Square Miles Served	301.0	329.5	630.5	301.0	307.3	608.3	259.4	371.1	630.5	259.4	348.9	608.3
Percent of Total Served	75.8	--	91.6	75.8	--	62.8	65.4	--	91.6	65.4	--	62.8
Population												
Total Population	1,756,100	463,200	2,219,300	1,756,100	463,200	2,219,300	1,756,100	463,200	2,219,300	1,756,100	463,200	2,219,300
Population Served	1,488,700	604,800	2,093,500	1,488,700	482,800	1,971,500	1,390,000	703,500	2,093,500	1,390,000	581,500	1,971,500
Percent of Total Served	84.8	--	94.3	84.8	--	88.8	79.2	--	94.3	79.2	--	88.8

Source: SEWRPC.

of employment opportunities is forecast to increase by about 267,000 jobs, from 749,000 jobs in 1972 to 1,116,000 jobs in 2000. It is important to note, however, that, while the regional population and employment levels remain unchanged, the levels within each county would vary under the two different land use arrangements proposed.

Kenosha County

A comparison of the changes proposed within Kenosha County under each of the alternative regional land use plans considered is provided in Table 201. The controlled decentralization plan proposes the largest addition to the existing stock of urban land, with about 12,000 acres, or 19 square miles, converted to urban use by the year 2000, representing a 43 percent increase. The controlled centralization plan proposes to convert nearly 6,000 acres, or about nine square miles, representing a 21 percent increase in urban land. To provide for the new urban development, the controlled decentralization plan proposes to convert 9 percent of the existing stock of agricultural land and 5 percent of the existing stock of other open lands, while the controlled centralization plan would convert about

Table 201

COMPARISON OF PROPOSED LAND USE CHANGES IN KENOSHA COUNTY: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Land Use Category	Existing 1970		Alternative Plan Increments: 1970-2000				Alternative Plan Totals: 2000			
			Controlled Centralization		Controlled Decentralization		Controlled Centralization		Controlled Decentralization	
	Acres	Percent of Total	Acres	Percent Change	Acres	Percent Change	Acres	Percent of Total	Acres	Percent of Total
Urban Land Use										
Residential										
Urban High Density	1,375.70	0.8	237.00	17.2	237.00	17.2	1,612.70	0.9	1,612.70	0.9
Urban Medium Density	3,499.02	2.0	5,140.29	146.9	7,262.90	207.6	8,639.31	4.9	10.761.92	6.0
Urban Low Density	7,099.74	3.9	- 1,486.48	- 20.9	- 1,668.20	- 23.5	5,613.26	3.2	5,431.54	3.0
Suburban	1,502.97	0.8	- 993.31	- 66.1	1,264.03	84.1	509.66	0.3	2,767.00	1.6
Subtotal	13,477.43	7.5	2,897.50	21.5	7,095.73	52.6	16,374.93	9.3	20,573.16	11.5
Commercial	504.08	0.3	92.91	18.4	146.74	29.1	596.99	0.3	650.82	0.4
Industrial	811.02	0.5	345.48	42.6	429.20	52.9	1,156.50	0.6	1,240.22	0.7
Governmental[a]	1,323.90	0.7	240.48	18.2	407.55	30.8	1,564.38	0.9	1,731.45	1.0
Transportation[b]	8,927.35	5.0	1,649.17	18.5	3,153.74	35.3	10,576.52	5.9	12,081.09	6.8
Recreation[c]	2,671.91	1.5	703.46	26.3	771.72	28.9	3,375.37	1.9	3,443.63	1.9
Urban Land Use Subtotal	27,715.69	15.5	5,929.00	21.4	12,004.68	43.3	33,644.69	18.9	39,720.37	22.3
Rural Land Use										
Residential[d]	--	--	--	--	54.30	--	--	--	54.30	--[e]
Agricultural										
Prime	66,054.65	37.1	- 1,506.84	- 2.3	- 3,200.55	- 4.8	64,547.81	36.2	62,854.10	35.3
Other	47,875.24	26.9	- 2,879.97	- 6.0	- 7,098.38	- 14.8	44,995.27	25.3	40,776.86	22.9
Subtotal	113,929.89	64.0	- 4,386.81	- 3.9	- 10,298.93	- 9.0	109,543.08	61.5	103,630.96	58.2
Other Open Lands[f]	36,454.39	20.5	- 1,542.19	- 4.2	- 1,760.05	- 4.8	34,912.20	19.6	34,694.34	19.5
Rural Land Use Subtotal	150,384.28	84.5	- 5,929.00	- 3.9	- 12,004.68	- 8.0	144,455.28	81.1	138,379.60	77.7
Total	178,099.97	100.0	--	--	--	--	178,099.97	100.0	178,099.97	100.0
Rural Lands Converted to Urban Use	--	--	5,929.00	--	12,004.68	--	--	--	--	--
Urban Lands Reverted to Unused Category[g]	--	--	--	--	--	--	--	--	--	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Existing area includes public and private recreation sites; planned incremental area includes only public recreation uses.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Less than 0.1 percent.*

[f] *Includes woodlands, water, wetlands, unused rural lands, and quarries.*

[g] *Includes only commercial and industrial land uses.*

Source: SEWRPC.

4 percent of the existing stock of agricultural land and about 4 percent of the existing stock of other open lands. About twice as much prime agricultural land would be converted to urban use in Kenosha County under the controlled decentralization plan than the controlled centralization plan, with about 3,200 acres being converted under the former and 1,500 acres under the latter. The controlled decentralization plan would add about 7,200 acres of urban medium-density residential land and about 1,300 acres of suburban density residential land, while nearly all of the new residential development under the controlled centralization plan would occur in the urban medium-density category.

For the major regional centers in Kenosha County, the two alternative regional land use plans are identical. Each plan would provide for two major retail and service centers, two major industrial centers, and three major regional outdoor recreational centers.

The greatest population increase in Kenosha County would occur under the controlled decentralization land use plan, which proposes that the County population reach nearly 203,000 persons by 2000, an increase of about 85,000 persons, or 72 percent, over the 1970 level of nearly 118,000 persons. Under the controlled centralization land use plan, the Kenosha County population would total nearly 175,000 in 2000, an increase of nearly 57,000, or 48 percent, over the 1972 level (see Table 202). The forecast population for Kenosha County set forth in Chapter III of this volume is nearly 175,000, or equal to the planned population under the controlled centralization land use plan and about 16 percent less than the planned population under the controlled decentralization land use plan.

As a result of the differing land use arrangements and allocations, county employment levels under the two alternative land use plans would vary from the county employment forecasts set forth in Chapter III of this volume. Under the controlled decentralization land use plan, employment in Kenosha County would reach nearly 77,000 in 2000, an increase of about 36,000, or nearly 89 percent, over the 1972 level of about 41,000. Under the controlled centralization land use plan, Kenosha County employment would reach nearly 65,000 in 2000, an increase of 24,000, or 59 percent, over the 1972 level. The forecast employment for Kenosha County is 54,300, or about 16 percent less than the planned employment under the controlled centralization plan and about 29 percent less than the planned employment under the controlled decentralization land use plan.

As shown in Table 203, the controlled centralization plan would propose to increase the developed land area within Kenosha County to about 55 square miles, an increase of 23 miles, or about 72 percent, over the 1970 level of 32 miles. In 1970, about 73 percent of the developed land area and nearly 80 percent of the population within the County were served by public sanitary sewerage facilities, and about 51 percent of the developed land area and 69 percent of the population were served by public water supply facilities. By 2000 the controlled centralization plan would propose to serve 92 percent of the developed area and 93 percent of the population with public sanitary sewerage and water supply facilities. The controlled decentralization plan would propose to increase the developed area to nearly 75 square miles, an increase of 42 miles, or about 131 percent, over the 1970 level, and would serve 79 percent of this developed area and 92 percent of the total population with public sanitary sewerage and water supply facilities.

Milwaukee County

A comparison of the changes proposed in Milwaukee County under each of the alternative regional land use plans considered is provided in Table 204. The controlled centralization plan proposes the largest addition to the existing stock of urban land, with about 13,000 acres, or 20 square miles, converted to urban use by the year 2000, representing a 12 percent increase. The controlled decentralization plan proposes to convert nearly 5,300 acres, or about 8 square miles, representing a 5 percent increase in urban land. Under this plan, however, about 1,200 acres, or about two square miles, of currently urban land are assumed to revert to the unused land category.

Table 202

EXISTING AND PROPOSED POPULATION AND EMPLOYMENT IN KENOSHA COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Category	Existing 1970	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		Increment: 1970-2000		Total 2000	Increment: 1970-2000		Total 2000
		Number	Percent Change		Number	Percent Change	
Population	117,917	56,883	48.2	174,800	84,884	72.0	202,801
Employment . .	40,600	24,100	59.4	64,700	36,000	88.7	76,600

Source: SEWRPC.

Table 203

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN KENOSHA COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Area and Population	Public Sanitary Sewer Service						Public Water Supply Service					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Developed Area												
Total Square Miles	32.5	22.9	55.4	32.5	42.3	74.8	32.5	22.9	55.4	32.5	42.3	74.8
Square Miles Served	23.8	27.0	50.8	23.8	35.5	59.3	16.4	34.4	50.8	16.4	42.9	59.3
Percent of Total Served	73.2	--	91.7	73.2	--	79.3	50.5	--	91.7	50.5	--	79.3
Population												
Total Population	117,917	56,883	174,800	117,917	84,884	202,801	117,917	56,883	174,800	117,917	84,884	202,801
Population Served	94,000	69,100	163,100	94,000	93,500	187,500	81,000	82,100	163,100	81,000	106,500	187,500
Percent of Total Served	79.7	--	93.3	79.7	--	92.5	68.7	--	93.3	68.7	--	92.5

Source: SEWRPC.

Consequently, the net increase in urban land under the controlled decentralization plan in Milwaukee County is about 4,100 acres, or about six square miles, representing a 4 percent increase in urban land. To provide for the new urban development, the controlled centralization plan proposes to convert 32 percent of the existing stock of agricultural land and 20 percent of the existing stock of other open lands, while the controlled decentralization plan would convert about 11 percent of the existing stock of agricultural land and about 6 percent of existing stock of other open lands. Nearly twice as much prime agricultural land would be converted to urban use in Milwaukee County under the controlled centralization plan as under the controlled decentralization plan, with about 1,100 acres being converted under the former and 600 acres under the latter. The controlled decentralization plan would add about 7,000 acres of urban medium-density residential land, while about 8,600 acres, or almost all of the residential development under the controlled centralization plan, would occur in the urban-medium density category.

For the major regional centers in Milwaukee County, the two alternative regional land use plans differ somewhat. Under the controlled centralization plan, Milwaukee County would be provided with a total of 10 major retail and service centers and 13 major industrial centers. Under the controlled decentralization plan, Milwaukee County would gain a total of nine major retail and service centers and 12 major industrial centers. The single major commercial center not included in the controlled decentralization plan is the center proposed for the City of Oak Creek under the controlled centralization plan. The single major industrial center not included in the controlled decentralization plan is the major industrial center in the Granville area of the City of Milwaukee included in the controlled centralization plan. Under each plan there would be provided nine regional outdoor recreation centers in Milwaukee County.

Under the controlled centralization land use plan, Milwaukee County population would decrease only slightly from the 1970 level of about 1,054,000 persons, declining about 5,000 persons to a year 2000 total of about 1,049,000 persons. Under the controlled decentralization land use plan, the population decline in Milwaukee County would be quite dramatic, declining by nearly 156,000 over the 1970 level to a year 2000 total of slightly under 900,000. This would represent nearly a 15 percent loss in the population of Milwaukee County (see Table 205). The forecast population for Milwaukee County set forth in Chapter III of this volume is about 1,049,000, or equal to the planned population under the controlled centralization land use plan, and about 14 percent more than the planned population under the controlled decentralization land use plan.

Under the controlled centralization plan, employment in Milwaukee County would increase from the 1972 level of about 509,000 to a year 2000 level of nearly 599,000, an increase of 90,000, or nearly 18 percent. Under the controlled decentralization land use plan, Milwaukee County employment would increase more modestly, to about 524,000 in 2000, an increase of nearly 15,000, or about 3 percent. The forecast employment for Milwaukee County is about 593,600, or about 1 percent less than the planned employment under the controlled centralization plan and about 13 percent more than the planned employment under the controlled decentralization plan.

Table 204

COMPARISON OF PROPOSED LAND USE CHANGES IN MILWAUKEE COUNTY: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Land Use Category	Existing 1970		Alternative Plan Increments: 1970-2000				Alternative Plan Totals: 2000			
			Controlled Centralization		Controlled Decentralization		Controlled Centralization		Controlled Decentralization	
	Acres	Percent of Total	Acres	Percent Change	Acres	Percent Change	Acres	Percent of Total	Acres	Percent of Total
Urban Land Use										
Residential										
Urban High Density	20,177.88	13.0	562.83	2.8	-2,992.03	-14.8	20,740.71	13.4	17,185.85	11.1
Urban Medium Density	13,663.23	8.8	8,626.88	63.1	6,977.96	51.1	22,290.11	14.4	20,641.19	13.3
Urban Low Density	9,290.54	6.0	- 2,104.93	-22.7	-1,311.68	-14.1	7,185.61	4.6	7,978.86	5.1
Suburban	2,500.65	1.6	- 375.87	-15.0	- 757.10	-30.3	2,124.78	1.4	1,743.55	1.1
Subtotal	45,632.30	29.4	6,708.91	14.7	1,917.15	4.2	52,341.21	33.8	47,549.45	30.6
Commercial	2,874.71	1.9	289.41	10.1	- 569.73	-19.8	3,164.12	2.0	2,304.98	1.5
Industrial	4,898.68	3.2	1,382.34	28.2	960.67	19.6	6,281.02	4.0	5,859.35	3.8
Governmental[a]	7,489.97	4.8	567.76	7.6	204.53	2.7	8,057.73	5.2	7,694.50	5.0
Transportation[b]	35,430.62	22.9	3,952.96	11.2	1,332.96	3.8	39,383.58	25.4	36,763.58	23.7
Recreation[c]	9,924.02	6.4	421.32	4.2	255.34	2.6	10,345.34	6.7	10,179.36	6.6
Urban Land Use Subtotal	106,250.30	68.6	13,322.70	12.5	4,100.92	3.9	119,573.00	77.1	110,351.22	71.2
Rural Land Use										
Residential[d]	--	--	--	--	446.29	--	--	--	446.29	0.3
Agricultural										
Prime	7,164.83	4.6	- 1,153.39	-16.1	- 641.50	- 9.0	6,011.44	3.9	6,523.33	4.2
Other	21,442.82	13.8	- 8,056.68	-37.6	-2,583.55	-12.0	13,386.14	8.6	18,859.27	12.1
Subtotal	28,607.65	18.4	- 9,210.07	-32.2	-3,255.05	-11.3	19,397.58	12.5	25,382.60	16.3
Other Open Lands[e]	20,206.65	13.0	- 4,112.59	-20.4	-1,322.11	- 6.5	16,094.06	10.4	18,884.54	12.2
Rural Land Use Subtotal	48,814.30	31.4	-13,322.66	-27.3	-4,100.87	- 8.4	35,491.64	22.9	44,713.43	28.8
Total	155,064.60	100.0	--	--	--	--	155,064.64	100.0	155,064.65	100.0
Rural Lands Converted to Urban Use	--	--	13,322.70	--	5,285.06	--	--	--	--	--
Urban Lands Reverted to Unused Category[f]	--	--	--	--	1,184.14	--	--	--	--	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Existing area includes public and private recreation sites; planned incremental area includes only public recreation uses.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused rural lands, and quarries.*

[f] *Includes only commercial and industrial land uses.*

Source: SEWRPC.

As shown in Table 206, the controlled centralization plan would propose to increase the developed land area within Milwaukee County to about 215 square miles, an increase of about 41 square miles, or about 23 percent, over the 1970 level of 175 miles. In 1970 about 98 percent of the developed area and the population within the County were served by public sanitary sewerage facilities, and about 95 percent of the developed land area and 96 percent of the population were served by public water supply facilities.

By 2000 the controlled centralization plan would propose to serve all of the developed area and all of the population with public sanitary sewerage and water supply facilities. The controlled decentralization plan would propose to increase the developed area to about 201 square miles, an increase of 26 square miles, or about 15 percent, over the 1970 level, and would similarly serve all of this developed area and all of the total population with public sanitary sewerage and water supply facilities.

Table 205

EXISTING AND PROPOSED POPULATION AND EMPLOYMENT IN MILWAUKEE COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Category	Existing 1970	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		Increment: 1970-2000		Total 2000	Increment: 1970-2000		Total 2000
		Number	Percent Change		Number	Percent Change	
Population	1,054,249	- 4,649	- 0.4	1,049,600	- 155,728	- 14.8	898,521
Employment . .	508,500	90,200	17.7	598,700	14,900	2.9	523,400

Source: SEWRPC.

Table 206

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN MILWAUKEE COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Area and Population	Public Sanitary Sewer Service						Public Water Supply Service					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Developed Area												
Total Square Miles . . .	174.6	40.8	215.4	174.6	26.4	201.0	174.6	40.8	215.4	174.6	26.4	201.0
Square Miles Served . .	170.6	44.8	215.4	170.6	30.4	201.0	165.2	50.2	215.4	165.2	35.8	201.0
Percent of Total Served.	97.7	--	100.0	97.7	--	100.0	94.6	--	100.0	94.6	--	100.0
Population												
Total Population	1,054,249	- 4,649	1,049,600	1,054,249	- 155,728	898,521	1,054,249	- 4,649	1,049,600	1,054,249	- 155,728	898,521
Population Served . . .	1,034,700	14,900	1,049,600	1,034,700	- 136,179	898,521	1,013,400	36,200	1,049,600	1,013,400	- 114,879	898,521
Percent of Total Served.	98.1	--	100.0	98.1	--	100.0	96.1	--	100.0	96.1	--	100.0

Source: SEWRPC.

Ozaukee County

A comparison of the changes proposed in Ozaukee County under each of the alternative regional land use plans considered is provided in Table 207. The controlled decentralization plan proposes the largest addition to the existing stock of urban land, with nearly 28,000 acres, or 44 square miles, converted to urban use by the year 2000, representing a 116 percent increase. The controlled centralization plan proposes to convert about 7,200 acres, or about 11 square miles, representing a 30 percent increase in urban land. To provide for the new urban development, the controlled decentralization plan proposes to convert 26 percent of the existing stock of agricultural land and 6 percent of the existing stock of other open lands, while the controlled centralization plan would convert about 6 percent of the existing stock of agricultural land and about 3 percent of the existing stock of other open lands. Under the controlled centralization plan the amount of prime agricultural land converted to urban use would be negligible, while under the controlled decentralization plan the amount of prime agricultural land converted to urban use would approximate 8,000 acres, or about 21 percent of the total stock of prime agricultural land in that county. The controlled decentralization plan would add about 3,800 acres of urban medium-density residential land and about 14,000 acres of suburban-density residential land, while

Table 207

COMPARISON OF PROPOSED LAND USE CHANGES IN OZAUKEE COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Land Use Category	Existing 1970		Alternative Plan Increments: 1970-2000				Alternative Plan Totals: 2000			
			Controlled Centralization		Controlled Decentralization		Controlled Centralization		Controlled Decentralization	
	Acres	Percent of Total	Acres	Percent Change	Acres	Percent Change	Acres	Percent of Total	Acres	Percent of Total
Urban Land Use										
Residential										
Urban High Density	53.39	--[a]	- 44.26	- 82.9	- 44.49	- 83.3	9.13	--[a]	8.90	--[a]
Urban Medium Density	2,297.41	1.5	3,314.62	144.3	3,845.07	167.4	5,612.03	3.7	6,142.48	4.1
Urban Low Density	6,237.32	4.2	2,957.46	47.4	2,430.32	39.0	9,194.78	6.1	8,667.64	5.8
Suburban	3,732.72	2.5	- 2,053.97	- 55.0	14,070.80	377.0	1,678.75	1.1	17,803.52	11.8
Subtotal	12,320.84	8.2	4,173.85	33.9	20,301.70	164.8	16,494.69	10.9	32,622.54	21.7
Commercial	330.50	0.2	73.56	22.3	130.78	39.6	404.06	0.3	461.28	0.3
Industrial	444.42	0.3	102.88	23.1	336.61	75.7	547.30	0.4	781.03	0.5
Governmental[b]	939.18	0.6	269.16	28.7	374.45	39.9	1,208.34	0.8	1,313.63	0.9
Transportation[c]	8,053.84	5.4	1,894.69	23.5	5,757.71	71.5	9,948.53	6.6	13,811.55	9.2
Recreation[d]	1,657.44	1.1	704.24	42.5	726.50	43.8	2,361.68	1.6	2,383.94	1.6
Urban Land Use Subtotal	23,746.22	15.8	7,218.38	30.4	27,627.75	116.3	30,964.60	20.6	51,373.97	34.3
Rural Land Use										
Residential[e]	--	--	--	--	319.49	--	--	--	319.49	0.2
Agricultural										
Prime	37,112.23	24.7	- 7.96	--[g]	- 7,972.91	- 21.5	37,104.27	24.7	29,139.32	19.4
Other	63,379.14	42.3	- 6,424.70	- 10.1	- 18,293.60	- 28.9	56,954.44	38.0	45,085.54	30.1
Subtotal	100,491.37	67.0	- 6,432.66	- 6.4	- 26,266.51	- 26.1	94,058.71	62.7	74,224.86	49.5
Other Open Lands[f]	25,775.67	17.2	- 785.66	- 3.0	- 1,680.67	- 6.5	24,990.01	16.7	24,095.00	16.1
Rural Land Use Subtotal	126,267.04	84.1	- 7,218.32	- 5.7	- 27,627.69	- 21.9	119,048.72	79.4	98,639.35	65.8
Total	150,013.26	100.0	--	--	--	--	150,013.32	100.0	150,013.32	100.0
Rural Lands Converted to Urban Use	--	--	7,218.38	--	27,627.75	--	--	--	--	--
Urban Lands Reverted to Unused Category[g]	--	--	--	--	--	--	--	--	--	--

[a] *Less than 0.1 percent.*

[b] *Includes institutional uses.*

[c] *Includes communications, utilities, and off-street parking uses.*

[d] *Existing area includes public and private recreation sites; planned incremental area includes only public recreation uses.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused rural lands, and quarries.*

[g] *Includes only commercial and industrial land uses.*

Source: SEWRPC.

the controlled centralization plan would add about 3,300 acres of urban medium-density residential land and about 2,900 acres of urban low-density residential land.

For the major regional centers in Ozaukee County, the controlled centralization plan would provide for no major commercial or industrial centers, whereas the controlled decentralization plan would provide for one new major industrial center and one new major retail and service center, both to be located in the Cedarburg-Grafton area. Under both alternative plans, three major regional outdoor recreation centers would be provided.

The greatest population increase in Ozaukee County would occur under the controlled decentralization land use plan, which proposes that the county population reach nearly 149,000 persons by 2000, an increase of about 94,000 persons, or 173 percent, over the 1970 level of about 54,000 persons. Under the controlled centralization plan the Ozaukee County population would total about 114,000 in 2000, an increase of nearly 60,000, or 109 percent over the 1972 level (see Table 208). The forecast population for Ozaukee County set forth in Chapter III of this volume is 114,000, or equal to the planned population under the controlled centralization land use plan, and about 23 percent less than the planned population under the controlled decentralization land use plan.

Under the controlled decentralization land use plan, employment in Ozaukee County would reach about 53,000 in 2000, an increase of about 34,000, or 176 percent over the 1972 level of about 19,000. Under the controlled centralization land use plan, Ozaukee County employment would reach about 35,000 in 2000, an increase of about 16,000, or 84 percent, over the 1972 level. The forecast employment for Ozaukee County is about 38,000, or about 7 percent more than the planned employment under the controlled centralization plan and about 29 percent less than the planned employment under the controlled decentralization land use plan.

As shown in Table 209, the controlled centralization plan would propose to increase the developed land area within Ozaukee County to nearly 55 square miles, an increase of 35 square miles, or about 175 percent over the 1970 level of 20 square miles. In 1970, about 87 percent of the developed land area and nearly 67 percent of the population within the County were served by public sanitary sewerage facilities, and about 36 percent of the developed land area and 47 percent of the population were served by public water supply facilities. By 2000 the controlled centralization plan would propose to serve 91 percent of the developed area and 89 percent of the population with public sanitary sewerage and water supply facilities. The controlled decentralization plan would propose to increase the developed area to nearly 110 square miles, an increase of 90 miles, or about 450 percent, over the 1970 level, and would serve 48 percent of this developed area and 74 percent of the total population with public sanitary sewerage and water supply facilities.

Racine County

A comparison of the changes proposed within Racine County under each of the alternative regional land use plans considered is provided in Table 210. The controlled decentralization plan proposes the largest addition to the existing stock of urban land, with nearly 13,000 acres, or 20 square miles, converted to urban use by the year 2000, representing a 36 percent increase. The controlled centralization plan proposes to convert about 5,000 acres, or about eight square miles, representing a 14 percent increase in urban land. To provide for the new urban development, the controlled decentralization plan proposes to convert about 8 percent of the existing stock of agricultural land and 4 percent of the existing stock of other open lands, while the controlled centralization plan would convert about 3 percent of the existing stock of agricultural land and about 3 percent of the existing stock of other open lands. Prime agricultural land conversion within Racine County under the two alternative plans would be nearly identical, with about 1,300 acres proposed for conversion under the

Table 208

EXISTING AND PROPOSED POPULATION AND EMPLOYMENT IN OZAUKEE COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Category	Existing 1970	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		Increment: 1970-2000		Total 2000	Increment: 1970-2000		Total 2000
		Number	Percent Change		Number	Percent Change	
Population	54,461	59,539	109.3	114,000	94,475	173.5	148,936
Employment . .	19,300	16,200	83.9	35,500	34,000	176.2	53,300

Source: SEWRPC.

Table 209

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN OZAUKEE COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Area and Population	Public Sanitary Sewer Service						Public Water Supply Service					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Developed Area												
Total Square Miles	19.8	34.7	54.5	19.8	89.7	109.5	19.8	34.7	54.5	19.8	89.7	109.5
Square Miles Served	17.3	32.5	49.8	17.3	35.4	52.7	7.2	42.6	49.8	7.2	45.5	52.7
Percent of Total Served	87.4	--	91.4	87.4	--	48.1	36.4	--	91.4	36.4	--	48.1
Population												
Total Population	54,461	59,539	114,000	54,461	94,475	148,936	54,461	59,539	114,000	54,461	94,475	148,936
Population Served	36,300	65,100	101,400	36,300	74,000	110,300	25,700	75,700	101,400	25,700	84,600	110,300
Percent of Total Served	66.7	--	88.9	66.7	--	74.1	47.2	--	88.9	47.2	--	74.1

Source: SEWRPC.

controlled decentralization plan and about 1,100 acres proposed for conversion under the controlled centralization plan, each approximating 2 percent of the total prime agricultural land in Racine County. The controlled decentralization plan would add about 3,900 acres of urban medium-density residential land and about 5,700 acres of suburban-density residential land, while virtually all of the new residential development under the controlled centralization plan would occur in the urban medium-density category.

For the major regional centers in Racine County, the controlled centralization and controlled decentralization land use plans each propose three major industrial centers, while the controlled centralization plan proposes two major retail and service centers and the controlled decentralization plan proposes a total of three major retail and service centers. Both plans would provide for three major regional outdoor recreation centers in Racine County.

The greatest population increase in Racine County would occur under the controlled decentralization land use plan, which proposes that the County population reach nearly 225,000 persons by 2000, an increase of about 54,000 persons, or 32 percent, over the 1970 level of nearly 171,000 persons. Under the controlled centralization land use plan, the Racine County population would total nearly 218,000 in 2000, an increase of about 47,000, or 27 percent, over the 1970 level (see Table 211). The forecast population for Racine County set forth in Chapter III of this volume is nearly 218,000, or equal to the planned population under the controlled centralization plan and about 3 percent less than the planned population under the controlled decentralization land use plan.

Under the controlled decentralization land use plan, employment in Racine County would reach nearly 95,000 in 2000, an increase of about 31,000, or 49 percent, over the 1972 level of about 64,000. Under the controlled centralization land use plan, Racine County employment would reach about 89,000 in 2000, an increase of 26,000, or 40 percent, over the 1972 level. The forecast employment for Racine County is about 95,500, or about 7 percent more than the planned employment under the controlled centralization plan and about 1 percent more than the planned employment under the controlled decentralization plan.

As shown in Table 212, the controlled centralization plan would propose to increase the developed land area in Racine County to about 74 square miles, an increase of nearly 28 square miles, or about 61 percent, over the 1970 level of 46 square miles. In 1970 about 64 percent of the developed land area and nearly 80 percent of the population within the County were served by public sanitary sewerage facilities, and about 54 percent of the developed land area and 71 percent of the population were served by public water supply facilities. By 2000, the controlled centralization plan would propose to serve 92 percent of the developed area and 91 percent of the population with public sanitary sewerage and water supply facilities. The controlled decentralization plan would propose to increase the

Table 210

COMPARISON OF PROPOSED LAND USE CHANGES IN RACINE COUNTY: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Land Use Category	Existing 1970		Alternative Plan Increments: 1970-2000				Alternative Plan Totals: 2000			
			Controlled Centralization		Controlled Decentralization		Controlled Centralization		Controlled Decentralization	
	Acres	Percent of Total	Acres	Percent Change	Acres	Percent Change	Acres	Percent of Total	Acres	Percent of Total
Urban Land Use										
Residential										
Urban High Density	2,031.03	0.9	55.62	2.7	59.41	2.9	2,086.65	1.0	2,090.44	1.0
Urban Medium Density	4,254.75	2.0	4,223.61	99.3	3,954.85	93.0	8,478.36	3.9	8,209.60	3.8
Urban Low Density	8,970.09	4.1	-1,140.49	-12.7	- 1,245.78	-13.9	7,829.60	3.6	7,724.31	3.5
Suburban	1,368.75	0.6	- 843.63	-61.6	5,756.01	420.5	525.12	0.2	7,124.76	3.3
Subtotal	16,624.62	7.6	2,295.11	13.8	8,524.49	51.3	18,919.73	8.7	25,149.11	11.6
Commercial	574.80	0.3	80.50	14.0	99.79	17.4	655.30	0.3	674.59	0.3
Industrial	1,098.50	0.5	497.25	45.3	542.12	49.4	1,595.75	0.7	1,640.62	0.7
Governmental[a]	1,744.39	0.8	190.67	10.9	203.04	11.6	1,935.06	0.9	1,947.43	0.9
Transportation[b]	12,442.46	5.7	1,374.36	11.0	2,746.74	22.1	13,816.82	6.3	15,189.20	7.0
Recreation[c]	2,585.47	1.2	598.14	23.1	588.95	22.8	3,183.61	1.5	3,174.42	1.5
Urban Land Use Subtotal	35,070.24	16.1	5,036.03	14.4	12,705.13	36.2	40,106.27	18.4	47,775.37	22.1
Rural Land Use										
Residential[d]	--	--	--	--	48.62	--	--	--	48.62	--[e]
Agricultural										
Prime	69,128.85	31.8	-1,103.04	- 1.6	- 1,261.51	- 1.8	68,025.81	31.3	67,867.34	31.2
Other	78,078.10	35.9	-3,029.00	- 3.9	-10,249.17	-13.1	75,049.10	34.5	67,828.93	31.2
Subtotal	147,206.95	67.7	-4,132.04	- 2.8	-11,510.68	- 7.8	143,074.91	65.8	135,696.27	62.4
Other Open Lands[f]	35,284.69	16.2	- 903.99	- 2.6	- 1,243.07	- 3.5	34,380.70	15.8	34,041.62	15.6
Rural Land Use Subtotal	182,491.64	83.9	-5,036.03	- 2.8	-12,705.13	- 7.0	177,455.61	81.6	169,786.51	78.0
Total	217,561.88	100.0	--	--	--	--	217,561.88	100.0	217,561.88	100.0
Rural Lands Converted to Urban Use	--	--	5,036.03	--	12,705.13	--	--	--	--	--
Urban Lands Reverted to Unused Category[g]	--	--	--	--	--	--	--	--	--	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Existing area includes public and private recreation sites; planned incremental area includes only public recreation uses.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Less than 0.1 percent.*

[f] *Includes woodlands, water, wetlands, unused rural lands, and quarries.*

[g] *Includes only commercial and industrial land uses.*

Source: SEWRPC.

Table 211

EXISTING AND PROPOSED POPULATION AND EMPLOYMENT IN RACINE COUNTY: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Category	Existing 1970	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		Increment: 1970-2000		Total 2000	Increment: 1970-2000		Total 2000
		Number	Percent Change		Number	Percent Change	
Population	170,838	46,862	27.4	217,700	53,858	31.5	224,696
Employment . .	63,600	25,500	40.1	89,100	30,900	48.6	94,500

Source: SEWRPC.

Table 212

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY
PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN RACINE COUNTY: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Area and Population	Public Sanitary Sewer Service						Public Water Supply Service					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Developed Area												
Total Square Miles . . .	46.4	27.6	74.0	46.4	57.6	104.0	46.4	27.6	74.0	46.4	57.6	104.0
Square Miles Served . .	29.5	38.6	68.1	29.5	33.2	62.7	25.2	42.9	68.1	25.2	37.5	62.7
Percent of Total Served.	63.6	--	92.0	63.6	--	60.3	54.3	--	92.0	54.3	--	60.3
Population												
Total Population	170,838	46,862	217,700	170,838	53,858	224,696	170,838	46,862	217,700	170,838	53,858	224,696
Population Served . . .	135,900	62,200	198,100	135,900	59,100	195,000	120,900	77,200	198,100	120,900	74,100	195,000
Percent of Total Served.	79.5	-	91.0	79.5	--	86.8	70.8	--	91.0	70.8	--	86.8

Source: SEWRPC.

developed area to nearly 104 square miles, an increase of about 58 miles, or 126 percent, over the 1970 level, and would serve 60 percent of this developed area and 87 percent of the total population with public sanitary sewerage and water supply facilities.

Walworth County

A comparison of the changes proposed in Walworth County under each of the alternative regional land use plans considered is provided in Table 213. The controlled decentralization plan proposes the largest addition to the existing stock of urban land, with about 12,000 acres, or 19 square miles, converted to urban use by the year 2000, representing a 37 percent increase. The controlled centralization plan proposes to convert nearly 5,000 acres, or about eight square miles, representing a 15 percent increase in urban land. To provide for the new urban development, the controlled decentralization plan proposes to convert 4 percent of the existing stock of agricultural land and 2 percent of the existing stock of other open land, while the controlled centralization plan would convert about 1 percent of the existing stock of agricultural land and about 2 percent of the existing stock of other open lands. Nearly 900 acres of prime agricultural land would be converted to urban use under the controlled decentralization plan, representing about 1 percent of the total stock of prime

Table 213

COMPARISON OF PROPOSED LAND USE CHANGES IN WALWORTH COUNTY: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Land Use Category	Existing 1970		Alternative Plan Increments: 1970-2000				Alternative Plan Totals: 2000			
			Controlled Centralization		Controlled Decentralization		Controlled Centralization		Controlled Decentralization	
	Acres	Percent of Total	Acres	Percent Change	Acres	Percent Change	Acres	Percent of Total	Acres	Percent of Total
Urban Land Use										
Residential										
Urban High Density	29.03	--[a]	19.91	68.6	19.91	68.6	48.94	--[a]	48.94	--[a]
Urban Medium Density	3,082.85	0.8	4,020.35	130.4	3,794.82	123.1	7,103.20	1.9	6,877.67	1.9
Urban Low Density	7,223.40	2.1	104.64	1.4	199.91	2.8	7,328.04	2.0	7,423.31	2.0
Suburban	3,072.87	0.8	-2,098.51	-68.3	3,770.88	122.7	974.36	0.3	6,843.75	1.8
Subtotal	13,408.15	3.7	2,046.39	15.3	7,785.52	58.1	15,454.54	4.2	21,193.67	5.7
Commercial	593.02	0.2	48.39	8.2	84.48	14.2	641.41	0.2	677.50	0.2
Industrial	827.20	0.2	71.14	8.6	142.84	17.3	898.34	0.2	970.04	0.3
Governmental[b]	1,192.13	0.3	170.06	14.3	210.14	17.6	1,362.19	0.4	1,402.27	0.4
Transportation[c]	12,019.97	3.2	1,189.21	9.9	2,516.03	20.9	13,209.18	3.6	14,536.00	3.9
Recreation[d]	4,274.76	1.2	1,331.34	31.1	1,325.91	31.0	5,606.10	1.5	5,600.67	1.5
Urban Land Use Subtotal	32,315.23	8.8	4,856.53	15.0	12,064.92	37.3	37,171.76	10.1	44,380.15	12.0
Rural Land Use										
Residential[e]	--	--	--	--	33.27	--	--	--	33.27	--[e]
Agricultural										
Prime	112,462.66	30.4	- 356.55	- 0.3	- 894.14	- 0.8	112,106.11	30.3	111,568.52	30.1
Other	149,281.10	40.3	-3,042.96	- 2.0	- 9,558.26	- 6.4	146,238.14	39.5	139,722.84	37.8
Subtotal	261,743.76	70.7	-3,399.51	- 1.3	-10,452.40	- 4.0	258,344.25	69.8	251,291.36	67.9
Other Open Lands[f]	75,922.47	20.5	-1,457.00	- 1.9	- 1,645.77	- 2.2	74,465.47	20.1	74,276.70	20.1
Rural Land Use Subtotal	337,666.23	91.2	-4,856.51	- 1.4	-12,064.90	- 3.6	332,809.72	89.9	325,601.33	88.1
Total	369,981.46	100.0	--	--	--	--	369,981.48	100.0	369,981.48	100.0
Rural Lands Converted to Urban Use	--	--	4,856.53	--	12,064.92	--	--	--	--	--
Urban Lands Reverted to Unused Category[g]	--	--	--	--	--	--	--	--	--	--

[a] *Includes only commercial and industrial land uses.*

[b] *Includes institutional uses.*

[c] *Includes communications, utilities, and off-street parking uses.*

[d] *Existing area includes public and private recreation sites; planned incremental area includes only public recreation uses.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Less than 0.1 percent.*

[g] *Includes woodlands, water, wetlands, unused rural lands, and quarries.*

Source: SEWRPC.

agricultural land in Walworth County, while about 400 acres of prime agricultural land would be converted to urban use under the controlled centralization plan, representing less than 1 percent of the total such land in the county. The controlled decentralization plan would add about 3,800 acres of suburban-density residential land and about 3,800 acres of urban medium-density residential land, while virtually all of the new residential development under the controlled centralization plan would occur in the urban medium-density category.

Neither the controlled centralization nor the controlled decentralization plan would provide for the establishment of any major retail and service or major industrial centers in Walworth County. Both plans would provide, however, for a total of three major outdoor recreational centers in that County.

The greatest population increase in Walworth County would occur under the controlled decentralization land use plan, which proposes that the County population reach nearly 107,000 persons by 2000, an increase of about 43,000 persons, or 68 percent, over the 1970 level of about 63,000 persons. Under the controlled centralization land use plan, the Walworth County population would total nearly 100,000 in 2000, an increase of about 36,000, or 57 percent, over the 1970 level (see Table 214). The forecast population for Walworth County set forth in Chapter III of this volume is nearly 100,000, or equal to the planned population under the controlled centralization land use plan and about 7 percent less than the planned population under the controlled decentralization land use plan.

Under the controlled decentralization land use plan, employment in Walworth County would reach nearly 47,000 in 2000, an increase of nearly 23,000, or 94 percent, over the 1972 level of about 24,000. Under the controlled centralization land use plan, Walworth County employment would total about 37,000 in 2000, an increase of about 13,000, or 55 percent, over the 1972 level. The forecast employment for Walworth County is about 41,200, or about 10 percent more than the planned employment under the controlled centralization plan and about 12 percent less than the planned employment under the controlled decentralization plan.

As shown in Table 215, the controlled centralization plan would propose to increase the developed land area within Walworth County to nearly 56 square miles, an increase of 27 square miles, or about 93 percent, over the 1970 level of nearly 29 square miles. In 1970 about 41 percent of the developed land area and 56 percent of the population within the County were served by public sanitary sewerage facilities, and about 44 percent of the developed land area and 57 percent of the population were served by public water supply facilities. By 2000, the controlled centralization plan would propose to serve 77 percent of the developed area and 77 percent of the population with public sanitary sewerage and water supply facilities. The controlled decentralization plan would propose to increase the developed area to about 67 square miles, an increase of 38 square miles, or about 131 percent, over the 1970 level, and would serve about 52 percent of this developed area and 71 percent of the total population with public sanitary sewerage and water supply facilities.

Washington County

A comparison of the changes proposed within Washington County under each of the alternative regional land use plans is provided in Table 216. The controlled decentralization plan proposes the largest addition to the existing stock of urban land, with nearly 36,000 acres, or 56 square miles, converted to urban use by the year 2000, representing a 137 percent increase. The controlled centralization plan proposes to convert about 9,000 acres, or about 14 square miles, representing a 35 percent increase in urban land. To provide for the new urban development, the controlled decentralization plan proposes to convert about 18 percent of the existing stock of agricultural land and 3 percent of the existing stock of other open lands, while the controlled centralization plan would convert about 4 percent of the existing stock of agricultural land and about 2 percent of the existing stock of other open lands. The controlled

Table 214

EXISTING AND PROPOSED POPULATION AND EMPLOYMENT IN WALWORTH COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Category	Existing 1970	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		Increment: 1970-2000		Total 2000	Increment: 1970-2000		Total 2000
		Number	Percent Change		Number	Percent Change	
Population	63,444	36,156	57.0	99,600	43,161	68.0	106,605
Employment . .	24,100	13,300	55.2	37,400	22,600	93.8	46,700

Source: SEWRPC.

Table 215

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN WALWORTH COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Area and Population	Public Sanitary Sewer Service						Public Water Supply Service					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Developed Area												
Total Square Miles . . .	28.9	26.9	55.8	28.9	38.4	67.3	28.9	26.9	55.8	28.9	38.4	67.3
Square Miles Served . .	11.8	31.0	42.8	11.8	23.0	34.8	12.7	30.1	42.8	12.7	22.1	34.8
Percent of Total Served.	40.8	--	76.7	40.8	--	51.7	43.9	--	76.7	43.9	--	51.7
Population												
Total Population	63,444	36,156	99,600	63,444	43,161	106,605	63,444	36,156	99,600	63,444	43,161	106,605
Population Served . . .	35,500	41,600	77,100	35,500	39,700	75,200	36,300	40,800	77,100	36,300	38,900	75,200
Percent of Total Served.	56.0	--	77.4	56.0	--	70.5	57.2	--	77.4	57.2	--	70.5

Source: SEWRPC.

centralization plan would propose to convert about 600 acres of prime agricultural land, representing about 1 percent of the total stock of such land within the County, while the controlled decentralization plan would propose to convert about 400 acres of prime agricultural land to urban use. The controlled decentralization plan would add nearly 4,300 acres of urban medium density residential land and over 21,000 acres of suburban-density residential land, while virtually all of the new residential development under the controlled centralization plan would occur in the urban medium-density category.

For the major regional centers in Washington County, the two alternative regional land use plans are identical. Each plan would provide for one major retail and service center, one major industrial center, and two major outdoor recreation centers.

The greatest population increase in Washington County would occur under the controlled decentralization land use plan, which proposes that the County population reach nearly 175,000 persons by 2000, an increase of about 111,000 persons, or 173 percent, over the 1970 level of nearly 64,000 persons. Under the controlled centralization land use plan, the Washington County population would total about 143,000 in 2000, an increase of about 79,000, or 124 percent, over the 1970 level (see Table 217). The forecast population for Washington County set forth in Chapter III of this volume is 143,000, or equal to the planned population under the controlled centralization plan and about 18 percent less than the planned population under the controlled decentralization plan.

Under the controlled decentralization land use plan, employment in Washington County would reach about 59,000 in 2000, an increase of nearly 38,000, or about 179 percent, over the 1972 level of about 21,000. Under the controlled centralization land use plan, Washington County employment would reach nearly 53,000 in 2000, an increase of 32,000, or about 148 percent, over the 1972 level. The forecast employment for Washington County is about 36,000, or about 32 percent less than the planned employment under the controlled centralization plan and about 39 percent less than the planned employment under the controlled decentralization land use plan.

As shown in Table 218, the controlled centralization plan would propose to increase the developed land area within Washington County to about 52 square miles, an increase of 36 square miles, or about 225 percent, over the 1970 level of 16 square miles. In 1970 about 58 percent of the developed land area and 47 percent of the population within the County were served by public sanitary sewerage facilities, and about 50 percent of the developed land area and 44 percent of the population were served by public water supply facilities. By 2000 the controlled centralization plan would propose to serve 79 percent of the developed area and 79 percent of the population with public sanitary sewerage and water supply facilities. The controlled decentralization plan would propose to increase the developed area to about 153 square miles, an increase of 137 miles, or about 856 percent, over the 1970 level and would serve 25 percent of this developed area and 63 percent of the total population with public sanitary sewerage and water supply facilities.

Table 216

COMPARISON OF PROPOSED LAND USE CHANGES IN WASHINGTON COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Land Use Category	Existing 1970		Alternative Plan Increments: 1970-2000				Alternative Plan Totals: 2000			
			Controlled Centralization		Controlled Decentralization		Controlled Centralization		Controlled Decentralization	
	Acres	Percent of Total	Acres	Percent Change	Acres	Percent Change	Acres	Percent of Total	Acres	Percent of Total
Urban Land Use										
Residential										
Urban High Density	98.77	--[a]	84.23	85.3	91.17	92.3	183.00	0.1	189.94	0.1
Urban Medium Density	2,999.42	1.1	5,063.94	168.8	4,283.75	142.8	8,063.36	2.9	7,283.17	2.6
Urban Low Density	6,983.67	2.5	83.11	1.2	782.86	11.2	7,066.78	2.5	7,766.53	2.8
Suburban	1,443.64	0.5	- 759.57	- 52.6	21,154.33	1,465.3	684.07	0.2	22,597.97	8.1
Subtotal	11,525.50	4.1	4,471.71	38.8	26,312.11	228.3	15,997.21	5.7	37,837.61	13.6
Commercial	299.00	0.0	141.86	47.4	149.06	49.9	440.86	0.1	448.06	0.1
Industrial	433.70	0.2	450.41	103.9	469.95	108.4	884.11	0.3	903.65	0.3
Governmental[b]	919.03	0.3	375.19	40.8	398.63	43.4	1,294.22	0.5	1,317.66	0.5
Transportation[c]	11,286.02	4.0	2,544.74	22.5	7,335.39	65.0	13,830.76	5.0	18,621.41	6.7
Recreation[d]	1,663.71	0.6	1,108.87	66.7	1,101.68	66.2	2,772.58	1.0	2,765.39	1.0
Urban Land Use Subtotal	26,126.96	9.2	9,092.78	34.8	35,766.82	136.9	35,219.74	12.6	61,893.78	22.2
Rural Land Use										
Residential[e]	--	--	--	--	168.59	--	--	--	168.59	0.1
Agricultural										
Prime	49,537.08	17.8	- 611.16	- 1.2	- 387.56	- 0.8	48,925.92	17.6	49,149.52	17.6
Other	136,928.67	49.1	- 7,253.17	- 5.3	- 33,923.25	- 24.8	129,675.50	46.5	103,005.42	37.0
Subtotal	186.465.75	66.9	- 7,864.33	- 4.2	- 34,310.81	- 18.4	178,601.42	64.1	152,154.94	54.6
Other Open Lands[f]	66,140.69	23.7	- 1,228.44	- 1.9	- 1,624.60	- 2.5	64,912.25	23.3	64,516.09	23.1
Rural Land Use Subtotal	252,606.44	90.6	- 9,092.77	- 3.6	- 35,766.82	- 14.2	243,513.67	87.4	216,839.62	77.8
Total	278,733.40	99.8	--	--	--	--	278,733.41	100.0	278,733.40	100.0
Rural Lands Converted to Urban Use	--	--	9,092.78	--	35,766.82	--	--	--	--	--
Urban Lands Reverted to Unused Category[g]	--	--	--	--	--	--	--	--	--	--

[a] *Less than 0.05 percent.*

[b] *Includes institutional uses.*

[c] *Includes communications, utilities, and off-street parking uses.*

[d] *Existing area includes public and private recreation sites; planned incremental area includes only public recreation uses.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused rural lands, and quarries.*

[g] *Includes only commercial and industrial land uses.*

Source: SEWRPC.

Table 217

EXISTING AND PROPOSED POPULATION AND EMPLOYMENT IN WASHINGTON COUNTY: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Category	Existing 1970	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		Increment: 1970-2000		Total 2000	Increment: 1970-2000		Total 2000
		Number	Percent Change		Number	Percent Change	
Population	63,839	79,161	124.0	143,000	110,663	173.3	174,502
Employment . .	21,200	31,400	148.1	52,600	37,900	178.8	59,100

Source: SEWRPC.

Table 218

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY
PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN WASHINGTON COUNTY: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Area and Population	Public Sanitary Sewer Service						Public Water Supply Service					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Developed Area												
Total Square Miles . . .	16.3	36.2	52.5	16.3	137.0	153.3	16.3	36.2	52.5	16.3	137.0	153.3
Square Miles Served . .	9.4	32.0	41.4	9.4	29.1	38.5	8.1	33.3	41.4	8.1	30.4	38.5
Percent of Total Served.	57.7	--	78.9	57.7	--	25.1	49.7	--	78.9	49.7	--	25.1
Population												
Total Population	63,839	79,161	143,000	63,839	110,663	174,502	63,839	79,161	143,000	63,839	110,663	174,502
Population Served . . .	30,200	83,400	113,600	30,200	79,000	109,200	28,300	85,300	113,600	28,300	80,900	109,200
Percent of Total Served.	47.3	--	79.4	47.3	--	62.6	44.3	--	79.4	44.3	--	62.6

Source: SEWRPC.

Waukesha County

A comparison of the changes proposed in Waukesha County under each of the alternative regional land use plans considered is provided in Table 219. The controlled decentralization plan proposes the largest addition to the existing stock of urban land, with about 46,000 acres, or 72 square miles, converted to urban use by the year 2000, representing a 60 percent increase. The controlled centralization land use plan proposes to convert nearly 19,000 acres, or about 30 square miles, representing a 24 percent increase in urban land. To provide for the new urban development, the controlled decentralization plan proposes to convert 22 percent of the existing stock of agricultural land and 5 percent of the existing stock of other open lands, while the controlled centralization plan would convert nearly 8 percent of the existing stock of agricultural land and nearly 4 percent of the existing stock of other open lands. Whereas the controlled centralization plan would propose to convert to urban use about 1,300 acres of prime agricultural land, representing about 2 percent of the total such land in the County, the controlled decentralization plan would propose to convert about 8,000 acres of prime agricultural land to urban use, representing nearly 13 percent of the total such land in the County. The controlled decentralization plan would add about 14,000 acres of urban medium-density residential land and about 20,000 acres of suburban-density residential land, while virtually all of the new residential development under the controlled centralization plan would occur in the urban medium-density category.

Table 219

COMPARISON OF PROPOSED LAND USE CHANGES IN WAUKESHA COUNTY: 1970 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Land Use Category	Existing 1970		Alternative Plan Increments: 1970-2000				Alternative Plan Totals: 2000			
			Controlled Centralization		Controlled Decentralization		Controlled Centralization		Controlled Decentralization	
	Acres	Percent of Total	Acres	Percent Change	Acres	Percent Change	Acres	Percent of Total	Acres	Percent of Total
Urban Land Use										
Residential										
Urban High Density	623.09	0.1	81.03	13.0	81.03	13.0	704.12	0.2	704.12	0.2
Urban Medium Density	7,295.83	2.0	13,364.14	183.2	13,768.61	188.7	20,659.97	5.6	21,064.44	5.7
Urban Low Density	26,896.02	7.2	- 746.47	2.8	- 1,611.06	- 6.0	26,149.55	7.0	25,284.96	6.8
Suburban	8,462.61	2.3	- 2,399.58	- 28.4	19,630.40	232.0	6,063.03	1.6	28,093.01	7.5
Subtotal	43,277.55	11.6	10,299.12	23.8	31,868.98	73.6	53,576.67	14.4	75,146.53	20.2
Commercial	1,340.74	0.4	270.02	20.1	343.36	25.6	1,610.76	0.5	1,684.10	0.5
Industrial	1,525.09	0.4	804.90	52.8	965.70	63.3	2,329.99	0.6	2,490.79	0.7
Governmental[a]	3,008.97	0.8	827.59	27.5	937.07	31.1	3,836.56	1.0	3,946.04	1.1
Transportation[b]	21,246.56	5.7	5,402.15	25.4	10,945.59	51.5	26,648.71	7.2	32,192.15	8.6
Recreation[c]	6,218.79	1.7	957.76	15.4	967.97	15.6	7,176.55	1.9	7,186.76	1.9
Urban Land Use Subtotal	76,617.70	20.6	18,561.54	24.2	46,028.67	60.1	95,179.24	25.6	122,646.37	33.0
Rural Land Use										
Residential[d]	--	--	--	--	3,711.98	--	--	--	3,711.98	1.0
Agricultural										
Prime	63,743.55	17.2	- 1,296.63	- 2.0	- 8,030.45	- 12.6	62,446.92	16.8	55,713.10	15.0
Other	137,932.54	37.1	- 13,888.97	- 10.1	- 36,975.74	- 26.8	124,043.57	33.4	100,956.80	27.2
Subtotal	201,676.09	54.3	- 15,185.60	- 7.5	- 45,006.19	- 22.3	186,490.49	50.2	156,669.90	42.2
Other Open Lands[e]	93,351.47	25.1	- 3,375.89	- 3.6	- 4,734.41	- 5.1	89,975.58	24.2	88,617.06	23.8
Rural Land Use Subtotal	295,027.56	79.4	- 18,561.49	- 6.3	- 46,028.62	- 15.6	276,466.07	74.4	248,998.94	67.0
Total	371,645.26	100.0	--	--	--	--	371,645.31	100.0	371,645.31	100.0
Rural Lands Converted to Urban Use	--	--	18,561.54	--	46,028.67	--	--	--	--	--
Urban Lands Reverted to Unused Category[f]	--	--	--	--	--	--	--	--	--	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Existing area includes public and private recreation sites; planned incremental area includes only public recreation uses.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused rural lands, and quarries.*

[f] *Includes only commercial and industrial land uses.*

Source: SEWRPC.

Both the controlled centralization and controlled decentralization plans would provide for three major industrial centers in Waukesha County, while the controlled centralization plan would provide for two major retail and service centers and the controlled decentralization plan a total of three major retail and service centers in Waukesha County. Each plan would provide for six major regional outdoor recreation centers.

The greatest population increase in Waukesha County would occur under the controlled decentralization land use plan which proposes that the County population reach about 463,000 persons by 2000, an increase of about 232,000 persons, or about 100 percent, over the 1970 level of about 231,000 persons. Under the controlled centralization land use plan, the Waukesha County population would total nearly 421,000 in 2000, an increase of about 189,000, or 82 percent, over the 1970 level (see Table 220). The forecast population for Waukesha County set forth in Chapter III of this volume is about 421,000, or equal to the planned population under the controlled centralization land use plan and about 9 percent less than the planned population under the controlled decentralization land use plan.

Under the controlled decentralization land use plan, employment in Waukesha County would total about 162,000 in 2000, an increase of nearly 91,000, or about 127 percent, over the 1972 level of nearly 72,000. Under the controlled centralization land use plan, Waukesha County employment would total about 138,000 in 2000, an increase of nearly 67,000, or 92 percent, over the 1972 level. The forecast employment for Waukesha County is about 157,400, or about 14 percent more than the planned employment under the controlled centralization plan and about 3 percent less than the planned employment under the controlled decentralization plan.

As shown in Table 221, the controlled centralization plan would propose to increase the developed land area within Waukesha County to nearly 181 square miles, an increase

Table 220

EXISTING AND PROPOSED POPULATION AND EMPLOYMENT IN WAUKESHA COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Category	Existing 1970	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		Increment: 1970-2000		Total 2000	Increment: 1970-2000		Total 2000
		Number	Percent Change		Number	Percent Change	
Population	231,338	189,262	81.8	420,600	231,901	100.2	463,239
Employment . .	71,500	66,500	93.0	138,000	90,900	127.1	162,400

Source: SEWRPC.

Table 221

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN WAUKESHA COUNTY: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Area and Population	Public Sanitary Sewer Service						Public Water Supply Service					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Developed Area												
Total Square Miles . . .	78.4	102.4	180.8	78.4	180.6	259.0	78.4	102.4	180.8	78.4	180.6	259.0
Square Miles Served . .	38.5	123.7	162.2	38.5	120.8	159.3	24.6	137.6	162.2	24.6	134.7	159.3
Percent of Total Served.	49.1	--	89.7	49.1	--	61.5	31.4	--	89.7	31.4	--	61.5
Population												
Total Population	231,338	189,262	420,600	231,338	231,901	463,239	231,338	189,262	420,600	231,338	231,901	463,239
Population Served . . .	122,100	268,500	390,600	122,100	273,700	395,800	84,400	306,200	390,600	84,400	311,400	395,800
Percent of Total Served.	52.8	--	92.9	52.8	--	85.4	36.5	--	92.9	36.5	--	85.4

Source: SEWRPC.

of 102 square miles, or about 131 percent, over the 1970 level of about 78 square miles. In 1970, about 49 percent of the developed land area and nearly 53 percent of the population within the County were served by public sanitary sewerage facilities, and about 31 percent of the developed land area and nearly 37 percent of the population were served by public water supply facilities. By 2000 the controlled centralization plan would propose to serve nearly 90 percent of the developed land area and 93 percent of the population with public sanitary sewerage and water supply facilities. The controlled decentralization plan would propose to increase the developed area to nearly 259 square miles, an increase of 181 square miles, or 232 percent, over the 1970 level, and would serve about 62 percent of the developed area and 85 percent of the total population with public sanitary sewerage and water supply facilities.

Planning Analysis Area Comparisons

Planning analysis areas consist of groups of minor civil divisions—cities, villages, and towns—and in some cases subareas of minor civil divisions throughout the Region created for the purpose of presenting and analyzing relevant planning data. A total of 60 planning analysis areas have been identified within the Region (see Map 2). With respect to the two alternative regional land use plans considered, presentation of data at the planning analysis area level permits a greater degree of subcounty identification of proposed changes in urban and rural land use and accompanying population, employment, and public utility data. Changes in urban land use in the Region under the controlled centralization and controlled decentralization land use plans are identified by planning analysis area in Table 222. Similarly, Table 223 compares prime agricultural land lost in the Region by planning analysis area under the controlled centralization and controlled decentralization land use plans, while Table 224 compares population in the Region by planning analysis area. Finally, Table 225 compares employment in the Region by planning analysis area, while Table 226 compares population served by public sanitary sewer and water supply in the Region by planning analysis area.

ALTERNATIVE LAND USE PLAN EVALUATION—SATISFACTION OF OBJECTIVES AND STANDARDS

The specific land use development objectives to be met by the regional land use plans have been set forth in Chapter II of this volume, together with the standards which relate these objectives to physical development proposals and facilitate evaluation of the ability of the alternative land use plans to meet the chosen objectives. To determine the ability of the land use plans to meet the development objectives, the alternative land use plans were scaled against the standards supporting each development objective. It should be noted that some of the standards served as inputs to the plan design process and, accordingly, are equally well met for both land use plan alternatives. Other standards are not directly used in the plan design process and, therefore, can provide a sound basis for a differential evaluation of how well each plan meets the objectives.

The results of these procedures are summarized in Table 227. This table indicates the extent to which the controlled centralization and controlled decentralization land use plans meet each land use development standard. Determination of the ability of the plan proposals to meet the standards was based laregly upon evaluation of the incremental land use development proposals. In some cases, however, as noted below, the evaluation was based upon the total future land use development pattern.

Objective No. 1—Balanced Allocation of Land Use

The first land use development objective relates to achievement of a balanced allocation of space to the various land use categories so that the social, physical, and economic needs of the regional population are met. This objective is supported by five specific standards covering residential, governmental and institutional, park and recreation, commercial, and industrial land allocation. Standard No. 1, residential land allocation in the urban high-, urban medium-, urban low-, suburban-, and rural-density categories, has been met equally well for both the controlled centralization and controlled decentralization land use plans since the standard for each category served as an input to the plan design process. Accordingly, all of the incremental development would meet the residential land allocation standard.

Standards 2 and 5 under Objective No. 1 are intended to be applied to total regional development pattern, while Standards 3 and 4 are intended to be applied to the regional employment increment. None of these standards served as direct input to the plan design process. The governmental and institutional land allocation standard calls for provision on a regionwide basis of nine acres of major and other governmental and institutional land per thousand persons. The controlled centralization and controlled decentralization plans meet this standard equally well with each providing for a total of nine acres per thousand population. Similarly, both plans meet the standards for park and recreation land allocation of five gross acres of major park land per thousand persons and nine gross acres of local park land per thousand persons. In each case, the two plans would provide for five acres of major park land, and nine acres of other park land per thousand persons, thus precisely meeting the standard.

For the major commercial land allocation standard, both alternative land use plans would meet the one net development acre per 100 added employees standard. For the other commercial land portion of the standard, however, both plans would provide less land than the required two net development acres per 100 added employees, with both the controlled centralization plan and the controlled decentralization plan providing one net acre per 100 added employees.

Finally, with respect to the major and other industrial land allocation standard of seven net development acres per 100 added employees, both the controlled centralization plan and the controlled decentralization plan would not meet the standard, providing about four net acres per added 100 employees.

In summary, it may be concluded that, for Objective No. 1, providing a balanced allocation of land use within the Region, the controlled centralization and controlled

decentralization land use plans meet the relevant standards equally well. It may be expected, then, that, in applying the rank-based expected value method of plan evaluation discussed below, there will be no difference between these two plans for Objective No. 1.

Objective No. 2—Compatible Arrangement of Land Uses

The second land use development objective relates to achievement of a spatial distribution of the various land uses to result in a compatible arrangement of land uses. This objective is supported by four specific standards. Standard No. 1 indicates that urban high-, urban medium-, and urban low-density residential development should be located within neighborhood planning units that are served by centralized public sanitary sewerage and water supply facilities and that contain, within a reasonable walking distance, necessary supporting local service uses, such as park, neighborhood commercial, and elementary school facilities. As indicated in Table 227, this standard could be met by both the controlled centralization and controlled decentralization land use plans provided that local communities in the Region take appropriate action to ensure regional plan implementation through the development and implementation of community and neighborhood land use plans. In both alternative regional land use plans, the basic framework for sound neighborhood planning and development is provided, including proper densities and supporting utility facilities. It is important to note, however, that, while virtually all of the urban population in the Region could be accommodated in newly developed or redeveloped planned neighborhood units under the controlled centralization plan, about 150,000 urban persons would reside at the very low suburban and rural densities under the controlled decentralization plan and could not, therefore, be accommodated in neighborhood units.

Standard No. 2 indicates that suburban and rural residential density land uses should have reasonable access through the appropriate component of the transportation system to local commercial and industrial uses, cultural and governmental centers, and educational facilities. This standard has been met for both alternative regional land use plans by locating suburban and rural density land uses in areas already provided with adequate access to the higher density urban areas which would provide the basis for offering services and facilities to those residing in the suburban and rural areas of the Region.

Standard No. 3 provides that new industrial land uses should be so located as to have direct access to the arterial street system, as well as appropriate access to railway, seaport, and airport facilities, and should not be mixed with inappropriate commercial, residential, governmental, recreational, or institutional land uses. This standard has been met by design under both the controlled centralization and controlled decentralization land use plans.

Standard No. 4 indicates that new regional commercial uses should be located in centers of concentrated activity on only one side of an arterial street and should be afforded direct access to the arterial system. This standard has been met by design in both alternative land use plans considered.

In summary, it may be concluded that for Objective No. 2, providing for a compatible arrangement of land uses, the controlled centralization and controlled decentralization land use plans meet the relevant standards equally well. It may be expected, then, that, in applying the rank-based expected value method of plan evaluation, there will be no difference between the two plans with respect to Objective No. 2.

Objective No. 3—Protection, Wise Use, and Development of the Natural Resource Base

The third land use development objective seeks spatial distribution of land uses that will result in the protection, wise use, and development of the natural resources of the Region. This objective is supported by five specific standards relating to soils, inland lakes and streams, wetlands, woodlands, and wildlife habitat.

Standard No. 1 involves the proper relationship of urban and rural land use development to the soils found in the Region. This standard provides that sewered urban development should not be located in areas covered by soils rated as having "severe" or "very severe" limitations for such development; that unsewered suburban and rural development should not be located in areas covered by soils rated as having "severe" or "very severe" limitations for such development; and that rural agricultural development should not be located in areas covered by soils rated as having "severe" or "very severe" limitations for such use. As indicated in Table 227, this standard has been met equally well by both the controlled centralization and controlled decentralization land use plans, since the soils data provided an input to the plan design process.

Standard No. 2 considers the proper recognition of shorelands and floodlands along inland lakes and streams and contains several specific standards as summarized in Table 227. For major inland lakes, that is, those lakes having a surface area of 50 acres or more, the standards provide that 25 percent of the shoreline be maintained in a natural state, that 50 percent of the shoreline be maintained in nonurban use, and that 10 percent of the shoreline be preserved for public use. As indicated in Table 227, these standards can be met for varying numbers of major lakes throughout the Region, with no difference between the two alternative regional land use plans in the degree to which these standards can be met. For minor inland lakes, that is, lakes having under 50 acres in surface area, the standard provides that 25 percent of the shoreline be maintained in a natural state or in a low-density public use, a standard that is considered to be partially met under either alternative regional land use plan. For perennial streams, the standards provide for maintenance of 25 percent of the shoreline in a natural state and 50 percent of the shoreline in nonurban use. These standards can be met for 121 of 129 streams in the Region under either alternative regional land use plan. The final two substandards relate to keeping floodlands free from new and incompatible urban development and restricting encroachments in channels and floodways. Again, these standards have been met in the design of the two alternative regional land use plans considered, particularly because of the recommendations in those plans for preservation of primary environmental corridors.

Table 222

COMPARISON OF URBAN LAND USE IN THE REGION BY PLANNING ANALYSIS AREA: 1963, 1970, AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Planning Analysis Area[a]	Urban Land Use Area in Acres							
			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Historic 1963	Existing 1970	Planned Increment	Percent Change 1970-2000	Total 2000	Planned Increment	Percent Change 1970-2000	Total 2000
Kenosha County								
50	3,074,14	3,222.79	444.76	13.8	3,667.55	181.67	5.6	3,404.46
51	4,931.98	5,344.26	882.27	16.5	6,226.53	964.27	18.0	6,308.53
52	3,358.03	3,991.74	1,864.04	46.7	5,855.78	3,775.84	94.6	7,767.58
53	3,340.59	3,547.14	1,254.40	35.4	4,801.54	2,219.99	62.6	5,767.13
54	2,481.96	3,023.03	347.11	11.5	3,370.14	479.75	15.9	3,502.78
55	7,711.88	8,586.73	1,136.42	13.2	9,723.15	4,383.16	51.0	12,969.89
Subtotal	24,898.58	27,715.69	5,929.00	21.4	33,644.69	12,004.68	43.3	39,720.37
Milwaukee County								
13	5,303.65	5,209.08	--	--	5,209.08	- 416.48	- 8.0	4,792.60
14	4,674.71	5,323.35	677.69	12.7	6,001.04	401.99	7.6	5,725.34
15	2,610.90	2,616.58	--	--	2,616.58	- 29.74	- 1.1	2,586.84
16	2,286.89	2,258.58	--	--	2,258.58	- 73.05	- 3.2	2,185.53
17	5,028.50	7,253.23	4,206.84	58.0	11,460.07	1,658.02	22.9	8,911.25
18	8,394.30	9,081.70	--	--	9,081.70	- 151.73	- 1.7	8,929.97
19	5,276.70	5,374.04	--	--	5,374.04	- 119.43	- 2.2	5,254.61
20	6,350.53	6,173.35	--	--	6,173.35	- 355.68	- 5.8	5,817.67
21	4,802.46	4,837.99	--	--	4,837.99	- 153.83	- 3.2	4,684.16
22	2,381.04	2,489.95	--	--	2,489.95	- 25.94	- 1.0	2,464.01
23	2,887.19	3,213.67	--	--	3,213.67	- 7.07	- 0.2	3,206.60
24	4,240.64	4,362.36	--	--	4,362.36	- 79.54	- 1.8	4,282.82
25	4,219.30	5,283.25	81.76	1.5	5,365.01	81.76	1.5	5,365.01
26	6,161.43	6,416.49	--	--	6,416.49	- 23.50	- 0.4	6,392.99
27	4,423.95	5,106.89	4,347.54	85.1	9,454.43	2,249.01	44.0	7,355.90
28	4,741.06	5,824.39	2,588.82	44.4	8,413.21	338.80	5.8	6,163.19
29	8,476.18	9,765.18	1,405.76	14.4	11,170,94	962.01	9.9	10,727.19
30	7,280.41	7,638.75	--	--	7,638.75	- 115.06	- 1.5	7,523.69
31	7,318.59	8,021.47	14.29	0.2	8,035.76	- 39.62	- 0.5	7,981.85
Subtotal	96,858.43	106,250.30	13,322.70	12.5	119,573.00	4,100.92	3.9	110,351.22
Ozaukee County								
1	2,673.23	2,987.24	574.37	19.2	3,561.61	540.19	18.1	3,527.43
2	2,177.36	2,465.83	312.87	12.7	2,778.70	3,937.22	159.7	6,403.05
3	1,910.24	2,181.74	645.14	29.6	2,826.88	3,627.03	166.2	5,808.77
4	4,386.66	6,953.20	1,971.73	28.4	8,924.93	16,157.75	232.4	23,110.95
5	7,929.94	9,158.21	3,714.27	40.6	12,872.48	3,365.56	36.7	12,523.77
Subtotal	19,077.43	23,746.22	7,218.38	30.4	30,964.60	27,627.75	116.3	51,373.97

Table 222 (continued)

Planning Analysis Area[a]	Urban Land Use Area in Acres							
			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Historic 1963	Existing 1970	Planned Increment	Percent Change 1970-2000	Total 2000	Planned Increment	Percent Change 1970-2000	Total 2000
Racine County								
43	5,431.66	6,111.75	309.73	5.1	6,421.48	308.85	5.1	6,420.60
44	6,544.48	6,973.02	75.00	1.1	7,048.02	75.00	1.1	7,048.02
45	2,869.02	3,678.45	493.32	13.4	4,171.77	916.49	24.9	4,594.94
46	2,778.80	3,628.72	1,780.71	49.1	5,409.43	1,718.19	47.3	5,346.91
47	3,529.96	4,597.61	477.57	10.4	5,075.18	954.51	20.8	5,552.12
48	5,245.32	6,252.01	1,003.37	16.0	7,255.38	6,021.92	96.3	12,273.93
49	3,422.25	3,828.68	896.33	23.4	4,725.01	2,710.17	70.8	6,538.85
Subtotal	29,821.49	35,070.24	5,036.03	14.4	40,106.27	12,705.13	36.2	47,775.37
Walworth County								
56	3,576.42	4,218.72	908.31	21.5	5,127.03	6,558.87	155.5	10,777.59
57	4,514.63	5,099.77	835.73	16.4	5,935.50	1,832.31	35.9	6,932.08
58	2,768.18	3,512.46	1,386.57	39.5	4,899.03	1,760.87	50.1	5,273.33
59	12,128.91	14,175.51	1,184.27	8.4	15,359.78	1,259.91	8.9	15,435.42
60	4,960.03	5,308.77	541.65	10.2	5,850.42	652.96	12.3	5,961.73
Subtotal	27,948.17	32,315.23	4,856.53	15.0	37,171.76	12,064.92	37.3	44,380.15
Washington County								
6	2,373.48	2,826.30	225.66	8.0	3,051.96	413.29	14.6	3,239.59
7	5,551.40	6,999.99	3,024.33	43.2	10,024.32	12,522.17	178.9	19,522.16
8	2,101.03	2,231.72	133.63	6.0	2,365.35	1,319.86	59.1	3,551.58
9	2,055.03	2,631.30	1,091.18	41.5	3,722.48	4,333.52	164.7	6,964.82
10	3,537.38	4,112.82	1,934.86	47.0	6,047.68	5,877.91	142.9	9,990.73
11	2,243.32	2,983.66	2,683.12	89.9	5,666.78	2,070.00	69.4	5,053.66
12	2,546.10	4,341.17	--	--	4,341.17	9,230.07	212.6	13,571.24
Subtotal	20,407.74	26,126.96	9,092.78	34.8	35,219.74	35,766.82	136.9	61,893.78
Waukesha County								
32	7,195.90	8,094.83	3,230.01	39.9	11,324.84	2,969.19	36.7	11,064.02
33	11,453.12	12,726.42	1,460.09	11.5	14,186.51	1,676.72	13.2	14,403.14
34	6,288.19	8,048.09	2,879.49	35.8	10,927.58	3,020.76	37.5	11,068.85
35	3,865.07	4,493.16	1,573.60	35.0	6,066.76	1,620.41	36.1	6,113.57
36	5,216.98	7,087.45	2,302.12	32.5	9,389.57	10,342.85	145.9	17,430.30
37	2,817.51	3,585.91	843.16	23.5	4,429.07	2,508.06	69.9	6,093.97
38	2,836.02	3,686.66	1,040.36	28.2	4,727.02	2,950.86	80.0	6,637.52
39	6,256.61	7,422.03	914.86	12.3	8,336.89	7,500.58	101.1	14,922.61
40	7,571.73	9,706.91	3,378.74	34.8	13,085.65	6,024.12	62.1	15,731.03
41	4,066.92	6,945.34	--	--	6,945.34	30.99	0.4	6,976.33
42	3,646.01	4,820.90	939.11	19.5	5,760.01	7,384.13	153.2	12,205.03
Subtotal	61,214.06	76,617.70	18,561.54	24.2	95,179.24	46,028.67	60.1	122,646.37
Region Total	280,225.90	327,842.34	64,016.96	19.5	391,859.30	150,298.89	45.8	478,141.23

[a] *See Map 2.*

Source: SEWRPC.

Table 223

COMPARISON OF NET PRIME AGRICULTURAL LAND IN THE REGION BY PLANNING ANALYSIS AREA
1963, 1970, AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Planning Analysis Area[a]	Net Prime Agricultural Land Area in Acres							
			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Historic 1963	Existing 1970	Planned Increment	Percent Change 1970-2000	Total 2000	Planned Increment	Percent Change 1970-2000	Total 2000
Kenosha County								
50	151.84	150.83	- 46.55	- 30.9	104.28	- 38.64	- 25.6	112.19
51	10.16	6.95	--	--	6.95	--	--	6.95
52	13,281.18	12,782.85	- 1,034.47	- 8.1	11,748.38	- 2,468.47	- 19.3	10,314.38
53	6,133.71	5,919.06	- 136.86	- 2.3	5,782.20	- 405.08	- 6.8	5,513.98
54	30,171.43	30,050.01	- 246.34	- 0.8	29,803.67	- 245.74	- 0.8	29,804.27
55	17,265.22	17,144.95	- 42.62	- 0.2	17,102.33	- 42.62	- 0.2	17,102.33
Subtotal	67,013.54	66,054.65	- 1,506.84	- 2.3	64,547.81	- 3,200.55	- 4.8	62,854.10
Milwaukee County								
13	--	--	--	--	--	--	--	--
14	272.53	197.39	- 51.40	- 26.0	145.99	- 51.40	- 26.0	145.99
15	--	--	--	--	--	--	--	--
16	--	--	--	--	--	--	--	--
17	1,892.94	1,301.73	- 748.10	- 57.5	553.63	- 337.20	- 25.9	964.53
18	--	--	--	--	--	--	--	--
19	--	--	--	--	--	--	--	--
20	--	--	--	--	--	--	--	--
21	--	--	--	--	--	--	--	--
22	--	--	--	--	--	--	--	--
23	--	--	--	--	--	--	--	--
24	--	--	--	--	--	--	--	--
25	--	--	--	--	--	--	--	--
26	--	--	--	--	--	--	--	--
27	1,361.49	1,305.05	- 353.89	- 27.1	951.16	- 252.90	- 19.4	1,052.15
28	4,448.72	4,360.66	--	--	4,360.66	--	--	4,360.66
29	--	--	--	--	--	--	--	--
30	--	--	--	--	--	--	--	--
31	--	--	--	--	--	--	--	--
Subtotal	7,975.68	7,164.83	- 1,153.39	- 16.1	6,011.44	- 641.50	- 9.0	6,523.33
Ozaukee County								
1	15,524.82	15,479.95	--	--	15,479.95	--	--	15,479.95
2	5,175.74	5,159.73	--	--	5,159.73	- 613.34	- 11.9	4,546.39
3	1,731.78	1,733.50	--	--	1,733.50	--	--	1,733.50
4	9,506.59	8,620.99	- 7.96	- 0.1	8,613.03	- 6,939.84	- 80.5	1,681.15
5	6,221.96	6,118.06	--	--	6,118.06	- 419.73	- 6.9	5,698.33
Subtotal	38,160.89	37,112.23	- 7.96	--[b]	37,104.27	- 7,972.91	- 21.5	29,139.32

Table 223 (continued)

Planning Analysis Area[a]	Net Prime Agricultural Land Area in Acres							
			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Historic 1963	Existing 1970	Planned Increment	Percent Change 1970-2000	Total 2000	Planned Increment	Percent Change 1970-2000	Total 2000
Racine County								
43	--	--	--	--	--	--	--	--
44	625.06	597.15	--	--	597.15	--	--	597.15
45	11,619.56	11,060.09	- 176.64	- 1.6	10,883.45	- 292.16	- 2.6	10,767.93
46	14,171.87	13,294.20	- 836.99	- 6.3	12,457.21	- 879.12	- 6.6	12,415.08
47	25,771.54	25,137.75	- 89.41	- 0.4	25,048.34	- 89.41	- 0.4	25,048.34
48	17,492.06	17,309.82	--	--	17,309.82	- 0.82	--[b]	17,309.00
49	1,711.65	1,729.84	--	--	1,729.84	--	--	1,729,84
Subtotal	71,391.74	69,128.85	- 1,103.04	- 1.6	68,025.81	- 1,261.51	- 1.8	67,867.34
Walworth County								
56	8,033.32	8,022.85	--	--	8,022.85	--	--	8,022.85
57	21,526.76	21,512.69	--	--	21,512.69	- 231.74	- 1.1	21,280.95
58	24,145.73	23,679.98	- 149.82	- 0.6	23,530.16	- 375.95	- 1.6	23,304.03
59	24,586.09	24,501.18	- 55.62	- 0.2	24,445.56	- 136.97	- 0.6	24,364.21
60	34,726.56	34,745.96	- 151.11	- 0.4	34,594.85	- 149.48	- 0.4	34,596.48
Subtotal	113,018.46	112,462.66	- 356.55	- 0.3	112,106.11	- 894.14	- 0.8	111,568.52
Washington County								
6	1,733.62	1,745.84	--	--	1,745.84	--	--	1,745.84
7	3,836.90	3,758.28	--	--	3,758.28	- 9.55	- 0.3	3,748.73
8	19,411.48	19,405.29	--	--	19,405.29	--	--	19,405.29
9	11,718.54	11,541.26	- 87.63	- 0.8	11,453.63	--	--	11,541.26
10	3,876.46	3,856.35	--	--	3,856.35	--	--	3,856.35
11	2,726.59	2,545.86	- 523.53	- 20.6	2,022.33	- 377.30	- 14.8	2,168.56
12	6,849.31	6,684.20	--	--	6,684.20	- 0.71	--[b]	6,683.49
Subtotal	50,152.90	49,537.08	- 611.16	- 1.2	48,925.92	- 387.56	- 0.8	49,149.52
Waukesha County								
32	169.52	162.11	- 131.15	- 80.9	30.96	- 31.78	- 19.6	130.33
33	--	--	--	--	--	--	--	--
34	--	--	--	--	--	--	--	--
35	3,361.53	3,335.35	--	--	3,335.35	--	--	3,335.35
36	6,279.73	5,822.64	--	--	5,822.64	- 2,639.56	- 45.3	3,183.08
37	7,050.48	6,901.04	--	--	6,901.04	- 89.14	- 1.3	6,811.90
38	2,932.06	2,863.97	--	--	2,863.97	- 91.50	- 3.2	2,772.47
39	15,455.87	15,253.61	- 19.49	- 0.1	15,234.12	- 3,604.55	- 23.6	11,649.06
40	7,901.38	7,298.00	- 1,113.38	- 15.3	6,184.62	- 1,541.31	- 21.1	5,756.69
41	12,137.59	11,629.92	--	--	11,629.92	--	--	11,629.92
42	10,583.13	10,476.91	- 32.61	- 0.3	10,444.30	- 32.61	- 0.3	10,444.30
Subtotal	65,871.29	63,743.55	- 1,296.63	- 2.0	62,446.92	- 8,030.45	- 12.6	55,713.10
Region Total	413,584.50	405,203.85	- 6,035.57	- 1.5	399,168.28	- 22,388.62	- 5.5	382,815.23

[a] *See Map 2.*

[b] *Less than 0.1 percent.*

Source: SEWRPC.

Table 224

COMPARISON OF POPULATION IN THE REGION BY PLANNING ANALYSIS AREA: 1963, 1970, AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Planning Analysis Area[a]	Population							
			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Historic 1963	Existing 1970	Planned Increment	Percent Change 1970-2000	Total 2000	Planned Increment	Percent Change 1970-2000	Total 2000
Kenosha County								
50	26,644	29,524	6,686	22.6	36,210	4,676	15.8	34,200
51	52,480	54,116	11,445	21.1	65,561	11,582	21.4	65,698
52	6,141	6,981	15,832	226.8	22,813	30,718	440.0	37,699
53	5,135	7,473	10,174	136.1	17,647	17,701	236.9	25,174
54	3,800	4,484	3,193	71.2	7,677	3,216	71.7	7,700
55	12,500	15,339	9,553	62.3	24,892	16,991	110.8	32,330
Subtotal	106,700	117,917	56,883	48.2	174,800	84,884	72.0	202,801
Milwaukee County								
13	12,886	14,154	1,060	7.5	15,214	1,065	7.5	15,219
14	17,656	24,312	7,422	30.5	31,734	5,421	22.3	29,733
15	38,710	34,758	- 3,955	- 11.4	30,803	- 5,958	- 17.1	28,800
16	51,196	45,979	- 10,481	- 22.8	35,498	- 14,477	- 31.5	31,502
17	24,186	38,029	31,760	83.5	69,789	16,189	42.6	54,218
18	131,138	127,286	- 8,386	- 6.6	118,900	- 26,387	- 20.7	100,899
19	97,965	89,031	- 11,228	- 12.6	77,803	- 23,233	- 26.1	65,798
20	205,770	165,520	- 37,223	- 22.5	128,297	- 68,220	- 41.2	97,300
21	92,583	74,278	- 15,678	- 21.1	58,600	- 25,679	- 34.6	48,599
22	22,159	22,134	- 2,634	- 11.9	19,500	- 4,134	- 18.7	18,000
23	38,586	42,063	951	2.3	43,014	- 51	0.1	42,012
24	72,459	64,772	- 8,769	- 13.5	56,003	- 12,770	- 19.7	52,002
25	29,584	35,369	2,562	7.2	37,931	2,562	7.2	37,931
26	53,100	56,530	2,180	3.9	58,710	- 1,819	- 3.2	54,711
27	10,464	13,821	25,356	183.5	39,177	10,356	74.9	24,177
28	11,000	12,989	20,568	158.3	33,557	5,559	42.8	18,548
29	37,400	48,894	14,376	29.4	63,270	11,376	23.3	60,270
30	78,100	83,794	- 8,694	- 10.4	75,100	- 16,691	- 19.9	67,103
31	61,558	60,536	- 3,836	- 6.3	56,700	- 8,837	- 14.6	51,699
Subtotal	1,086,500	1,054,249	- 4,649	- 0.4	1,049,600	- 155,728	- 14.8	898,521
Ozaukee County								
1	4,800	5,225	1,684	32.2	6,909	1,575	30.1	6,800
2	8,100	10,280	4,376	42.6	14,656	12,746	124.0	23,026
3	2,400	2,905	5,608	193.0	8,513	10,847	373.4	13,752
4	14,000	20,201	22,765	112.7	42,966	46,757	231.5	66,958
5	12,300	15,850	25,106	158.4	40,956	22,550	142.3	38,400
Subtotal	41,600	54,461	59,539	109.3	114,000	94,475	173.5	148,936

Table 224 (continued)

Planning Analysis Area[a]	Population							
			Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Historic 1963	Existing 1970	Planned Increment	Percent Change 1970-2000	Total 2000	Planned Increment	Percent Change 1970-2000	Total 2000
Racine County								
43	42,325	46,517	4,645	10.0	51,162	4,883	10.5	51,400
44	65,472	68,521	2,982	4.4	71,503	2,979	4.3	71,500
45	6,261	7,608	6,057	79.6	13,665	9,084	119.4	16,692
46	6,042	10,978	13,904	126.7	24,882	13,403	122.1	24,381
47	7,200	9,512	4,535	47.7	14,047	4,988	52.4	14,500
48	13,300	15,565	7,857	50.5	23,422	11,758	75.5	27,323
49	10,100	12,137	6,882	56.7	19,019	6,763	55.7	18,900
Subtotal	150,700	170,838	46,862	27.4	217,700	53,858	31.5	224,696
Walworth County								
56	6,200	6,916	7,669	110.9	14,585	11,314	163.6	18,230
57	9,900	13,872	3,894	28.1	17,766	7,403	53.4	21,275
58	6,543	7,594	5,693	75.0	13,287	5,706	75.1	13,300
59	20,341	21,847	13,493	61.8	35,340	12,453	57.0	34,300
60	12,516	13,215	5,407	40.9	18,622	6,285	47.6	19,500
Subtotal	55,500	63,444	36,156	57.0	99,600	43,161	68.0	106,605
Washington County								
6	4,000	4,826	2,674	55.4	7,500	3,174	65.8	8,000
7	18,600	24,136	27,612	114.4	51,748	46,169	191.3	70,305
8	3,200	3,589	1,332	37.1	4,921	3,111	86.7	6,700
9	3,214	4,645	10,425	224.4	15,070	11,230	241.8	15,875
10	10,086	11,689	12,449	106.5	24,138	14,826	126.8	26,515
11	5,800	7,390	22,125	299.4	29,515	17,310	234.2	24,700
12	4,600	7,564	2,544	33.6	10,108	14,843	196.2	22,407
Subtotal	49,500	63,839	79,161	124.0	143,000	110,663	173.3	174,502
Waukesha County								
32	29,000	35,021	30,617	87.4	65,638	28,579	81.6	63,600
33	34,500	43,124	13,901	32.2	57,025	15,176	35.2	58,300
34	18,000	27,038	29,415	108.8	56,453	30,762	113.8	57,800
35	10,164	11,566	16,497	142.6	28,063	17,034	147.3	28,600
36	13,156	17,229	23,375	135.7	40,604	30,746	178.5	47,975
37	4,052	5,449	4,609	84.6	10,058	5,483	100.6	10,932
38	6,165	8,051	10,803	134.2	18,854	15,593	193.7	23,644
39	16,000	19,430	11,063	56.9	30,493	21,174	109.0	40,604
40	40,527	47,557	35,969	75.6	83,526	44,401	93.4	91,958
41	6,500	8,632	2,882	33.4	11,514	4,711	54.6	13,343
42	6,436	8,241	10,131	122.9	18,372	18,242	221.4	26,483
Subtotal	184,500	231,338	189,262	81.8	420,600	231,901	100.2	463,239
Region Total	1,675,000	1,756,086	463,214	26.4	2,219,300	463,214	26.4	2,219,300

[a] *See Map 2.*

Source: SEWRPC.

Table 225

COMPARISON OF EMPLOYMENT IN THE REGION BY PLANNING ANALYSIS AREA: 1972 AND 2000
CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Planning Analysis Area[a]	Existing 1972	Employment					
		Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		Planned Increment	Percent Change 1972-2000	Total 2000	Planned Increment	Percent Change 1972-2000	Total 2000
Kenosha County							
50	5,758	2,216	38.5	7,974	1,749	30.4	7,507
51	27,576	3,578	13.0	31,154	3,827	13.9	31,403
52	3,012	5,628	186.9	8,640	11,010	365.5	14,022
53	1,805	9,346	517.8	11,151	12,916	715.6	14,721
54	537	1,200	223.5	1,737	1,302	242.5	1,839
55	1,990	2,069	104.0	4,059	5,103	256.4	7,093
Subtotal	40,678	24,037	59.1	64,715	35,907	88.3	76,585
Milwaukee County							
13	2,980	8	0.3	2,988	36	1.2	3,016
14	18,027	2,847	15.8	20,874	2,549	14.1	20,576
15	10,220	336	3.4	10,556	- 1,645	- 16.1	8,575
16	58,320	578	1.0	58,898	- 4,268	- 7.3	54,052
17	14,128	26,512	187.7	40,640	18,386	130.1	32,514
18	46,378	2,095	4.5	48,473	- 4,392	- 9.5	41,986
19	20,930	1,090	5.2	22,020	- 5,638	- 26.9	15,292
20	78,778	2,517	3.2	81,295	- 11,493	- 14.6	67,285
21	86,043	2,324	2.7	88,367	- 5,146	- 6.0	80,897
22	9,573	524	5.5	10,097	- 680	- 7.1	8,893
23	4,232	622	14.7	4,854	178	4.2	4,410
24	22,439	1,436	6.4	23,875	- 949	- 4.2	21,490
25	8,750	1,179	13.5	9,929	1,440	16.5	10,190
26	17,063	1,754	10.3	18,817	289	1.7	17,352
27	3,503	24,591	702.0	28,094	18,695	533.7	22,198
28	1,754	10,938	623.6	12,692	6,606	376.6	8,360
29	11,998	6,611	55.1	18,609	6,360	53.0	18,358
30	56,180	2,189	3.9	58,369	- 4,289	- 7.6	51,891
31	37,176	2,073	5.6	39,249	- 1,111	- 3.0	36,065
Subtotal	508,472	90,224	17.7	598,696	14,928	2.9	523,400
Ozaukee County							
1	1,299	841	64.7	2,140	898	69.1	2,197
2	4,717	774	16.4	5,491	2,929	62.1	7,646
3	519	1,550	298.7	2,069	3,826	737.2	4,345
4	7,909	5,675	71.8	13,584	18,740	236.9	26,649
5	4,893	7,322	149.6	12,215	7,570	154.7	12,463
Subtotal	19,337	16,162	83.6	35,499	33,963	175.6	53,300

Table 225 (continued)

Planning Analysis Area[a]	Existing 1972	Employment					
		Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		Planned Increment	Percent Change 1972-2000	Total 2000	Planned Increment	Percent Change 1972-2000	Total 2000
Racine County							
43	15,813	122	0.8	15,935	361	2.3	16,174
44	33,808	3,619	10.7	37,427	4,014	11.9	37,822
45	828	1,479	178.6	2,307	2,770	334.5	3,598
46	5,708	9,927	173.9	15,635	9,825	172.1	15,533
47	1,159	1,923	165.9	3,082	2,164	186.7	3,323
48	2,123	2,899	136.6	5,022	4,463	210.2	6,586
49	4,180	5,516	132.0	9,696	7,284	174.3	11,464
Subtotal	63,619	25,485	40.1	89,104	30,881	48.5	94,500
Walworth County							
56	1,154	3,007	260.6	4,161	4,207	364.6	5,361
57	3,767	1,505	40.0	5,272	4,323	114.8	8,090
58	4,064	2,161	53.2	6,225	3,304	81.3	7,368
59	9,872	4,319	43.8	14,191	7,906	80.1	17,778
60	5,302	2,224	41.9	7,526	2,791	52.6	8,093
Subtotal	24,159	13,216	54.7	37,375	22,531	93.3	46,690
Washington County							
6	1,526	925	60.6	2,451	868	56.9	2,394
7	11,367	10,670	93.9	22,037	16,695	146.9	28,062
8	441	646	146.5	1,087	851	193.0	1,292
9	970	2,625	270.6	3,595	1,789	184.4	2,759
10	4,772	3,942	82.6	8,714	6,551	137.3	11,323
11	1,230	12,826	1,046.8	14,056	10,941	889.5	12,171
12	888	- 235	- 26.5	653	211	23.8	1,099
Subtotal	21,194	31,399	148.2	52,593	37,906	178.9	59,100
Waukesha County							
32	11,677	10,622	91.0	22,299	11,899	101.9	23,576
33	14,500	4,668	32.2	19,168	5,868	40.5	20,368
34	7,998	13,592	169.9	21,590	15,747	196.9	23,745
35	1,076	4,444	413.0	5,520	5,094	473.4	6,170
36	2,935	6,327	215.6	9,262	8,999	306.6	11,934
37	518	1,196	230.9	1,714	769	148.5	1,287
38	1,335	3,154	236.3	4,489	7,016	525.5	8,351
39	5,398	3,897	72.2	9,295	7,820	144.9	13,218
40	24,149	14,730	61.0	38,879	21,436	88.9	45,585
41	1,085	1,052	97.0	2,137	1,332	122.8	2,417
42	826	2,821	341.5	3,647	4,923	596.0	5,749
Subtotal	71,497	66,503	93.0	138,000	90,903	127.1	162,400
Region Total	748,956	267,026	35.7	1,015,982	267,019	35.7	1,015,975

[a] *See Map 2.*

Source: SEWRPC.

Table 226

COMPARISON OF POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICES IN THE REGION BY PLANNING ANALYSIS AREA: 1970 AND 2000 CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION LAND USE PLANS

Planning Analysis Area[a]	Total Population		Population Served by Public Sanitary Sewer Service					Population Served by Public Water Supply Service				
	Controlled Centralization Land Use Plan	Controlled Decentralization Land Use Plan		Controlled Centralization Land Use Plan		Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan		Controlled Decentralization Land Use Plan	
	Planned 2000	Planned 2000	Existing 1970	Planned 2000	Percent of Total	Planned 2000	Percent of Total	Existing 1970	Planned 2000	Percent of Total	Planned 2000	Percent of Total
Kenosha County												
50	36,210	34,200	29,524	36,210	100.0	34,200	100.0	29,500	36,210	100.0	34,200	100.0
51	65,561	65,698	53,239	65,561	100.0	65,378	99.5	48,900	65,561	100.0	65,378	99.5
52	22,813	37,699	3,559	22,003	96.4	37,011	98.2	1,430	22,003	96.4	37,011	98.2
53	17,647	25,174	2,137	16,931	95.9	24,453	97.1	760	16,931	95.9	24,453	97.1
54	7,677	7,700	524	3,971	51.7	3,742	48.6	370	3,971	51.7	3,742	48.6
55	24,892	32,330	5,017	18,424	74.0	22,716	70.3	--	18,424	74.0	22,716	70.3
Subtotal	174,800	202,801	94,000	163,100	93.3	187,500	92.5	80,960	163,100	93.3	187,500	92.5
Milwaukee County												
13	15,214	15,219	14,154	15,214	100.0	15,219	100.0	7,940	15,214	100.0	15,219	100.0
14	31,734	29,733	24,297	31,734	100.0	29,733	100.0	24,310	31,734	100.0	29,733	100.0
15	30,803	28,800	34,758	30,803	100.0	28,800	100.0	34,760	30,803	100.0	28,800	100.0
16	35,498	31,502	45,979	35,498	100.0	31,502	100.0	45,980	35,498	100.0	31,502	100.0
17	69,789	54,218	36,747	69,789	100.0	54,218	100.0	38,030	69,789	100.0	54,218	100.0
18	118,900	100,899	127,286	118,900	100.0	100,899	100.0	127,290	118,900	100.0	100,899	100.0
19	77,803	65,798	89,031	77,803	100.0	65,798	100.0	89,030	77,803	100.0	65,798	100.0
20	128,297	97,300	165,520	128,297	100.0	97,300	100.0	165,520	128,297	100.0	97,300	100.0
21	58,600	48,599	74,278	58,600	100.0	48,599	100.0	74,280	58,600	100.0	48,599	100.0
22	19,500	18,000	22,134	19,500	100.0	18,000	100.0	22,130	19,500	100.0	18,000	100.0
23	43,014	42,012	42,063	43,014	100.0	42,012	100.0	42,060	43,014	100.0	42,012	100.0
24	56,003	52,002	64,772	56,003	100.0	52,002	100.0	64,770	56,003	100.0	52,002	100.0
25	37,931	37,931	35,369	37,931	100.0	37,931	100.0	35,370	37,931	100.0	37,931	100.0
26	58,710	54,711	56,530	58,710	100.0	54,711	100.0	56,530	58,710	100.0	54,711	100.0
27	39,177	24,177	9,943	39,177	100.0	24,177	100.0	5,700	39,177	100.0	24,177	100.0
28	33,557	18,548	4,352	33,557	100.0	18,548	100.0	--	33,557	100.0	18,548	100.0
29	63,270	60,270	43,157	63,270	100.0	60,270	100.0	35,360	63,270	100.0	60,270	100.0
30	75,100	67,103	83,794	75,100	100.0	67,103	100.0	83,790	75,100	100.0	67,103	100.0
31	56,700	51,699	60,536	56,700	100.0	51,699	100.0	60,540	56,700	100.0	51,699	100.0
Subtotal	1,049,600	898,521	1,034,700	1,049,600	100.0	898,521	100.0	1,013,390	1,049,600	100.0	898,521	100.0
Ozaukee County												
1	6,909	6,800	1,759	4,265	61.7	4,156	61.1	1,850	4,265	61.7	4,156	61.1
2	14,656	23,026	8,859	13,560	92.5	17,654	76.7	8,750	13,560	92.5	17,654	76.7
3	8,513	13,752	1,057	7,249	85.2	8,572	62.3	1,390	7,249	85.2	8,572	62.3
4	42,966	66,958	14,029	37,116	86.4	43,264	64.6	13,700	37,116	86.4	43,264	64.6
5	40,956	38,400	10,596	39,210	95.7	36,654	95.5	--	39,210	95.7	36,654	95.5
Subtotal	114,000	148,936	36,300	101,400	88.9	110,300	74.1	25,690	101,400	88.9	110,300	74.1

Table 226 (continued)

Planning Analysis Area[a]	Total Population		Population Served by Public Sanitary Sewer Service					Population Served by Public Water Supply Service				
	Controlled Centralization Land Use Plan	Controlled Decentralization Land Use Plan		Controlled Centralization Land Use Plan		Controlled Decentralization Land Use Plan			Controlled Centralization Land Use Plan		Controlled Decentralization Land Use Plan	
	Planned 2000	Planned 2000	Existing 1970	Planned 2000	Percent of Total	Planned 2000	Percent of Total	Existing 1970	Planned 2000	Percent of Total	Planned 2000	Percent of Total
Racine County												
43	51,162	51,400	45,748	51,162	100.0	51,400	100.0	41,700	51,162	100.0	51,400	100.0
44	71,503	71,500	68,077	71,503	100.0	71,500	100.0	62,430	71,503	100.0	71,500	100.0
45	13,665	16,692	2,961	11,133	81.5	14,051	84.2	1,180	11,133	81.5	14,051	84.2
46	24,882	24,381	6,383	23,729	95.4	23,248	95.3	3,380	23,729	95.4	23,248	95.3
47	14,047	14,500	2,762	8,148	58.0	7,963	54.9	2,755	8,148	58.0	7,963	54.9
48	23,422	27,323	2,443	16,064	68.6	13,162	48.2	1,975	16,064	68.6	13,162	48.2
49	19,019	18,900	7,526	16,361	86.0	13,676	72.4	7,480	16,361	86.0	13,676	72.4
Subtotal	217,700	224,696	135,900	198,100	91.0	195,000	86.8	120,900	198,100	91.0	195,000	86.8
Walworth County												
56	14,585	18,230	1,684	10,125	69.4	6,288	34.5	1,850	10,125	69.4	6,288	34.5
57	17,766	21,275	10,060	13,217	74.4	16,024	75.3	12,040	13,217	74.4	16,024	75.3
58	13,287	13,300	3,971	9,168	69.0	8,670	65.2	3,990	9,168	69.0	8,670	65.2
59	35,340	34,300	12,335	28,815	81.5	27,567	80.4	10,870	28,815	81.5	27,567	80.4
60	18,622	19,500	7,450	15,775	84.7	16,651	85.4	7,590	15,775	84.7	16,651	85.4
Subtotal	99,600	106,605	35,500	77,100	77.4	75,200	70.5	36,340	77,100	77.4	75,200	70.5
Washington County												
6	7,500	8,000	1,922	4,840	64.5	5,042	63.0	1,930	4,840	64.5	5,042	63.0
7	51,748	70,305	16,748	47,654	92.1	55,271	78.6	16,560	47,654	92.1	55,271	78.6
8	4,921	6,700	672	1,899	38.6	2,113	31.5	610	1,899	38.6	2,113	31.5
9	15,070	15,875	643	10,792	71.6	6,534	41.2	560	10,792	71.6	6,534	41.2
10	24,138	26,515	7,757	22,398	92.8	19,038	71.8	7,520	22,398	92.8	19,038	71.8
11	29,515	24,700	2,458	26,017	88.1	21,202	85.8	1,120	26,017	88.1	21,202	85.8
12	10,108	22,407	--	--	--	--	--	--	--	--	--	--
Subtotal	143,000	174,502	30,200	113,600	79.4	109,200	62.6	28,300	113,600	79.4	109,200	62.6
Waukesha County												
32	65,638	63,600	18,079	65,638	100.0	63,600	100.0	19,460	65,638	100.0	63,600	100.0
33	57,025	58,300	28,645	57,025	100.0	58,300	100.0	4,390	57,025	100.0	58,300	100.0
34	56,453	57,800	8,791	54,874	97.2	56,222	97.3	2,400	54,874	97.2	56,222	97.3
35	28,063	28,600	4,676	26,604	94.8	27,140	94.9	--	26,604	94.8	27,140	94.9
36	40,604	47,975	5,641	36,180	89.1	32,218	67.2	3,270	36,180	89.1	32,218	67.2
37	10,058	10,932	--	7,946	79.0	6,215	56.9	--	7,946	79.0	6,215	56.9
38	18,854	23,644	2,933	16,873	89.5	19,464	82.3	2,760	16,873	89.5	19,464	82.3
39	30,493	40,604	9,576	27,362	89.7	28,941	71.3	8,740	27,362	89.7	28,941	71.3
40	83,526	91,958	40,684	81,586	97.7	87,506	95.2	40,260	81,586	97.7	87,506	95.2
41	11,514	13,343	438	2,551	22.2	3,329	24.9	750	2,551	22.2	3,329	24.9
42	18,372	26,483	2,637	13,961	76.0	12,865	48.6	2,370	13,961	76.0	12,865	48.6
Subtotal	420,600	463,239	122,100	390,600	92.9	395,800	85.4	84,400	390,600	92.9	395,800	85.4
Region Total	2,219,300	2,219,300	1,488,700	2,093,500	94.3	1,971,521	88.8	1,389,980	2,093,500	94.3	1,971,521	88.8

[a] *See Map 2.*

Source: SEWRPC.

Table 227

COMPARISON OF THE RELATIVE ABILITY OF THE CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION ALTERNATIVE LAND USE PLANS TO MEET LAND USE DEVELOPMENT STANDARDS

Development Objective and Supporting Standards	Controlled Centralization Land Use Plan	Controlled Decentralization Land Use Plan
Objective No. 1—Balanced Allocation of Land Use		
1. Residential Land Allocation		
a. High Density Urban—25 net acres per 1,000 persons	Met	Met
b. Medium Density Urban—65 net acres per 1,000 persons	Met	Met
c. Low Density Urban—238 net acres per 1,000 persons	Met	Met
d. Suburban Density—429 net acres per 1,000 persons	Met	Met
e. Rural Density—1,430 net acres per 1,000 persons	Met	Met
2. Park and Recreation Land Allocation		
a. Major—5 gross acres per 1,000 persons	Met	Met
b. Other—9 gross acres per 1,000 persons	Met	Met
3. Industrial Land Allocation		
a. Major and Other—7 net acres per 100 added employees	4 acres per 100 employees	4 acres per 100 employees
4. Commercial Land Allocation		
a. Major—1 net acre per 100 added employees	Met	Met
b. Other—2 net acres per 100 added employees	1 acre per 100 employees	1 acre per 100 employees
5. Governmental and Institutional Land Allocation		
a. Major and Other—9 net acres per 1,000 persons	Met	Met
Objective No. 2—Compatible Arrangement of Land Uses		
1. Neighborhood Units for Urban High, Medium, and Low Density Residential Development	Could be met	Could be met
2. Suburban and Rural Residential Land Location	Met	Met
3. Industrial Land Location	Met	Met
4. Regional Commercial Land Location	Met	Met
Objective No. 3—Protection, Wise Use, and Development of Natural Resource Base		
1. Soils		
a. Sewered Urban Development	Met	Met
b. Unsewered Suburban Development	Met	Met
c. Rural Development	Met	Met
2. Inland Lakes and Streams		
a. Major Inland Lakes—50 acres or more		
(1) 25 Percent of Shoreline in Natural State	Met for 42 of 100 lakes	Met for 42 of 100 lakes
(2) 50 Percent of Shoreline in Nonurban Use	Met for 33 of 100 lakes	Met for 33 of 100 lakes
(3) 10 Percent of Shoreline in Public Use	Met for 15 of 100 lakes	Met for 15 of 100 lakes
b. Minor Inland Lakes—Under 50 Acres		
(1) 25 Percent of Shoreline in Natural State or Low-Intensity Public Use	Partially Met	Partially Met
c. Perennial Streams		
(1) 25 Percent of Shoreline in Natural State	Met for 121 of 129 streams	Met for 121 of 129 streams
(2) 50 Percent of Shoreline in Nonurban Use	Met for 121 of 129 streams	Met for 121 of 129 streams
d. Floodlands Free from New Incompatible Urban Development	Met	Met
e. Restrict Encroachments in Channels and Floodways	Met	Met
3. Wetlands		
a. Protect Wetlands over 50 Acres and Those with High Resource Value	Met	Met
4. Woodlands		
a. Protect 10 Percent of Watershed	Partially Met	Partially Met
b. Preserve 40 Acres Each Per County of Four Forest Types	Could be Met	Could be Met
c. Maintain Five Acres per 1,000 Persons for Recreation Use	Met	Met
5. Wildlife		
a. Ensure Preservation of Suitable Habitat	Met	Met

Table 227 (continued)

Development Objective and Supporting Standards	Controlled Centralization Land Use Plan	Controlled Decentralization Land Use Plan
Objective No. 4—Properly Relate Development to Transportation and Utility Systems		
1. Locate Urban Development So As to Maximize Use of Existing Transportation and Utility Systems	Met	Partially Met
2. Locate Urban Development Where Transportation System Can Provide Ready Access	Met	Met
3. Locate Urban High, Medium, and Low Density Residential Development Where Readily Servicable by Public Sanitary Sewerage Facilities	99 Percent Served	98 Percent Served
4. Locate Urban High, Medium, and Low Density Residential Development Where Readily Servicable by Public Water Supply Facilities	99 Percent Served	98 Percent Served
5. Locate Urban High and Medium Density Residential Development Where Readily Servicable by Mass Transit	Partially Met	Partially Met
6. Minimize Penetration by Major Transportation Routes of Residential Neighborhood Units	Could be Met	Could be Met
7. Locate Transportation Terminal Facilities Near Principal Land Uses Served	Could be Met	Could be Met
Objective No. 5—Conserve and Develop Healthy, Safe, Convenient, and Attractive Residential Areas		
1. Locate Urban High, Medium, and Low Density Residential Development in Physically Self-Contained Neighborhood Units	Could be Met	Could be Met
2. Locate Appropriate Land Uses Within Neighborhood Units	Could be Met	Could be Met
3. Locate Suburban and Rural Residential Development Properly to Environment	Met	Met
Objective No. 6—Preserve, Develop, and Redevelop Variety of Industrial and Commercial Sites		
1. Regional Industrial Site Requirements	Met	Met
2. Regional Commercial Site Requirements	Met	Met
3. Local Industrial Site Requirements	Could be Met	Could be Met
4. Local Commercial Site Requirements	Could be Met	Could be Met
Objective No. 7—Preserve and Provide Open Space		
1. Regional Park Spatial Location	Met	Met
2. Local Park Spatial Location	Could be Met	Could be Met
3. Preserve Unique Scientific, Cultural, Scenic, or Educational Sites	Partially Met	Partially Met
Objective No. 8—Preserve Land Areas for Agricultural Uses		
1. Preserve Prime Agricultural Lands	99 Percent Preserved	95 Percent Preserved
2. Preserve Other Agricultural Land Areas Within a One-Half Mile Radius of High Value Scientific, Educational, or Recreational Sites	3,100 Acres Lost	5,400 Acres Lost

Source: SEWRPC.

Standard No. 3 provides that wetlands over 50 acres in area and those with a high value resource rating be protected from encroachment by filling and urban development. This standard has been met under both alternative regional land use plans, since such wetlands were identified in the regional land use inventory and since no urban development was allocated to these wetlands in the design of the plans.

Standard No. 4 provides that a minimum of 10 percent of the land area of the watersheds in the Region should be devoted to woodlands. This standard is only partially met under the two regional land use plans because none of the 11 major watersheds in the Region contains enough woodland cover to constitute 10 percent of the total watershed area. If this standard were to be fully met in the Region, a reforestation program would be required in each watershed. In addition, Standard No. 4 provides for the preservation of specific examples of major forest types for demonstration and educational purposes. This standard could be met through appropriate state or local action under either of the two alternative regional land use plans. Finally, Standard No. 4 indicates that there should be maintained for recreational purposes a minimum regional aggregate of five acres of woodlands per thousand population. This standard is assumed to be met equally under both alternative land use plans since, in each case, about 29 acres of woodlands per thousand persons are preserved and maintained in the primary environmental corridors. It is further assumed that the local governments concerned will take appropriate action to utilize the woodlands within the corridors for outdoor recreation purposes.

Standard No. 5 provides for preservation of a suitable wildlife habitat and population. As indicated in Table 227, this standard is considered to be met equally well by both alternative regional land use plans because all of the primary environmental corridors are proposed to be preserved. These corridors contain 165,000 acres, or about 84 percent of the remaining high and medium value wildlife habitat areas within the Region.

In summary, it may be concluded that for Objective No. 3—the protection, wise use, and development of the natural resource base of the Region—the controlled centralization and controlled decentralization land use plans meet the relevant standards equally well. It may be expected, then, that in applying the rank-based expected value method of plan evaluation, there will be no difference between these two plans for Objective No. 3.

Objective No. 4—Properly Relate Development to Transportation and Utility Systems

The fourth land use development objective calls for a spatial distribution of the various land uses properly related to the supporting transportation and public utility systems in order to assure the economical provision of transportation, utility, and other municipal services. This objective is supported by seven specific standards.

Standard No. 1 indicates that new urban development should be located to maximize the use of existing transportation and utility systems. As indicated in Table 227, this standard is considered achieved under the controlled centralization land use plan in which every attempt has been made to centralize new urban development so as to minimize extensions of transportation and utility systems and take maximum advantage of existing systems, particularly in Milwaukee County. This standard is, considered to have been only partially achieved however, by the controlled decentralization land use plan since new urban development is extended over a much wider geographic area and therefore, requires, extensions of transportation and utility systems. In addition, existing systems in parts of Milwaukee County would be underutilized under the controlled decentralization plan.

Standard No. 2 indicates that the transportation system should be located and designed to provide access to all land presently devoted to urban development and to land proposed to be used for such development. This standard has been met equally well by design under both of the alternative plans.

Standards Nos. 3 and 4 provide that all land developed or proposed to be developed for urban medium, high, and low residential density land uses be located in areas serviceable by existing or planned public sanitary sewerage and water supply systems. These standards have been met and water supply systems. These standards have been met nearly equally well by both alternative plans: about 99 percent of the incremental urban medium-, high-, and low-density residential development is readily serviceable under the controlled centralization plan, and about 98 percent of such development is readily serviceable under the controlled decentralization plan.

Standard No. 5 provides that new and proposed medium and high urban density residential land uses be located in areas serviceable by mass transit facilities. This standard has been partially met to about the same degree under both alternative regional land use plans, since the plans differ substantially only in the low urban density and suburban residential land use categories.

Standard No. 6 indicates that the transportation system should be located and designed to minimize the penetration of existing and proposed residential neighborhoods by through traffic. The effective evaluation of this standard can only be made when the final right-of-way and specific alignments for proposed transportation facilities are established. Consequently, these determinations will come late in the plan implementation process. As indicated in Table 227, however, this standard can be met under both the alternative plans considered. Therefore, it should be noted that new urban development can be adjusted to the precise location of needed transportation facilities and the standard thus fully met. In existing developed areas, it would, of course, be more difficult to meet this standard fully no matter which alternative plan is considered.

Standard No. 7 provides that transportation terminal facilities, such as off-street parking, off-street truck loading, and mass transit loading facilities, should be located in close proximity to the principal land uses which they serve. This standard could be met under either alternative land use plan, but can only be met through effective local planning and plan implementation action.

In summary, it may be concluded that for Objective No. 4, properly relating development to transportation and utility systems, the controlled centralization plan meets the relevant standards better than the controlled decentralization plan. It may be expected, then, that in the rank-based expected value method of plan evaluation, the controlled centralization plan will rank higher than the controlled decentralization plan for Objective No. 4.

Objective No. 5—Conserve and Develop Healthy, Safe, Convenient, and Attractive Residential Areas

The fifth land use development objective encompasses the development and conservation of residential areas within a physical environment that is healthy, safe, convenient, and attractive. This objective is supported by three specific standards for the development of residential areas.

Standard No. 1 provides that urban high-, medium-, and low-density residential development be placed in neighborhood units with clearly defined and relatively permanent isolating boundaries. The controlled centralization and controlled decentralization plans each assume that all new urban high-, medium-, and low-density residential development would occur in physically self-contained neighborhood units. This standard can only be met, however, through appropriate local planning and plan implementation action.

Standard No. 2 provides that urban residential neighborhood units contain enough area to house the population served by one elementary school and one neighborhood park; contain an internal street system which discourages penetration by through traffic; and contain the community and commercial facilities necessary to meet the day-to-day requirements of the family residing in the neighborhood unit. Like the first standard under this objective, this standard can only be met through appropriate local planning and plan implementation action. Accordingly, this standard could be met under both the controlled centralization and controlled decentralization land use plans.

Standard No. 3 indicates that suburban- and rural-density residential development should be located in areas where onsite soil absorption sewage disposal systems can be accommodated and where access to other services and facilities can be provided through appropriate components of the transportation system at the community or regional level. This standard has been met by design under both the controlled centralization and controlled decentralization land use plans.

In summary, it may be concluded with that for Objective No. 5, conserving and developing attractive residential areas, the controlled centralization and controlled decentralization plans meet the relevant standards equally well. It may be expected, then, that in applying the rank-based expected value method of plan evaluation, there will be no difference between the two plans for Objective No. 5.

Objective No. 6—Preserve, Develop, and Redevelop Industrial and Commercial Sites

The sixth land use development objective relates to the preservation, development, and redevelopment of a variety of industrial and commercial sites, suitable both in physical characteristics and location. This objective is supported by four specific standards relating to commercial and industrial development.

Standards Nos. 1 and 2 provide for location of new regional industrial and commercial development in planned industrial and commercial districts that meet minimum site areas that provide appropriate access to the regional transportation and public utility systems. These standards have been met by design under both alternative regional land use plans considered.

Standards Nos. 3 and 4 consider the proper location of new local commercial and industrial development. These standards can only be met through appropriate local planning and plan implementation action. Accordingly, it is indicated in Table 227 that these standards could be met under either of the two alternative plans.

In summary, it may be concluded that for Objective No. 6, to preserve, develop, and redevelop commercial and industrial sites, the controlled centralization and controlled decentralization land use plans meet the relevant standards equally well. It may be expected, then, that in applying the rank-based expected value method of plan evaluation, there will be no difference between the two plans for Objective No. 6.

Objective No. 7—Preserve and Provide Open Space

The seventh land use development objective relates to the preservation and provision of open space to enhance the total quality of the regional environment, to maximize essential natural resource availability, to give form and structure to urban development, and to facilitate the attainment of a balanced outdoor recreational program. This objective is supported by three specific standards for park and outdoor recreation development.

Standard No. 1 calls for the provision of regional outdoor recreation centers within an approximately one-hour travel time of every dwelling unit in the Region, such regional centers having a minimum site area of 250 acres. This standard has been met by design under both the controlled centralization and controlled decentralization plans. Such plans are identical on the acquisition and development of regional outdoor recreation centers.

Standard No. 2 covers the provision of local park and outdoor recreation lands within appropriate distances from dwelling units in urban areas. This standard can only be met through appropriate local planning and plan implementation action. Accordingly, it has been indicated in Table 227 that this standard could be met for both alternative regional land use plans.

Standard No. 3 provides for the retention in open space use of areas with unique scientific, cultural, scenic, or educational value. It is considered that this standard has been met under both alternative regional land use plans. The standard is met equally in both plans through the preservation of primary environmental corridors and, in the plan design process, through not allocating to urban development and known unique scientific or cultural site.

In summary, it may be concluded that for Objective No. 7, preserving and providing open space, the controlled centralization and controlled decentralization land use plans meet the relevant standards equally well. It may be expected, then, that in applying the rank-based expected value method of plan evaluation there will be no difference between the plans for Objective No. 7.

Objective No. 8—Preserve Land Areas for Agricultural Uses

The eighth land use development objective considers the preservation of land areas for agricultural uses in order to provide for certain special types of agriculture, to provide a reserve or holding zone for future needs, and to ensure the preservation of those unique recreational areas that provide wildlife habitat and that shape and order urban development. This objective is supported by two specific standards relating to agricultural land preservation.

Standard No. 1 provides that all delineated prime agricultural lands be preserved and kept free from urban encroachment. As indicated in Table 227, under the controlled centralization land use plan 99 percent of all prime agricultural lands would be preserved, whereas under the controlled decentralization land use plan 95 percent of such lands would be preserved.

Standard No. 2 provides that other agricultural lands within one-half mile radius of high value scientific, educational, or recreational sites should be preserved. As indicated in Table 227 under the controlled centralization plan approximately 3,100 acres would be converted to urban development, whereas under the controlled decentralization plan over 5,400 acres would be converted to urban development.

In summary, it may be concluded that for Objective No. 8, preserving agricultural lands, the controlled centralization plan meets the relevant standards to a greater degree than the controlled decentralization plan. It may be expected, then, that in the applying of the rank-based expected value method of plan evaluation, there will be a difference between the two plans for Objective No. 8.

ALTERNATIVE REGIONAL TRANSPORTATION PLAN COMPARISON—SYSTEM AND TRAVEL DEMAND CHARACTERISTICS

The more important implications of the six alternative regional transportation system plans described in Chapter V of this volume are summarized in this section. These include pertinent comparisons of the characteristics of the arterial street and highway system and the transit system included in each alternative plan, as well as of certain attendant travel demand characteristics, including total person trips generated, average trip lengths, modal split, trip purpose, and vehicle trips.

Arterial Street and Highway System Characteristics

The number of miles of arterial facilities provided under each alternative regional transportation system plan is identified by arterial facility type and by county in Table 228. Among the three alternative regional transportation plans designed to serve the controlled centralization land use plan—"no build," highway-supported transit, and transit-supported highway— the transit-supported highway plan would increase the arterial system by nearly 536 miles, while the highway-supported transit plan would increase the arterial system by 426 miles, and the "no build" alternative by 269 miles. For the regional freeway system, the transit-supported highway alternative plan calls for 212 miles of new freeways, while 116 miles of new freeways would be provided under the highway-supported transit plan, and 75 miles under the "no build" plan. In Milwaukee County the only new freeway facility included under the "no build" and highway-supported transit alternatives was the extension of IH 794 over the high level Milwaukee Harbor Bridge for a total of about five miles. The highway-supported transit alternative, however, does include the addition of lanes to IH 43 between Silver Spring Drive and STH 167. Under the transit-supported highway plan, nearly 43 miles of new freeways would be constructed in Milwaukee County.

The three alternative transportation plans, as designed to serve the controlled centralization land use plan, also differ in the number of miles of four- and six-lane arterial facilities provided. The transit-supported highway alternative calls for a total increase of 346 miles in four-lane arterial facilities, while under the highway-supported transit alternative the number of miles of four-lane facilities would be increased by 342 miles and under the "no build" plan would be decreased by 13 miles due to removal of parking. The "no build" and highway-supported transit alternatives call for increments of 64 and 68 miles, respectively, of six-lane arterial facilities, while the transit-supported highway alternative calls for a net increment of 30 miles of six-lane arterial facilities at the regional level. The increments noted here are net regional increments resulting from the summation of individual county increments. As can be seen in Table 228, individual county increments may be either additions or reductions in mileages for each arterial classification.

For the controlled decentralization land use plan, the transit-supported highway, highway-supported transit, and "no build" alternatives would increase the total arterial system by 536 miles, 426 miles, and 269 miles, respectively, and the regional freeway system by 212 miles, 116 miles, and 75 miles, respectively, the same as noted above for the controlled centralization land use plan. The number of four-lane arterial facilities would be decreased by 13 miles under the "no build" alternative due to removal of parking, by 381 miles under the highway-supported transit alternative, and by 372 miles under the transit-supported highway alternative; while six-lane arterial facilities would be increased by 64 miles under the "no build" alternative and 78 miles under the highway-supported transit alternative. The transit-supported highway alternative calls for a net increase of 29 miles of six-lane arterial facilities within the Region.

Transit System Characteristics

A comparison of the mass transit facilities proposed to be provided in the Milwaukee urbanized area under the six alternative regional transportation plans is set forth

Table 228

COMPARISON OF ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY: 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Arterial Facility Type	Miles of Arterial Facilities												
		Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
		Alternative Plan Increments[a]			Alternative Plan Totals			Alternative Plan Increments[a]			Alternative Plan Totals		
	1972	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan
Kenosha County													
Freeway													
4-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
6-lane	12.1	--	--	12.2	12.1	12.1	24.3	--	--	12.2	12.1	12.1	24.3
8-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	12.1	--	--	12.2	12.1	12.1	24.3	--	--	12.2	12.1	12.1	24.3
Standard Arterial													
2-lane	243.6	42.6	-14.1	- 4.6	286.2	229.5	239.0	42.6	- 31.0	-20.5	286.2	212.6	223.1
4-lane	24.1	9.2	49.5	51.5	33.3	73.6	75.6	9.2	62.7	56.8	33.3	86.8	80.9
6-lane	--	--	30.7	19.2	--	30.7	19.2	--	34.4	29.8	--	34.4	29.8
Subtotal	267.7	51.8	66.1	66.1	319.5	333.8	333.8	51.8	66.1	66.1	319.5	333.8	333.8
County Subtotal	279.8	51.8	66.1	78.3	331.6	345.9	358.1	51.8	66.1	78.3	331.6	345.9	358.1
Milwaukee County													
Freeway													
4-lane	12.7	1.4	1.4	- 0.1	14.1	14.1	12.6	1.4	1.4	- 0.1	14.1	14.1	12.6
6-lane	49.0	3.6	3.6	36.3	52.6	52.6	85.3	3.6	3.6	36.3	52.6	52.6	85.3
8-lane	2.1	--	--	6.7	2.1	2.1	8.8	--	--	6.7	2.1	2.1	8.8
Subtotal	63.8	5.0	5.0	42.9	68.8	68.8	106.7	5.0	5.0	42.9	68.8	68.8	106.7
Standard Arterial													
2-lane	339.5	- 20.5	-112.9	- 84.2	319.0	226.6	255.3	- 20.5	- 108.1	- 74.1	319.0	231.4	265.4
4-lane	268.7	- 30.3	143.0	125.0	238.4	411.7	393.7	- 30.3	138.6	125.7	238.4	407.3	394.4
6-lane	62.2	59.7	3.1	0.9	121.9	65.3	63.1	59.7	2.7	- 9.9	121.9	64.9	52.3
Subtotal	670.4	8.9	33.2	41.7	679.3	703.6	712.1	8.9	33.2	41.7	679.3	703.6	712.1
County Subtotal	734.2	13.9	38.2	84.6	748.1	772.4	818.8	13.9	38.2	84.6	748.1	772.4	818.8
Ozaukee County													
Freeway													
4-lane	10.8	16.6	16.6	16.6	27.4	27.4	27.4	16.6	16.6	16.6	27.4	27.4	27.4
6-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
8-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	10.8	16.6	16.6	16.6	27.4	27.4	27.4	16.6	16.6	16.6	27.4	27.4	27.4
Standard Arterial													
2-lane	233.0	34.8	17.3	11.8	267.8	250.3	244.8	34.8	15.1	10.4	267.8	248.1	243.4
4-lane	6.5	2.4	25.5	31.0	8.9	32.0	37.5	2.4	26.6	32.4	8.9	33.1	38.9
6-lane	--	--	--	--	--	--	--	--	1.1	--	--	1.1	--
Subtotal	239.5	37.2	42.8	42.8	276.7	282.3	282.3	37.2	42.8	42.8	276.7	282.3	282.3
County Subtotal	250.3	53.8	59.4	59.4	304.1	309.7	309.7	53.8	59.4	59.4	304.1	309.7	309.7
Racine County													
Freeway													
4-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
6-lane	12.0	0.0	0.0	12.1	12.0	12.0	24.1	0.0	0.0	12.1	12.0	12.0	24.1
8-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	12.0	--	--	12.1	12.0	12.0	24.1	--	--	12.1	12.0	12.0	24.1
Standard Arterial													
2-lane	303.5	24.1	-14.4	- 1.1	327.6	289.1	302.4	24.1	- 21.9	- 0.4	327.6	281.6	303.1
4-lane	28.0	1.1	53.4	56.3	29.1	81.4	84.3	1.1	61.3	54.8	29.1	89.3	82.8
6-lane	5.9	3.1	7.8	- 2.1	9.0	13.7	3.8	3.1	7.4	- 1.3	9.0	13.3	4.6
Subtotal	337.4	28.3	46.8	53.1	365.7	384.2	390.5	28.3	46.8	53.1	365.7	384.2	390.5
County Subtotal	349.4	28.3	46.8	65.2	377.7	396.2	414.6	28.3	46.8	65.2	377.7	396.2	414.6

Table 228 (continued)

Arterial Facility Type	Miles of Arterial Facilities												
		Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
		Alternative Plan Increments[a]			Alternative Plan Totals			Alternative Plan Increments[a]			Alternative Plan Totals		
	1972	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan
Walworth County													
Freeway													
4-lane	19.1	31.3	31.3	31.3	50.4	50.4	50.4	31.3	31.3	31.3	50.4	50.4	50.4
6-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
8-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	19.1	31.3	31.3	31.3	50.4	50.4	50.4	31.3	31.3	31.3	50.4	50.4	50.4
Standard Arterial													
2-lane	379.4	10.7	4.7	4.7	390.1	384.1	384.1	10.7	4.7	4.7	390.1	384.1	384.1
4-lane	9.7	0.4	19.1	19.1	10.1	28.8	28.8	0.4	19.1	19.1	10.1	28.8	28.8
6-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	389.1	11.1	23.8	23.8	400.2	412.9	412.9	11.1	23.8	23.8	400.2	412.9	412.9
County Subtotal	408.2	42.4	55.1	55.1	450.6	463.3	463.3	42.4	55.1	55.1	450.6	463.3	463.3
Washington County													
Freeway													
4-lane	0.4	1.9	35.6	37.2	2.3	36.0	37.6	1.9	35.6	37.2	2.3	36.0	37.6
6-lane	6.4	0.0	0.0	0.0	6.4	6.4	6.4	0.0	0.0	0.0	6.4	6.4	6.4
8-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	6.8	1.9	35.6	37.2	8.7	42.4	44.0	1.9	35.6	37.2	8.7	42.4	44.0
Standard Arterial													
2-lane	305.6	44.5	47.3	48.5	350.1	352.9	354.1	44.5	33.8	38.0	350.1	339.4	343.6
4-lane	26.8	1.0	3.0	3.0	27.8	29.8	29.8	1.0	12.1	12.6	27.8	38.9	39.4
6-lane	--	--	8.4	6.7	--	8.4	6.7	--	12.8	7.6	--	12.8	7.6
Subtotal	332.4	45.5	58.7	58.2	377.9	391.1	390.6	45.5	58.7	58.2	377.9	391.1	390.6
County Subtotal	339.2	47.4	94.3	95.4	386.6	433.5	434.6	47.4	94.3	95.4	386.6	433.5	434.6
Waukesha County													
Freeway													
4-lane	29.1	16.0	23.0	38.7	45.1	52.1	67.8	16.0	23.0	38.7	45.1	52.1	67.8
6-lane	8.7	4.2	4.2	21.2	12.9	12.9	29.9	4.2	4.2	21.2	12.9	12.9	29.9
8-lane	--	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	37.8	20.2	27.2	59.9	58.0	65.0	97.7	20.2	27.2	59.9	58.0	65.0	97.7
Standard Arterial													
2-lane	565.5	7.0	-27.3	-27.1	572.5	538.2	538.4	7.0	41.3	-35.0	572.5	524.2	530.5
4-lane	41.3	3.1	48.1	60.1	44.4	89.4	101.4	3.1	60.8	70.3	44.4	102.1	111.6
6-lane	3.9	1.0	18.0	5.1	4.9	21.9	9.0	1.0	19.3	2.8	4.9	23.2	6.7
Subtotal	610.7	11.1	38.8	38.1	621.8	649.5	648.8	11.1	38.8	38.1	621.8	649.5	648.8
County Subtotal	648.5	31.3	66.0	98.0	679.8	714.5	746.5	31.3	66.0	98.0	679.8	714.5	746.5
Southeastern Wisconsin Region													
Freeway													
4-lane	72.1	67.2	107.9	123.7	139.3	180.0	195.8	67.2	107.9	123.7	139.3	180.0	195.8
6-lane	88.2	7.8	7.8	81.8	96.0	96.0	170.0	7.8	7.8	81.8	96.0	96.0	170.0
8-lane	2.1	0.0	0.0	6.7	2.1	2.1	8.8	0.0	0.0	6.7	2.1	2.1	8.8
Subtotal	162.4	75.0	115.7	212.2	237.4	278.1	374.6	75.0	115.7	212.2	237.4	278.1	374.6
Standard Arterial													
2-lane	2,370.1	143.2	-99.4	-52.0	2,513.3	2,270.7	2,318.1	143.2	-148.7	-76.9	2,513.3	2,221.4	2,293.2
4-lane	405.1	-13.1	341.6	346.0	392.0	746.7	751.1	-13.1	381.2	371.7	392.0	786.3	776.8
6-lane	72.0	63.8	68.0	29.8	135.8	140.0	101.8	63.8	77.7	29.0	135.8	149.7	101.0
Subtotal	2,847.2	193.9	310.2	323.8	3,041.1	3,157.4	3,171.0	193.9	310.2	323.8	3,041.1	3,157.4	3,171.0
Region Total	3,009.6	268.9	425.9	536.0	3,278.5	3,435.5	3,545.6	268.9	425.9	536.0	3,278.5	3,435.5	3,545.6

[a] *Minus signs indicate increments of mileage reduction associated with the type of standard arterial facility shown. Reduction in the miles of two lane standard arterials will result, for example, when such existing facilities are improved to four or more lanes or when existing parking is removed to permit four lane operation.*

Source: SEWRPC.

in Table 229. As applied to serve the controlled centralization land use plan, the "no build" transportation plan would increase the total number of round trip miles by 449, while the increases in round trip route miles under the highway-supported transit and transit-supported highway plans would total 2,069 and 2,049, respectively. The number of such miles in high level primary service would be increased by 121 miles under the "no build" alternative, 932 miles under the highway-supported transit alternative, and 933 miles under the transit-supported highway alternative. Also, for the controlled centralization land use plan, the highway-supported transit plan would provide for nearly 37 miles of exclusive transit right-of-way, whereas the transit-supported highway plan would provide for 14 miles of such right-of-way. Both these alternative plans would provide for about 39 miles of exclusive transit lanes on arterial streets. In terns of the incremental number of buses required to serve the peak period, the "no build" alternative plan would require no additions to the transit fleet, whereas the highway-supported transit plan would require the addition of 1,020 buses, and the transit-supported highway plan would require about 720 additional buses.

As applied to serve the controlled decentralization land use plan, the number of incremental round trip route miles of mass transit facilities would be 499 under the "no build" plan, 2,015 under the highway-supported transit plan, and 2,051 under the transit-supported highway plan. With respect to the number of primary round trip transit route miles provided, the "no build" plan would provide for 121 such miles, the highway-supported transit plan 901 miles, and the transit-supported highway plan 959 miles. The number of miles of exclusive transit right-of-way would be 14 under both the highway-supported transit and the transit-supported highway plans, while the number of exclusive transit lanes on arterial streets would approximate nearly 39 miles in each case. Finally, in considering the number of buses required to serve the peak period, the "no build" plan would require 70 fewer in the fleet than in 1972, while the highway-supported transit plan would require 900 additional buses and the transit-supported highway plan nearly 700 buses.

A comparison of the mass transit facilities proposed to be provided in the Kenosha and Racine urbanized areas under the six alternative regional transportation plans is set forth in Table 230. In the Kenosha urbanized area, the number of incremental round trip route miles provided would be 41 miles under the "no build" plan and 57 miles each under the highway-supported transit and transit-supported highway plans, when those plans are designed to serve the controlled centralization land use plan. When applied to serve the controlled decentralization land use plan, the number of incremental round trip route miles provided would be 41 under the "no build" plan and 57 under the highway-supported transit and transit-supported highway plans.

In the Racine urbanized area, the number of incremental round trip route miles required is 52 under the "no build" plan and 76 each under the highway-supported transit and transit-supported highway plans when those plans are applied to serve the controlled centralization land use plan. When applied to serve the controlled decentralization land use plan, the number of incremental round trip route miles provided would be 52 under the "no build" alternative and 76 each under the highway-supported transit and transit-supported highway alternative system plans.

Automobile Availability

A comparison of the anticipated number of automobiles available to residents of the Region by county under each of the six alternative regional transportation system plans considered is set forth in Table 231. As applied to serve the controlled centralization land use plan, the "no build"

Table 229

COMPARISON OF MASS TRANSIT FACILITIES IN THE MILWAUKEE URBANIZED AREA 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Transit Facility Characteristic	Existing 1972	Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
		Alternative Plan Increments			Alternative Plan Totals			Alternative Plan Increments			Alternative Plan Totals		
		"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan
Round Trip Route Miles													
Primary	150	121	932	933	271	1,082	1,083	121	901	959	271	1,051	1,109
Secondary	56	-42	301	293	14	357	349	-42	298	293	14	354	349
Tertiary	855	420	836	823	1,275	1,691	1,678	420	816	799	1,275	1,671	1,654
Total	1,061	499	2,069	2,049	1,560	3,130	3,110	499	2,015	2,051	1,560	3,076	3,112
Miles of Special Facilities													
Exclusive Right-of-Way	--	--	36.5	13.9	--	36.5	13.9	--	13.9	13.9	--	13.9	13.9
Exclusive Lanes on Streets	--	--	39.4	39.4	--	39.4	39.4	--	39.4	39.4	--	39.4	39.4
Vehicle Requirements (Number)													
Peak Period	442	- 6	1,020	719	436	1,462	1,161	-72	900	692	370	1,342	1,134
Midday Period	291	-50	610	395	241	901	686	-89	559	399	202	850	690

Source: SEWRPC.

Table 230

COMPARISON OF MASS TRANSIT FACILITIES IN THE KENOSHA AND RACINE URBANIZED AREAS 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Transit Facility Characteristics	Existing 1972	Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
		Alternative Plan Increments			Alternative Plan Totals			Alternative Plan Increments			Alternative Plan Totals		
		"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan	"No Build" Plan	Highway-Supported Transit Plan	Transit-Supported Highway Plan
Kenosha Urbanized Area													
Round Trip Route Miles . .	59	41	57	57	100	116	116	41	57	57	100	116	116
Vehicle Requirements (Number)													
Peak Period	12	6	17	17	18	29	29	6	17	17	18	29	29
Midday Period	6	12	13	13	18	19	19	12	13	13	18	19	19
Racine Urbanized Area													
Round Trip Route Miles . .	81	52	76	76	133	157	157	52	76	76	33	157	157
Vehicle Requirements (Number)													
Peak Period	10	16	26	26	26	36	36	16	26	26	26	36	36
Midday Period	10	16	15	15	26	25	25	16	15	15	26	25	25

Source: SEWRPC.

Table 231

COMPARISON OF AUTOMOBILE AVAILABILITY IN THE REGION BY COUNTY 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

County	Existing 1972			Proposed 2000													
				Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan							
					"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan			"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Population	Number of Automobiles	Persons Per Automobile	Population	Number of Automobiles	Persons Per Automobile	Number of Automobiles	Persons Per Automobile	Number of Automobiles	Persons Per Automobile	Population	Number of Automobiles	Persons Per Automobile	Number of Automobiles	Persons Per Automobile	Number of Automobiles	Persons Per Automobile
Kenosha	122,700	48,700	2.5	174,800	85,600	2.0	84,700	2.1	84,000	2.1	202,800	100,700	2.0	98,800	2.0	99,000	2.0
Milwaukee . . .	1,060,500	386,600	2.7	1,049,600	470,400	2.2	392,800	2.7	397,100	2.6	898,500	392,500	2.3	346,100	2.6	354,200	2.5
Ozaukee	61,400	27,300	2.2	114,000	56,700	2.0	55,500	2.1	55,400	2.1	148,900	76,500	1.9	75,000	2.0	74,500	2.0
Racine	177,100	70,900	2.5	217,700	101,900	2.1	100,700	2.2	99,400	2.2	224,700	106,400	2.1	105,300	2.1	103,900	2.2
Walworth. . . .	72,300	32,000	2.3	99,600	50,300	2.0	50,300	2.0	50,300	2.0	106,600	55,000	1.9	55,000	1.9	55,000	1.9
Washington . .	71,400	28,900	2.5	143,000	70,500	2.0	70,100	2.0	70,200	2.0	174,500	90,300	1.9	90,000	1.9	90,000	1.9
Waukesha . . .	245,300	110,200	2.2	420,600	205,400	2.0	198,700	2.1	198,800	2.1	463,300	229,600	2.0	222,800	2.1	223,900	2.1
Total	1,810,700	704,600	2.6	2,219,300	1,040,800	2.1	952,800	2.3	955,200	2.3	2,219,300	1,051,000	2.1	994,000	2.2	1,000,500	2.2

Source: SEWRPC.

transportation plan would result in a total of about 1,041,000 automobiles in the year 2000, whereas the highway-supported transit alternative plan would require a total of about 953,000 automobiles and the transit-supported highway plan about 955,000 automobiles. The regional forecast of automobile availability, based on historic trends as described in Chapter III of this volume, is 1,168,000, or about 12, 23, and 22 percent more than the foregoing estimates of automobiles required to be available for the "no build," highway-supported transit, and transit-supported highway alternative transportation plans and the controlled centralization land use plan.

If the three transportation system plans are designed to serve the controlled decentralization land use plan, the number of automobiles required would be 1,051,000 for the "no build" plan, 994,000 for the highway-supported transit plan, and 1,001,000 for the transit-supported highway plan. The regional forecast of automobile availability is 1,168,000, or about 11, 18, and 17 percent more than the foregoing estimates required under the "no build," highway-supported transit and transit-supported highway alternative transportation plans, respectively, under the controlled decentralization land use plan.

It is interesting to note from the foregoing that, under both land use plans, the numbers of automobiles available to residents of the Region in 2000 are affected by the levels of transit service postulated. Given the interrelationship that exists between transit service levels and automobile availability, it may be expected that, all other things being equal, any plan which postulates a higher level of transit

service than another plan will result in estimates of lower automobile availability in the plan design year. Although the route miles of service postulated under both the highway-supported transit and transit-supported highway plans are similar, the levels of service in terms of headways or times between buses along a particular route are better under the highway-supported transit alternative. This improved transit service results in a lesser number of automobiles estimated to be available in the plan design year. The effects of the difference in population density within the transit services areas that exist between the controlled centralization land use plan and the controlled decentralization land use plan on levels of transit service, and thus automobiles available, can also be noted in the increased automobiles available in the plan design year under the highway-supported transit and transit-supported highway plans under the controlled decentralization land use plan when compared with the controlled centralization land use plan. Because a lesser population is available to support transit, a lesser level of service is provided, which together requires increased automobile use to satisfy total regional travel demands under the controlled decentralized land use plan than under the controlled centralization land use plan.

Person Trip Generation

A comparison of the distribution of internal person trips generated on an average weekday in the Region by trip purpose under each of the six alternative regional transportation system plans is set forth in Table 232. The controlled centralization land use plan, together with the "no build" transportation system plan, can be expected to generate a total of over 5.8 million internal person trips on an average weekday, whereas under the highway-supported transit and transit-supported highway plans, the number of trips generated on an average day would approximate 5.7 million each. The difference in internal tripmaking between the highway-supported transit and transit-supported highway system plans is estimated to be only 4,000 trips per day, whereas the largest difference in total internal tripmaking between the alternatives would be about 120,000 trips per average weekday between the "no build" and highway-supported transit plans, a difference of about 2 percent. A difference of this magnitude is very small and considered not significant for planning purposes.

Also as indicated in Table 232, the total internal person trips generated under the controlled decentralization land use plan approximates 5.7 million per average weekday for each of three alternative transportation system plans considered. While the total number of internal person trips generated on an average weekday may not be expected to vary significantly among the alternative transportation system plans, the differences among alternative transportation plans under each land use plan and the differences between land uses plans displayed in Table 232 do reflect both the role of transit service provided under the alternatives and the planned distributions of population. With the provision of higher levels of transit service and the resulting increased use of transit for person tripmaking, the opportunity for secondary and other additional side trips—those trips that can be easily undertaken if the primary trip is made by auto—is reduced when the primary trip is made by transit. This results in a lessening of total person tripmaking within the study area. Under the controlled decentralization land use plan, approximately 150,000 persons were reallocated from Milwaukee County to the other six counties of the Region. Further, this reallocation of population was assumed to result in a net decrease in the number of households within the Region. The average of persons per household within Milwaukee County is less than that experienced elsewhere in the Region and the redistribution of population and determination of number of households occupied by the redistributed

Table 232

COMPARISON OF THE DISTRIBUTION OF INTERNAL PERSONS IN THE REGION BY TRIP PURPOSE 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Trip Purpose Category	Internal Person Trips Generated on an Average Weekday[a]													
			Proposed 2000											
			Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Home-based Work	1,055,500	23.7	1,373,800	23.6	1,346,900	23.6	1,348,500	23.7	1,351,800	23.5	1,333,600	23.5	1,335,600	23.5
Home-based Shopping	673,600	15.1	858,500	14.8	844,900	14.8	845,300	14.8	850,800	14.8	845,700	14.9	846,200	14.9
Home-based Other	1,532,600	34.3	1,990,500	34.1	1,940,300	34.0	1,941,800	34.0	1,984,200	34.6	1,961,800	34.5	1,965,000	34.6
Nonhome-based	779,800	17.5	1,018,000	17.5	988,600	17.4	989,400	17.3	975,600	17.0	962,200	17.0	963,500	16.9
School	418,900	9.4	580,400	10.0	580,400	10.2	580,400	10.2	576,700	10.1	576,700	10.1	576,700	10.1
Total	4,460,400	100.0	5,821,200	100.0	5,701,100	100.0	5,705,400	100.0	5,739,100	100.0	5,680,000	100.0	5,687,000	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

population resulted in the vacating of a substantial number of dwelling units within Milwaukee County. These vacant dwelling units are not anticipated to generate traffic. Because tripmaking is closely related to the number of households, a lesser number of total person trips was indicated under the controlled decentralized land use plan. Although it is known that more trips are made by larger households, this additional increment of tripmaking did not offset the reduction in the number of households resulting from the reallocation of population from Milwaukee County under the controlled decentralized land use plan.

Although the total number of internal person trips generated on an average weekday may not be expected to vary significantly among all the alternative transportation system plans, a significant difference may be expected among the two alternative land use plans in terms of the spatial distribution of trip productions and attractions. The spatial distribution of trip productions and attractions would roughly coincide with the spatial distribution of population and employment, respectively, as proposed in each plan alternative. Since the population and employment distributions differ significantly between the two alternative land use plans, a significant difference would occur between the two plans with respect to trip distribution, with more trips being made outside of Milwaukee County under the controlled decentralization land use plan.

Mode of Travel

A comparison of the distribution of internal trips in the Region by mode of travel under each of the alternative regional transportation system plans is summarized in Table 233. As applied to serve the controlled centralization land use plan, the highway-supported transit alternative plan would result in the highest transit trip production, totaling about 693,000 trips on an average weekday, or about 12 percent of total daily internal travel. Similar figures for the transit-supported highway and "no build" alternatives are 351,000, or about 6 percent, and 187,000, or about 3 percent, respectively.

As applied to serve the controlled decentralization land use plan, the highway-supported transit alternative would result in an estimated 575,000 transit trips on an average weekday, representing about 10 percent of total daily internal travel. Similar figures for the transit-supported highway and "no build" alternatives are 316,000, or about 5 percent, and 148,000, or about 3 percent, respectively.

Transit trip production would, then, be greatest among all alternative plans considered under the highway-supported transit plan as applied to serve the controlled centralization land use plan. This is to be expected because the more densely populated Milwaukee transit service area assumed under the controlled centralization plan could be expected to generate more transit trips than the less densely populated Milwaukee transit service area under the controlled decentralization land use plan. In addition, it is important to emphasize that the increased transit trip production found for the highway-supported transit plan over the transit-supported highway plan may be attributed to the increased use of transit brought about by the assumed 50 percent fare reduction, by the increased transit service levels in terms of reduced headways, and by an increased charge for all day off-street parking within the Milwaukee central business district associated with the highway-supported transit plan. The results of application of the simulation models indicate that transit trip production would be nearly doubled because of these important differences between the transit services under the two transportation alternatives.

A comparison of the distribution of internal person trips by mode of travel for the three urbanized areas in the Region is set forth in Table 234. In the Kenosha urbanized area, transit trip production under the controlled centralization land use plan would approximate 6,000 trips per average weekday, or about 1.4 percent of total trips, under the "no build" alternative plan; about 23,000 trips, or about 6 percent of total trips, under the highway-supported transit plan; and about 23,000 trips, or about 6 percent of

Table 233

COMPARISON OF THE DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE TRAVEL 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Mode of Travel	Internal Person Trips Generated on an Average Weekday[a]													
			Proposed 2000											
			Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Automobile Driver	2,884,700	64.7	3,926,500	67.5	3,468,100	60.8	3,727,000	65.3	3,884,600	67.7	3,524,700	62.1	3,728,200	65.6
Automobile Passenger . .	1,217,900	27.3	1,419,900	24.4	1,251,900	22.0	1,339,500	23.5	1,415,000	24.6	1,288,400	22.7	1,351,400	23.8
Transit Passenger	184,200	4.1	186,800	3.2	693,100	12.2	350,900	6.2	147,700	2.6	575,100	10.1	315,600	5.5
School Bus Passenger . . .	173,600	3.9	288,000	4.9	288,000	5.0	288,000	5.0	291,800	5.1	291,800	5.1	291,800	5.1
Total	4,460,400	100.0	5,821,200	100.0	5,701,100	100.0	5,705,400	100.0	5,739,100	100.0	5,680,000	100.0	5,687,000	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

total trips, under the transit-supported highway plan. Transit trip production under the controlled decentralization land use plan would approximate 6,000 trips per average weekday, or about 1.3 percent of total trips, under the "no build" alternative plans; about 24,000 trips, or about 5 percent of total trips, under the highway-supported transit plan; and about 24,000 trips, or about 5 percent of total trips, under the transit-supported highway plan.

In the Milwaukee urbanized area, transit trip production under the controlled centralization land use plan would approximate 169,000 trips per average weekday, or about 4 percent of total trips, under the "no build" alternative plan; about 643,000 trips, or about 17 percent of total trips, under the highway-supported transit plan; and about 301,000 trips, or about 8 percent of total trips, under the transit-supported highway plan. Transit trip production under the controlled decentralization land use plan would approximate 129,000 trips per average weekday, or about 4 percent of total trips, under the "no build" alternative plan; about 523,000 trips, or about 15 percent of total trips, under the highway-supported transit plan; and about 264,000 trips, or about 8 percent of total trips, under the transit-supported highway plan.

In the Racine urbanized area, transit trip production under the controlled centralization land use plan would approximate 12,000 trips per average weekday, or about 3 percent of total trips, under the "no build" alternative plan; about 26,000 trips, or about 7 percent of total trips, under the highway-supported transit plan; and about 26,000 trips, or about 7 percent of total trips, under the transit-supported highway plan. Transit trip production under the controlled decentralization land use plan would approximate 12,000 trips per average weekday, or about 3 percent of total trips, under the "no build" alternative plan; about 27,000 trips, or about 7 percent of total trips, under the highway-supported transit plan; and about 27,000 trips, or about 7 percent of total trips, under the transit-supported highway plan.

Analyses of the information displayed in Table 234 indicate the differences in the levels of transit service in each alternative plan and also the impact of the change in population postulated for each urbanized area under the two land use plans. Under the controlled decentralized land use plan, the population within the Kenosha and Racine urbanized areas is greater than under the controlled centralized land use plan and thus the transit use under

Table 234

COMPARISON OF THE DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE URBANIZED AREAS OF THE REGION BY MODE OF TRAVEL: 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Mode of Travel	Internal Person Trips Generated on an Average Weekday[a]													
			Proposed 2000											
			Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Kenosha Urbanized Area														
Automobile Driver	208,500	66.7	279,600	66.0	260,700	62.8	260,700	62.8	317,300	65.4	306,100	62.7	306,100	62.7
Automobile Passenger	92,600	29.7	120,200	28.3	113,000	27.3	113,000	27.3	135,100	27.8	131,000	26.8	131,000	26.8
Transit Passenger	2,900	0.9	5,800	1.4	23,000	5.5	23,000	5.5	6,100	1.3	24,400	5.0	24,400	5.0
School Bus Passenger	8,300	2.7	18,200	4.3	18,200	4.4	18,200	4.4	26,500	5.5	26,500	5.5	26,500	5.5
Total	312,300	100.0	423,800	100.0	414,900	100.0	414,900	100.0	485,000	100.0	488,000	100.0	488,000	100.0
Milwaukee Urbanized Area														
Automobile Driver	2,061,700	64.2	2,605,700	66.5	2,176,100	57.1	2,432,900	63.8	2,386,000	67.0	2,041,200	58.4	2,242,300	64.0
Automobile Passenger	858,300	26.7	944,100	24.1	791,200	20.8	884,100	23.2	863.100	24.2	746,200	21.3	814,900	23.2
Transit Passenger	177,800	5.5	168,800	4.3	643,100	16.9	300,900	7.8	129,400	3.6	523,000	15.0	263,500	7.5
School Bus Passenger	116,900	3.6	198,200	5.1	198,200	5.2	198,200	5.2	185,600	5.2	185,600	5.3	185,600	5.3
Total	3,214,700	100.0	3,916,800	100.0	3,808,600	100.0	3,816,100	100.0	3,564,100	100.0	3,496,000	100.0	3,506,300	100.0
Racine Urbanized Area														
Automobile Driver	233,100	65.6	246,200	63.5	227,600	60.6	227,600	60.6	254,400	63.6	236,500	60.7	236,500	60.7
Automobile Passenger	105,100	29.6	108,700	28.0	101,300	26.9	101,300	26.9	112,300	28.0	105,100	27.0	105,100	27.0
Transit Passenger	3,100	0.9	11,900	3.1	26,200	7.0	26,200	7.0	12,000	3.0	26,700	6.8	26,700	6.8
School Bus Passenger	14,000	3.9	20,800	5.4	20,800	5.5	20,800	5.5	21,600	5.4	21,600	5.5	21,600	5.5
Total	355,300	100.0	387,600	100.0	375,900	100.0	375,900	100.0	400,300	100.0	389,900	100.0	389,900	100.0

[a] *Includes only trips completely within and not between urbanized areas.*

Source: SEWRPC.

both the highway-supported transit and transit-supported highway transportation alternatives is slightly greater under the decentralized land use plan than under the centralized land use plan. Within the Milwaukee urbanized area, the reverse is true because of the significant decrease in population within Milwaukee County.

A comparison of the distribution of transit trips by trip purpose among the alternative transportation system plans is set forth in Table 235, while similar data comparing the distribution of internal automobile person trips by trip purpose and internal automobile driver trips by trip purpose are set forth in Tables 236 and 237, respectively. Examination of the data presented in Table 235 demonstrates the significant differences in transit use among the alternative transportation system plans, whereas the data presented in Tables 236 and 237, relating to automobile use within the Region, do not reveal any significant differences between the alternative transportation plans considered for each of the two alternative regional land use plans.

A comparison of the distribution of total vehicle trips in the Region by vehicle class for each of the six alternative regional transportation system plans is set forth in Table 238. No significant differences in the number of external automobile and internal and external truck trips would be expected among the three transportation plan alternatives as applied to the two land use plan alternatives.

Table 235

COMPARISON OF THE DISTRIBUTION OF INTERNAL TRANSIT TRIPS BY TRIP PURPOSE 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Trip Purpose Category	Internal Transit Trips Generated on an Average Weekday[a]													
			Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Home-based Work	70,900	38.5	79,600	42.6	193,900	28.0	137,900	39.3	60,000	40.6	152,700	26.5	108,200	34.3
Home-based Shopping	18,800	10.2	17,300	9.3	119,300	17.2	46,000	13.1	14,900	10.1	102,300	17.8	47,400	15.0
Home-based Other	28,300	15.4	34,300	18.4	286,800	41.4	104,200	29.7	24,700	16.7	238,900	41.5	102,600	32.5
Nonhome-based	13,100	7.1	4,100	2.2	41,600	6.0	11,300	3.2	3,500	2.4	36,600	6.4	12,800	4.1
School	53,100	28.8	51,500	27.5	51,500	7.4	51,500	14.7	44,600	30.2	44,600	7.8	44,600	14.1
Total	184,200	100.0	186,800	100.0	693,100	100.0	350,900	100.0	147,700	100.0	575,100	100.0	315,600	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 236

COMPARISON OF THE DISTRIBUTION OF INTERNAL AUTOMOBILE PERSON TRIPS BY TRIP PURPOSE 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Trip Purpose Category	Internal Automobile Person Trips Generated on an Average Weekday[a]													
			Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Home-based Work	984,600	24.0	1,294,100	24.2	1,153,000	24.4	1,210,600	23.9	1,291,800	24.4	1,180,900	24.5	1,227,400	24.2
Home-based Shopping	654,800	16.0	841,300	15.7	725,600	15.4	799,300	15.8	835,900	15.8	743,400	15.5	798,800	15.7
Home-based Other	1,504,300	36.6	1,956,200	36.6	1,653,500	35.0	1,837,600	36.3	1,959,500	37.0	1,722,900	35.8	1,862,400	36.7
Nonhome-based	766,700	18.7	1,013,900	19.0	947,000	20.1	978,100	19.3	972,100	18.3	925,600	19.2	950,700	18.7
School	192,200	4.7	240,900	4.5	240,900	5.1	240,900	4.7	240,300	4.5	240,300	5.0	240,300	4.7
Total	4,102,600	100.0	5,346,400	100.0	4,720,000	100.0	5,066,500	100.0	5,299,600	100.0	4,813,100	100.0	5,079,600	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 237

COMPARISON OF THE DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS BY TRIP PURPOSE 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Trip Purpose Category	Internal Automobile Driver Trips Generated on an Average Weekday[a]													
			Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Home-based Work	840,800	29.2	1,153,900	29.4	1,035,300	29.8	1,086,100	29.1	1,150,900	29.6	1,058,400	30.0	1,099,200	29.5
Home-based Shopping	444,500	15.4	596,700	15.2	515,600	14.9	568,500	15.3	593,900	15.3	528,200	15.0	569,000	15.3
Home-based Other	976,300	33.8	1,320,600	33.6	1,112,700	32.1	1,242,000	33.3	1,318,100	33.9	1,151,900	32.7	1,252,900	33.6
Nonhome-based	555,700	19.3	769,000	19.6	718,200	20.7	744,100	20.0	736,300	19.0	700,800	19.9	721,700	19.3
School	67,400	2.3	86,300	2.2	86,300	2.5	86,300	2.3	85,400	2.2	85,400	2.4	85,400	2.3
Total	2,884,700	100.0	3,926,500	100.0	3,468,100	100.0	3,727,000	100.0	3,884,600	100.0	3,524,700	100.0	3,728,200	100.0

[a] *Does not include group quartered or nonresident trips.*

Source: SEWRPC.

Table 238

COMPARISON OF THE DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Vehicle Class	Total Vehicle Trips Generated on an Average Weekday													
			Proposed 2000											
			Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Automobile														
Internal	2,884,700	84.0	3,926,500	84.6	3,468,100	82.9	3,727,000	83.9	3,884,600	84.2	3,524,700	82.9	3,735,900	83.7
External[a]	111,900	3.2	163,800	3.5	163,800	3.9	163,800	3.7	174,700	3.8	174,700	4.1	174,700	3.9
Other[b]	34,200	1.0	46,000	1.0	46,000	1.1	46,000	1.0	48,400	1.1	48,400	1.1	48,400	1.1
Subtotal	3,030,800	88.2	4,136,300	89.1	3,677,900	87.9	3,936,800	88.6	4,107,700	89.1	3,747,800	88.1	3,959,000	88.7
Truck														
Internal	383,600	11.2	477,200	10.3	477,200	11.4	477,200	10.8	476,700	10.3	476,700	11.2	476,700	10.7
External	13,800	0.4	18,500	0.4	18,500	0.5	18,500	0.4	18,700	0.4	18,700	0.5	18,700	0.4
Other[b]	6,000	0.2	8,500	0.2	8,500	0.2	8,500	0.2	8,800	0.2	8,800	0.2	8,800	0.2
Subtotal	403,400	11.8	504,200	10.9	504,200	12.1	504,200	11.4	504,200	10.9	504,200	11.9	504,200	11.3
Total	3,434,200	100.0	4,640,500	100.0	4,182,100	100.0	4,441,000	100.0	4,611,900	100.0	4,252,000	100.0	4,463,200	100.0

[a] *Includes light truck, i.e., those under 6,000 pounds gross weight.*

[b] *Includes vehicle trips made by persons residing in group quarters and by nonresidents of the Region.*

Source: SEWRPC.

Table 238

ALTERNATIVE TRANSPORTATION PLAN EVALUATION—SATISFACTION OF OBJECTIVES AND STANDARDS

The specific transportation system development objectives to be met by the regional transportation system plans, together with the standards which relate these objectives to physical development proposals and facilitate evaluation of the ability of the alternative transportation plans to meet the chosen objectives, have been set forth in Chapter II of this volume. To determine the ability of the transportation plans to meet the development objectives, the alternative transportation plans were scaled against these standards supporting each development objective. The results of this process are presented in the following section.

Objective No. 1—Effectively Serve Regional Land Use Pattern

The first transportation objective refers to the achievement of an integrated transportation system which, by its location, capacity, and design will effectively serve the existing regional land use pattern and promote implementation of the regional land use plan, meeting the anticipated travel demand generated by the existing and proposed land uses. This objective is supported by two specific standards relating to accessibility and travel time.

Standard No. 1 indicates that the regional transportation system should provide service within each urbanized area of the Region so that all residents of each urbanized area are within 30 minutes overall travel time of at least 40 percent of the employment opportunities in the urbanized area; 35 minutes overall travel time of at least three major retail and service centers; 40 minutes overall travel time of at least one regional medical center and 30 minutes overall travel time of at least one hospital or medical clinic; 40 minutes overall travel time of at least one regional park; 40 minutes overall travel time of at least one higher educational facility; and 60 minutes overall travel time of an airport offering scheduled air transport service. Overall travel time is defined as the total door-to-door time of travel from origin to destination, including the time required to arrive at the transportation vehicle, as well as over-the-road travel time. The results of these analyses for the arterial street and highway components of the alternative regional transportation system plans are shown in Table 239, while similar results for the transit components of the alternative regional transportation system plans are set forth in Table 240.

As shown in Table 239, this particular transportation standard is fully met for the auto mode in each of the urbanized areas of the Region—Milwaukee, Kenosha, and Racine—for all land uses except employment related. The

Table 239

COMPARISON OF URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO SELECTED SUBAREAS THROUGH TRAVEL ON ARTERIAL STREETS AND HIGHWAYS 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Selected Subarea	Urbanized Area Population			Urbanized Area Population Meeting Travel Time Standard on Arterial Streets and Highways (in hundreds)													
						Proposed 2000											
						Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972	Proposed 2000		Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
		Controlled Centralization Land Use Plan	Controlled Decentralization Land Use Plan	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Kenosha Urbanized Area	890	1,416	1,459	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Employment-Related[a]	--	--	--	890	100.0	1,416	100.0	1,416	100.0	1,416	100.0	1,459	100.0	1,459	100.0	1,459	100.0
Major Retail-Service[b]	--	--	--	--	--	1,416	100.0	1,416	100.0	1,416	100.0	1,459	100.0	1,459	100.0	1,459	100.0
Medical Facility[c]	--	--	--	890	100.0	1,416	100.0	1,416	100.0	1,416	100.0	1,459	100.0	1,459	100.0	1,459	100.0
Major Park[d]	--	--	--	890	100.0	1,416	100.0	1,416	100.0	1,416	100.0	1,459	100.0	1,459	100.0	1,459	100.0
Higher Education Facility[e]	--	--	--	890	100.0	1,416	100.0	1,416	100.0	1,416	100.0	1,459	100.0	1,459	100.0	1,459	100.0
Scheduled Air Transport Airport[f]	--	--	--	890	100.0	1,416	100.0	1,416	100.0	1,416	100.0	1,459	100.0	1,459	100.0	1,459	100.0
Milwaukee Urbanized Area	12,796	15,088	14,002	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Employment-Related	--	--	--	12,333	96.4	13,778	91.3	13,864	91.9	14,324	94.9	12,259	89.9	10,543	75.3	12,758	91.1
Major Retail-Service	--	--	--	12,796	100.0	15,088	100.0	15,088	100.0	15,088	100.0	14,002	100.0	14,002	100.0	14,002	100.0
Medical Facility	--	--	--	12,796	100.0	15,088	100.0	15,088	100.0	15,088	100.0	14,002	100.0	14,002	100.0	14,002	100.0
Major Park	--	--	--	12,796	100.0	15,088	100.0	15,088	100.0	15,088	100.0	14,002	100.0	14,002	100.0	14,002	100.0
Higher Education Facility	--	--	--	12,796	100.0	15,088	100.0	15,088	100.0	15,088	100.0	14,002	100.0	14,002	100.0	14,002	100.0
Scheduled Air Transport Airport	--	--	--	12,796	100.0	15,088	100.0	15,088	100.0	15,088	100.0	14,002	100.0	14,002	100.0	14,002	100.0
Racine Urbanized Area	1,213	1,488	1,526	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Employment-Related	--	--	--	1,190	98.1	1,455	97.8	1,488	100.0	1,488	100.0	1,526	100.0	1,526	100.0	1,526	100.0
Major Retail-Service	--	--	--	91	7.5	1,488	100.0	1,488	100.0	1,488	100.0	1,526	100.0	1,526	100.0	1,526	100.0
Medical Facility	--	--	--	1,213	100.0	1,488	100.0	1,488	100.0	1,488	100.0	1,526	100.0	1,526	100.0	1,526	100.0
Major Park	--	--	--	1,213	100.0	1,488	100.0	1,488	100.0	1,488	100.0	1,526	100.0	1,526	100.0	1,526	100.0
Higher Education Facility	--	--	--	1,213	100.0	1,488	100.0	1,488	100.0	1,488	100.0	1,526	100.0	1,526	100.0	1,526	100.0
Scheduled Air Transport Airport	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

[a] *Standard: 30 minutes overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes overall travel time of a major regional medical center and/or 30 minutes overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes overall travel time of a scheduled air transport airport.*

Source: SEWRPC.

latter standard is met in the Kenosha and Racine urbanized areas under all plans except the controlled centralization "no build" plan. In the Milwaukee urbanized area, this standard also is only partially met, ranging from about 91 percent of the population under the "no build" plan to about 95 percent under the transit-supported highway plan, when the alternative transportation system plans prepared to serve the controlled centralization land use plan are examined; and from 75 percent of the population under the highway-supported transit plan to 91 percent under the transit-supported highway plan when the alternative transportation system plans prepared to serve the controlled decentralization land use plan are examined. Those subareas of the Milwaukee urbanized area not meeting the travel time standard over the arterial street and highway system are generally located on the fringe of the Milwaukee urbanized area and include the Cedarburg, Grafton, Saukville, and Port Washington areas of Ozaukee County; the Germantown area of Washington County; portions of the City of Oak Creek in Milwaukee County; and portions of the City of Waukesha in Waukesha County. In general, it may be concluded that this travel time standard is met relatively well for the arterial street and highway system for all of the transportation plans considered.

With respect to the transit component of the transportation system plans, however, the results are quite different, as shown in Table 240. Not only is the standard not met for the employment-related land uses under any of the plans in any of the three urbanized areas of the Region, but neither is the standard fully met in any of the plans in any of the urbanized areas for any of the other land use activities included in the standard. For example, while the employment-related standard is met for about the population in the Kenosha and Racine urbanized areas, in the Milwaukee urbanized area, only about 2 percent of the urbanized area in 1972 lived within 30 minutes overall travel time by transit of 40 percent of the urbanized area employment opportunities. For those alternative transportation plans prepared to serve the controlled centralization land use plan, this percentage would increase to nearly 3 percent under the "no build" plan, to 14 percent under the highway-supported transit plan, and to 16 percent under the transit-supported highway plan. Under the controlled decentralization plan, none of the urbanized area population would meet the standard under the "no build," plan, only about 5 percent under the highway-supported transit plan, and also only about 5 percent under the transit-supported highway plan, all due to a declining population in the transit service area.

Table 240

COMPARISON OF URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO SELECTED SUBAREAS THROUGH TRAVEL ON TRANSIT: 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Selected Subarea	Urbanized Area Population			Urbanized Area Population Meeting Travel Time Standard on Arterial Streets and Highways (in hundreds)													
						Proposed 2000											
						Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972	Proposed 2000		Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
		Controlled Centralization Land Use Plan	Controlled Decentralization Land Use Plan	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Kenosha Urbanized Area	890	1,416	1,459	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Employment-Related[a]	--	--	--	408	45.8	838	59.2	708	0.50	708	0.50	798	54.7	650	44.6	650	44.6
Major Retail-Service[b]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Medical Facility[c]	--	--	--	709	79.6	1,035	73.1	952	67.2	952	67.2	685	46.9	992	68.0	992	68.0
Major Park[d]	--	--	--	201	22.6	285	20.1	215	15.2	215	15.2	192	13.2	294	20.2	294	20.2
Higher Education Facility[e]	--	--	--	341	38.3	844	59.6	1,132	79.9	1,132	79.9	718	49.2	1,274	87.3	1,274	87.3
Scheduled Air Transport Airport[f]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Milwaukee Urbanized Area	12,796	15,088	14,002	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Employment-Related	--	--	--	233	1.8	429	2.8	2,179	14.4	2,449	16.2	--	--	638	4.6	740	5.3
Major Retail-Service	--	--	--	2,796	21.8	7,475	49.5	8,870	58.8	8,901	59.0	7,059	50.4	7,828	55.9	7,750	55.9
Medical Facility	--	--	--	9,508	74.3	11,949	79.2	12,613	83.6	11,906	78.9	9,689	69.2	11,266	80.5	11,555	80.5
Major Park	--	--	--	7,998	62.5	12,868	85.3	13,923	92.3	12,621	83.6	11,261	80.4	12,290	87.7	12,132	87.7
Higher Education Facility	--	--	--	11,555	90.3	12,714	84.3	12,985	86.1	12,167	80.6	11,555	82.5	12,212	87.2	12,308	87.2
Scheduled Air Transport Airport	--	--	--	2,565	20.0	9,637	63.9	10,202	67.6	9,824	65.1	9,036	64.5	8,432	60.2	8,629	60.2
Racine Urbanized Area	1,213	1,488	1,526	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Employment-Related	--	--	--	239	20.0	682	45.8	765	51.4	765	51.4	660	43.2	798	52.3	798	52.3
Major Retail-Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Medical Facility	--	--	--	455	37.5	955	64.2	901	60.6	901	60.6	832	54.5	914	59.9	914	59.9
Major Park	--	--	--	262	21.6	329	22.1	756	50.8	756	50.8	322	21.1	826	54.1	826	54.1
Higher Education Facility	--	--	--	1,012	83.4	1,467	98.6	1,481	99.5	1,481	99.5	1,495	98.0	1,518	99.5	1,518	99.5
Scheduled Air Transport Airport	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

[a] *Standard: 30 minutes overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes overall travel time of a major regional medical center and/or 30 minutes overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes overall travel time of a scheduled air transport airport.*

Source: SEWRPC.

Although this analysis has shown that even the high levels of transit service provided under the highway-supported transit and transit-supported highway plans are not capable of serving all residents of the urbanized area according to the design standards, it is interesting to note that those subareas served by transit that meets the standards are concentrated in the older, more densely developed portions of the central cities, such as the Model Cities area within the City of Milwaukee. These areas contain concentrations of the elderly, minority groups, and low income persons, groups most apt to depend upon the transit system for their mobility. In this respect, the street and highway and transit system designed under the highway-supported transit and transit-supported highway alternatives do offer levels of transportation service in accordance with the development objectives and standards for those subareas of the Region in which many of the poor and minority groups currently live.

It is apparent from the above analysis that provision of transit services within a large urbanized area such as Milwaukee sufficient to meet land use service standards, such as those set forth under Objective No. 1, is most difficult. This finding illustrates the extreme difficulty of making transit fully competitive with the automobile in an area having a diffused, low-density population base and dispersed employment and other major traffic generators. While the standards could be reduced, either by lengthening the overall travel time permitted by transit, reducing the percentage of land uses or jobs to be reached within the travel time, or perhaps both, evaluation of the data shown does permit determination of the ability of the level of transit service postulated under each alternative to serve the residents, land uses, and jobs within the urbanized area even though the standard itself may not be met. The analyses indicate that persons dependent upon transit use may not have good access to as many opportunities within the given travel time as they would if an auto were available.

Standard No. 2 indicates that the relative accessibility provided by the regional transportation system should be adjusted to the land use plan by providing to areas in which development is to be induced a higher relative accessibility than that provided to areas which should be protected from urban development. In order to determine the relative accessibility of the various subareas within the Region under existing 1972 conditions and under proposed transportation system conditions set forth in the six alternative transportation system plans, combined accessibility indices were computed for all zones within the Region, one for existing conditions and one or each alternative plan.[3]

The combined accessibility index measures the ease with which any land use activity can be reached from any other land use activity within the Region; the higher the index, the greater the accessibility. For this purpose, activity is defined as the location to which a trip destination can be satisfied for all trip purposes except school. The combined index for any zone was calculated by summing four indices computed for the zone, one for each of four trip purposes. These combined indices were plotted as iso-accessibility lines for each of the six alternative transportation plans and for existing conditions, and are shown on Map 40.

In essence, the accessibility index described above measures the relative ease with which a traveller living at a given point can reach all possible trip destinations. If the travel times to destination points are relatively low because of their nearness or because of the efficiency of the transportation system, it will result in a high value for the index. Similarly, if the destination points nearest a traveller's origin point are ones of large size, that is, high population or employment, it will also result in a high accessibility index value. On the other hand, if a traveller is located at a point relatively distant in travel time from major trip destinations, either because of low speeds or indirect routes on the transportation system, a low accessibility index will result.

From a comparison of the accessibility indices identified on Map 40, it can be seen that the rural areas of the Region generally have lower accessibility than the urbanized areas. The areas of highest relative accessibility within the Region, both under existing conditions and under all alternative plan conditions, are generally in western and northwestern Milwaukee County and, to some degree, in eastern Waukesha County. From these locations of relatively high accessibility, accessibility levels decrease in irregular concentric circle fashion to the fringe areas of the Region, with certain exceptions of high relative accessibility in the Cities of Kenosha and Racine.

In comparing the accessibility levels in 1972 with those alternative accessibility levels that would occur in the year 2000 under the alternative plan conditions, it can be observed that the accessibility levels in the Region are

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[3] *The accessibility index for any given zone i within the Region is defined as the denominator of the gravity model. This number is determined for each zone by multiplying the number of trip attractions in each other zone, j, by the friction factor between zones i and j. These products are summed to produce a total from zone i to all other zones. The index may be defined mathematically as:*

$$V_i = \sum_{j=1}^{N} A_j (Fij)$$

Where V_i = *The accessibility index for zone i to all other zones.*
A_j = *The trip attractions in zone j.*
Fij = *The gravity model friction factor for travel between zones i and j.*
N = *The number of traffic analysis zones in the Region.*

The gravity model friction factor, Fij, is determined from gravity model calibration process and can be thought of as the inverse of the door-to-door travel time between the two points, tij, by automobile raised to some power, b, or

$$Fij = \frac{1}{tij^b}$$

expected to increase in nearly all areas of the Region. These changes would come about both because of improvements to the transportation system and because of changes caused by growth and movement of the population and employment within the Region. The latter can be determined by comparing each of the "no build" transportation alternatives with the existing situation, whereas changes due primarily to transportation system improvements can be identified by comparing the highway-supported transit and transit-supported highway alternatives with their respective "no build" alternative plans. From such comparisons, it appears that the major cause of changes in accessibility levels is change in population and associated land use distribution rather than transportation system improvements, although some changes due to transportation system improvements also are apparent. When the transit-supported highway alternative plans prepared to serve the two alternative land use plans are compared to their respective "no build" alternative plans, it is apparent that highway improvements lead to increased accessibility levels, especially in Milwaukee County and eastern Waukesha County. Relatively little differences appear between the two highway-supported transit alternative plans and their respective "no build" alternative plans.

In comparing the relative accessibility provided by the alternative transportation system plans for the two alternative land use plans, it can be noted that those accessibility patterns associated with the controlled decentralization land use plan have smaller areas of high accessibility in Milwaukee County and larger areas of medium accessibility, especially in Waukesha, Ozaukee, and Kenosha Counties, than can be observed in the accessibility patterns associated with the controlled centralization land use plan. Thus, it appears that the population and associated land use redistribution assumed to occur under the controlled decentralization land use plan is accompanied by an outward shift in relative accessibility. In all cases, however, the accessibility levels are closely related to the land use patterns proposed in each of the alternative land use plans and thus would meet the plan standard equally well.

Objective No. 2—Minimize Costs and Energy Utilization

The second transportation objective concerns achievement of a transportation system which is economical and efficient, satisfying all other objectives at the lowest possible cost. This objective is supported by four specific standards relating to transportation system costs and benefits, utilization of existing transportation facilities, and utilization of energy.

Standard No. 1 indicates that the sum of the transportation system operating and capital investment costs should be minimized. Accordingly, an analysis was made to determine the estimated total costs of implementing each alternative transportation plan under each of the two alternative land use plans. These estimates were prepared by applying unit improvement costs to the estimated mileage of proposed future facility improvements, including acquisition of rights-of-way and construction of new arterial street and highway facilities; by applying unit improvement costs to the estimated mileage of collector and minor land access streets; and by preparing special estimates of the cost of constructing the proposed primary and secondary transit facilities, including transitways and preferential transit lanes, transit parking stations, transit vehicles, and transit vehicle storage and maintenance facilities. In addition, the cost of operating and maintaining the existing and proposed arterial street and highway system, the collector and land access street system, and the transit system were estimated. These operating costs include not only the costs to public implementing agencies having responsibilities for operating and maintaining the transportation system, but also the operating cost to system users in terms of time, vehicle operating costs, and accident costs. All cost estimates have been developed in constant 1975 dollars.

Rights-of-way costs include the cost to acquire the land and any residential and nonresidential structures necessary to provide a right-of-way capable of accommodating the required improvement cross section, as well as the costs associated with relocation and assistance payments. The right-of-way and relocation costs were based upon the recent experience of local units of government and the Wisconsin Department of Transportation in the Southeastern Wisconsin Region.

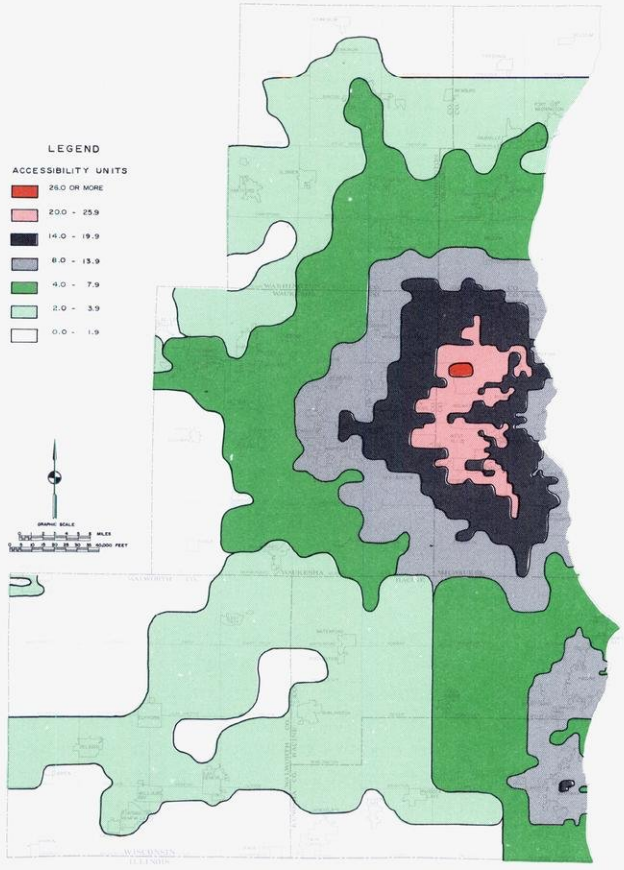
Construction costs, which include engineering and utility relocation, also reflect capital cost experiences of highway agencies within southeastern Wisconsin and have been developed for each street and highway cross section type. Where applicable, the costs of freeway development reflect current estimates developed for those projects. As noted earlier in this report, the estimated transit system costs were based upon a continued reliance on the motor bus as the transit vehicle for the purpose of developing cost estimates for the alternative system plans. A decision regarding transit vehicle and system specifications will be made as part of the evaluation of the transit element of the final recommended regional transportation system plan.

Unit improvement cost data for collector and minor land access street construction were also developed from information provided by the local units of government in southeastern Wisconsin and the Wisconsin Department of Transportation. The unit costs were expressed for collector and land access minor streets on a per mile basis and applied to mileage estimates, as these were determined by applying an appropriate factor representing the proportion of land normally developed for streets and highways in urban areas under good subdivision design practices to the land area to be converted from rural to urban use over the plan design period. The costs of initial collector and minor street construction were assumed to be borne by the developers of the land, and do not, therefore, represent a cost to the general public. The subsequent resurfacing and maintenance of such facilities, however, would be public costs.

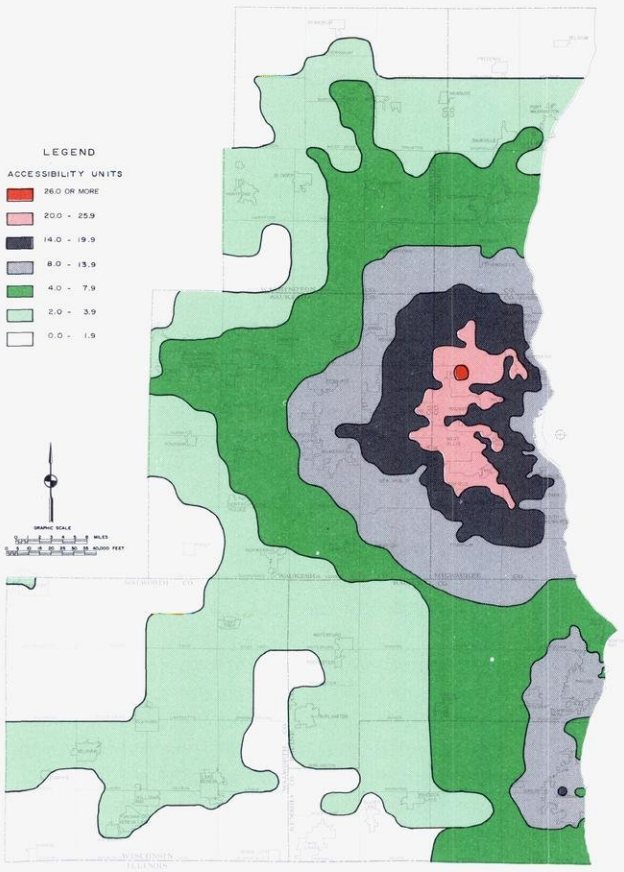
In addition to the initial investment required to provide new or expanded facility capacity, resurfacing of all other streets and highways was assumed during the plan implementation period, as well as the additional resurfacing of a proportion of all arterial facilities a second time to achieve adequate pavement life over the 25 year plan design period. The cost of reconstructing and resurfacing collector

ACCESSIBILITY TO LAND USE ACTIVITY IN THE REGION
1972 AND 2000 ALTERNATIVE LAND USE AND TRANSPORTATION PLANS

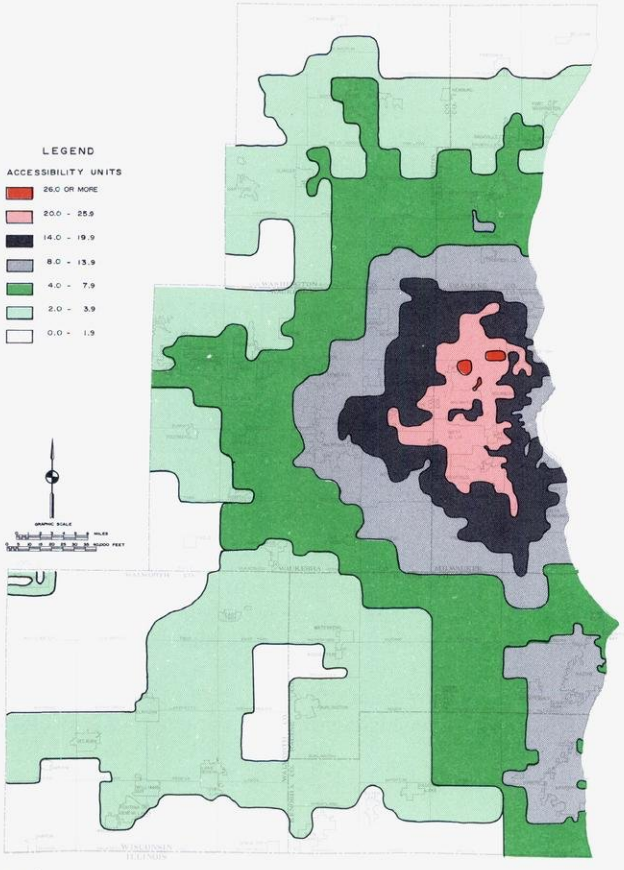
NO BUILD PLAN
CONTROLLED CENTRALIZATION LAND USE PLAN



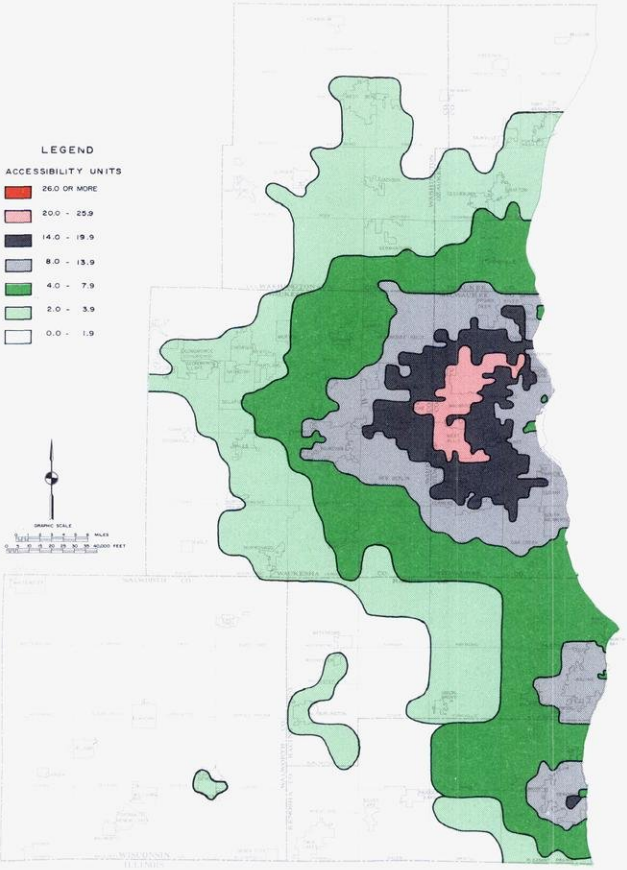
HIGHWAY-SUPPORTED TRANSIT PLAN
CONTROLLED CENTRALIZATION LAND USE PLAN



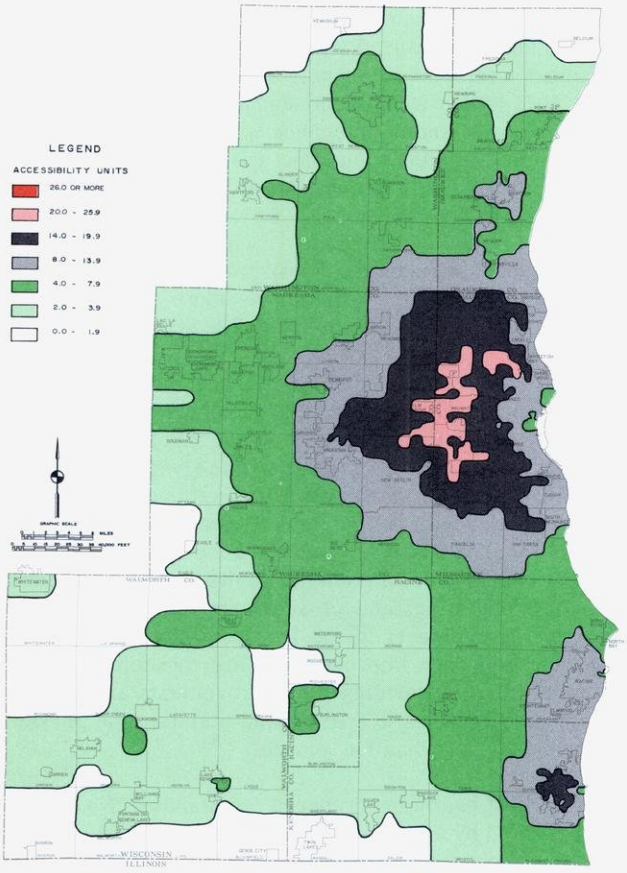
TRANSIT-SUPPORTED HIGHWAY PLAN
CONTROLLED CENTRALIZATION LAND USE PLAN



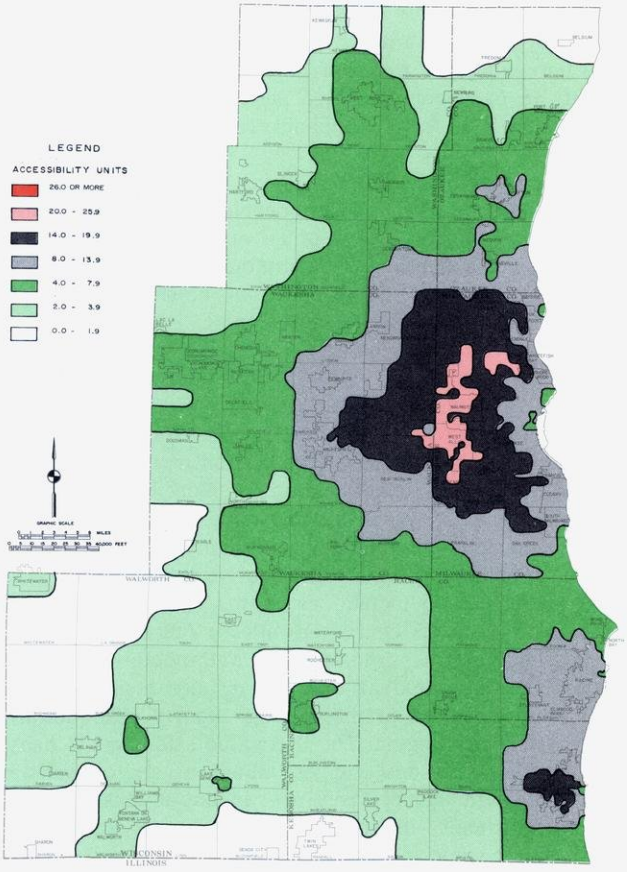
EXISTING CONDITIONS
1972



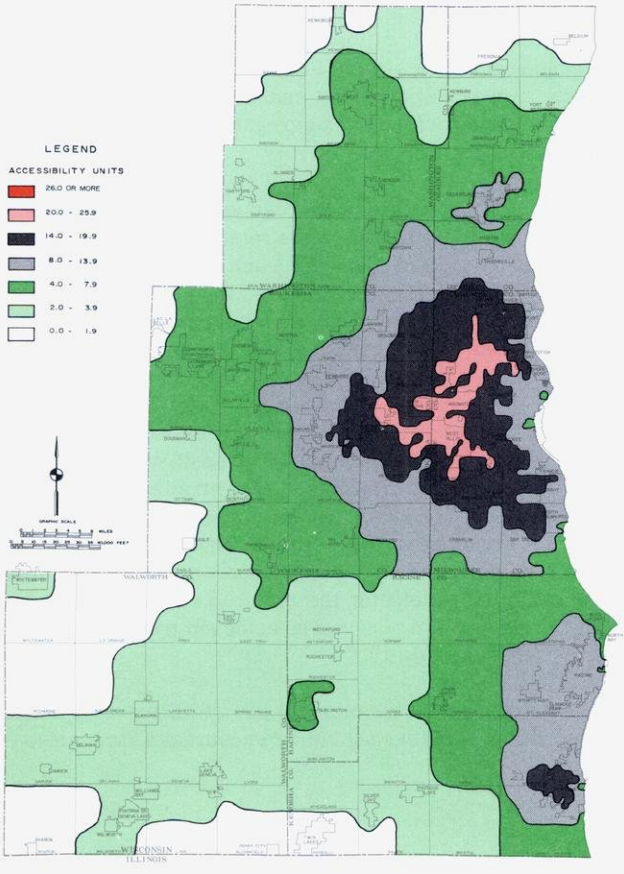
NO BUILD PLAN
CONTROLLED DECENTRALIZATION LAND USE PLAN



HIGHWAY-SUPPORTED TRANSIT PLAN
CONTROLLED DECENTRALIZATION LAND USE PLAN



TRANSIT-SUPPORTED HIGHWAY PLAN
CONTROLLED DECENTRALIZATION LAND USE PLAN



The series of seven maps on these two facing pages graphically portrays the relative accessibility in the Region under existing 1972 land use and transportation system conditions and under proposed land use and transportation system conditions as set forth in the six alternative plans. The areas of highest relative accessibility, both under existing conditions and under all alternative plan conditions, are located in western and northwestern Milwaukee County and in eastern Waukesha County. From these locations the accessibility levels decrease in irregular concentric circle fashion to the fringe areas of the Region, excepting only small areas of relatively high accessibility in the Cities of Kenosha and Racine. Accessibility levels in the Region could be expected to increase throughout the Region under all of the alternative plans. The major cause of change in accessibility levels would be population and associated land use redistribution, rather than transportation system improvements. When the transit-supported highway alternative plans are compared to the "No Build" plans, it is apparent that highway improvements lead to increased accessibility levels especially in Milwaukee County and eastern Waukesha County. By comparison, relatively few differences appear between the two highway-supported transit plans and the "No Build" plans. In comparing the relative accessibility provided by the alternative transportation system plans for the two alternative land use plans, it can be noted that those accessibility patterns associated with the controlled decentralization land use plan have smaller areas of high accessibility in Milwaukee County and larger areas of medium accessibility in Waukesha, Ozaukee, and Kenosha Counties than are observed in the accessibility patterns associated with the controlled centralization land use plan. Thus, population and land use redistribution under the controlled decentralization land use plan would be accompanied by an outward shift in relative accessibility.

Source: SEWRPC.

and minor streets during the plan implementation period was calculated on the basis of unit cost data for each cross section type and the amount of such mileage to be preserved. The percentage of miles of existing collector and minor streets in each county which require reconstruction and resurfacing is set forth in Appendix H.

Unit operation and maintenance cost data for collector and minor land access streets were developed from information provided by the local units of government in the Region. Similarly, unit operation and maintenance cost data for transit facilities were developed from information provided by local transit agencies in the Region.

User costs include the value of time spent in travel; the cost of accidents; and, in the case of auto and truck users, the out-of-pocket costs of vehicle operation and parking, including depreciation and that portion of insurance costs not represented in accident costs. Vehicle operating costs were developed on the basis of gasoline used at 39 cents per gallon as a function of vehicle and facility types used; plus a cost of 7 cents per mile. Heavy duty truck operating costs were developed to include estimates of the cost of fuel used plus 6.5 to 9.5 cents per mile, a function of vehicle speed. The value of time spent in automobile and transit travel was estimated at four dollars per hour, which in 1970 was equivalent to the average hourly manufacturer wage within the Region. The trip value attendant to heavy duty truck operations was estimated at six dollars per hour. Although transit fares are an out-of-pocket cost to the transit user, in an economic analysis such fares represent revenue to offset transit operating and maintenance costs. Transit fares are not, therefore, included as a transit user cost since such inclusion would represent a double accounting of such dollars. Transit fares, therefore, were treated in the same manner as road user taxes.

The resulting total cost estimates for each of the alternative transportation system plans are set forth in summary form in Table 241. For the three alternative transportation plans prepared to serve the controlled centralization land use plan, the lowest cost plan would be the "no build" alternative plan, with an estimated total cost of $71.98 billion. Of this total, about $1.48 billion would represent capital costs and $70.50 billion operation and maintenance costs, of which user costs represent $68.95 billion. The second lowest cost plan would be the transit-supported highway alternative plan, with an estimated total cost of about $73.06 billion. Of this total, about $3.47 billion would represent capital costs and $69.59 operation and maintenance costs, of which user costs represent $67.29 billion. The most costly plan would be the highway-supported transit alternative plan, with an estimated total cost of about $73.10 billion. Of this total, about $2.67 billion would represent capital costs and $70.43 billion operation and maintenance costs, of which user costs represent $67.94 billion.

For the three alternative transportation plans prepared to serve the controlled decentralization land use plan, the lowest cost plan would be the "no build" alternative plan, with an estimated total cost of $71.92 billion. Of this total, about $1.58 billion would represent capital costs and $70.34 operation and maintenance costs of which user costs represent $68.80 billion. The second lowest cost plan would be the highway-supported transit alternative plan, with an estimated total cost of about $73.09 billion. Of this total, about $2.74 billion would represent capital cost and $70.35 billion operation and maintenance costs of which user costs represent $67.90 billion. The most costly plan would be the transit-supported highway alternative plan, with an estimated total cost of about $73.28 billion. Of this total, about $3.64 billion would represent capital costs and $69.64 operation and maintenance costs, of which, user costs represent $67.30 billion. Additional, more detailed plan cost estimates are provided in Tables 242, 243, and 244.

Standard No. 2 indicates that the direct benefits derived from transportation system improvements should exceed the direct costs of such improvements. Application of this standard permits a comparative analysis of "build" alternatives—those that include transportation system improvements—with a "no build" alternative plan. The direct benefits derived from transportation system improvements include a reduction in the cost of travel time, of vehicle operation, and of accidents that are achieved through improvements to the transportation system. The direct costs of such improvements are the capital investments relating to providing the improvements and the cost to the public agencies to operate and maintain the physical facilities and transportation services.

The total cost estimates prepared for Standard No. 1 were supplemented by a benefit-cost analysis intended to demonstrate the economic value of the transportation system plan proposals. In preparing the benefit-cost analysis, it should be noted that the benefits and costs were calculated as accruing over a period of time extending from 1976 to 2025 in order to bring the salvage value of each staged facility recommended in the plans to zero. It should also be noted that the benefit-cost ratios set forth in Table 245 apply to the aggregation of system improvements proposed in the regional transportation plans and do not imply that each individual project within this aggregation will have a similar benefit-cost ratio.

The present worth values of the road user, construction, and operating and maintenance costs related to the alternative transportation system plans for each alternative land use plan are summarized in Table 245. In all cases, the cost to improve, operate, and maintain the transportation system proposed under the alternatives that include improvements over the "no build" alternative may be expected to exceed the benefits in terms of reduced road user costs that would accrue following implementation of the transportation facilities and service, although the transit-supported highway alternative with the controlled centralization land use plan has a benefit-cost ratio that rounds to 1.00. Thus, it should be anticipated that, under final plan synthesis, efforts will be made to identify those marginal facilities offering limited benefit for the required capital investment so that a total system plan can be achieved having a benefit-cost ratio that exceeds 1.0.

Standard No. 3 indicates that full use of all existing major transportation facilities should be encouraged through low-

capital and noncapital intensive techniques cooperatively fostered by government, business, and industry. In essence, this standard specifies that full use should be made of all existing transportation facilities. This standard was used to constrain the plan design and best process. For example, in the computation of system capacity, curb parking was assumed to have been eliminated in the peak direction during the peak hours on all arterial streets in order to minimize traffic congestion and the need for additional capital investment. Similarly, every effort was made in the plan design to facilitate a higher level of transit service by utilizing available arterial street capacity for the exclusive or preferential movement of transit vehicles in major transporation corridors. In this connection, when considering the traffic volumes developed in the preparation of the alternative transportation plans, it should be noted that such volumes do not include intrazonal or local circulation trips. The number of such intrazonal and local circulation trips will vary from link to link, depending upon location in the Region, land uses served, and land use density, but may increase the volume of trips from 10 to 20 percent on any given link.

Table 241

TRANSPORTATION SYSTEM CAPITAL, OPERATION AND MAINTENANCE, AND USER COSTS IN THE REGION OVER THE PERIOD 1976-2000: ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Cost Element	Cumulative Cost: 1976-2000 (dollars)					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
System Element Costs						
Arterial Streets and Highways						
Construction	756,442,000	1,608,926,000	2,511,820,000	751,311,000	1,651,391,000	2,558,254,000
Operation and Maintenance	580,949,000	624,577,000	655,188,000	580,949,000	629,091,000	657,699,000
Subtotal	1,337,391,000	2,233,503,000	3,167,008,000	1,332,260,000	2,280,482,000	3,215,953,000
Nonarterial Streets						
Construction	629,556,000	608,505,000	610,559,000	755,881,000	734,830,000	736,884,000
Operation and Maintenance	471,651,000	467,577,000	468,026,000	491,460,000	487,386,000	487,835,000
Subtotal	1,101,207,000	1,076,082,000	1,078,585,000	1,247,341,000	1,222,216,000	1,224,719,000
Mass Transit						
Construction	90,850,000	456,376,000	347,352,000	76,450,000	360,491,000	343,670,000
Operation and Maintenance	503,443,000	1,395,182,000	1,174,466,000	461,683,000	1,324,802,000	1,192,766,000
Subtotal	594,293,000	1,851,558,000	1,521,818,000	538,133,000	1,685,293,000	1,536,436,000
System Element Cost Total	3,032,891,000	5,161,143,000	5,767,411,000	3,117,734,000	5,187,991,000	5,977,108,000
User Costs						
Street and highway						
Time	38,057,999,000	35,373,130,000	36,267,806,000	37,963,964,000	35,544,451,000	36,297,921,000
Out-of-Pocket	23,225,660,000	22,047,492,000	22,815,628,000	23,309,844,000	22,286,790,000	22,999,603,000
Accident	5,052,000,000	4,601,000,000	4,522,000,000	5,146,000,000	4,705,000,000	4,602,000,000
Subtotal	66,335,659,000	62,021,622,000	63,605,434,000	66,419,808,000	62,536,241,000	63,899,524,000
Transit						
Time	2,595,841,000	5,872,977,000	3,652,159,000	2,365,295,000	5,326,361,000	3,367,205,000
Accident	16,000,000	46,000,000	30,000,000	15,000,000	41,000,000	32,000,000
Subtotal	2,611,841,000	5,918,977,000	3,682,159,000	2,380,295,000	5,367,361,000	3,399,205,000
User Costs Total	68,947,500,000	67,940,599,000	67,287,593,000	68,800,103,000	67,903,602,000	67,298,729,000
Total	71,980,391,000	73,101,742,000	73,055,004,000	71,917,837,000	73,091,593,000	73,275,837,000

Source: SEWRPC.

Table 242

TRANSPORTATION SYSTEM CAPITAL COSTS IN THE REGION OVER THE PERIOD 1976-2000
ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Transportation System Improvement	Cumulative Capital Investment Requirement: 1976-2000 (dollars)					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Right-of-Way						
Freeways	3,239,000	2,839,000	162,840,000	3,239,000	2,839,000	162,840,000
Surface Arterials	--	91,425,000	103,581,000	--	98,808,000	107,944,000
Subtotal	3,239,000	94,264,000	266,421,000	3,239,000	101,647,000	270,784,000
Construction						
Freeways	42,960,000	67,380,000	787,893,000	42,960,000	67,380,000	787,893,000
Surface Arterials	376,285,000	1,218,816,000	1,209,609,000	369,760,000	1,253,981,000	1,250,949,000
Arterial Subtotal	419,245,000	1,286,196,000	1,997,502,000	412,720,000	1,321,361,000	2,038,842,000
Nonarterials	457,036,000	437,539,000	439,410,000	578,644,000	559,147,000	561,019,000
Subtotal	457,036,000	437,539,000	439,410,000	578,644,000	559,147,000	561,019,000
Resurfacing						
Arterials	333,958,000	562,424,000	229,897,000	335,351,000	228,383,000	230,630,000
Nonarterials	172,520,000	170,966,000	171,149,000	177,237,000	175,683,000	175,866,000
Subtotal	506,478,000	733,390,000	401,046,000	512,588,000	404,066,000	406,496,000
Subtotal Arterial Streets and Highways	756,442,000	1,942,884,000	2,493,820,000	751,310,000	1,651,391,000	2,540,256,000
Subtotal Nonarterial Streets and Highways	629,556,000	608,505,000	610,559,000	755,881,000	734,830,000	736,885,000
Total Arterial and Nonarterial Streets and Highways	1,385,998,000	2,551,389,000	3,104,379,000	1,507,191,000	2,386,221,000	3,277,141,000
Transit System						
Right-of-Way Acquisition	-	35,537,000	20,570,000	--	22,045,000	20,570,000
Construction						
Transitway	-	150,095,000	86,010,000	--	88,160,000	86,010,000
Exclusive Lanes	--	12,075,000	12,075,000	--	12,075,000	12,075,000
Stations and Terminals	1,400,000	45,011,000	51,597,000	1,400,000	38,444,000	51,597,000
Offices, Maintenance, and Storage	5,800,000	16,233,000	13,750,000	5,125,000	15,242,000	13,518,000
Subtotal	7,200,000	223,414,000	163,432,000	6,525,000	153,921,000	163,200,000
Operating Equipment						
Buses	82,650,000	193,425,000	160,350,000	68,925,000	180,525,000	156,900,000
Supervisory and Maintenance Vehicles, Shelters and Signs, Tools and Spare Parts	1,000,000	4,000,000	3,000,000	1,000,000	4,000,000	3,000,000
Subtotal	83,650,000	197,425,000	163,350,000	69,925,000	184,525,000	159,900,000
Total Transit System	90,850,000	456,376,000	347,352,000	76,450,000	360,491,000	343,670,000
Total Transportation System	1,476,848,000	3,009,765,000	3,451,731,000	1,583,641,000	2,746,712,000	3,620,811,000

Source: SEWRPC.

Table 243

TRANSIT SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION BY URBANIZED AREAS OVER THE PERIOD 1976-2000: ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Urbanized Area and Cost Item	Cumulative Transit System Costs: 1976-2000 (dollars)					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Kenosha Urbanized Area						
Capital Cost	1,800,000	2,648,000	2,648,000	1,800,000	2,648,000	2,648,000
Operation and Maintenance Cost	11,687,000	25,850,000	25,850,000	11,687,000	25,850,000	25,850,000
Equivalent Annual Cost	539,000	1,140,000	1,140,000	539,000	1,140,000	1,140,000
Milwaukee Urbanized Area						
Capital Cost	86,875,000	450,211,000	341,187,000	72,475,000	354,326,000	337,505,000
Operation and Maintenance Cost	474,180,000	1,336,404,000	1,115,688,000	432,420,000	1,266,024,000	1,133,988,000
Equivalent Annual Cost	22,442,000	71,465,000	58,275,000	20,196,000	64,814,000	58,860,000
Racine Urbanized Area						
Capital Cost	2,175,000	3,518,000	3,518,000	2,175,000	3,518,000	3,518,000
Operation and Maintenance Cost	17,576,000	32,928,000	32,928,000	17,576,000	32,928,000	32,928,000
Equivalent Annual Cost	790,000	1,458,000	1,458,000	790,000	1,458,000	1,458,000
Southeastern Wisconsin Region						
Capital Cost	90,850,000	456,376,000	347,352,000	76,450,000	360,491,000	343,670,000
Operation and Maintenance Cost	503,443,000	1,395,182,000	1,174,466,000	461,683,000	1,324,802,000	1,192,766,000
Equivalent Annual Cost	23,772,000	74,062,000	60,873,000	21,525,000	67,412,000	61,457,000

Source: SEWRPC.

It should be understood that the specific development and implementation of the traffic management techniques assumed in system plan design will require subsequent local planning and engineering and plan implementation actions.[4] Such actions are essential if congestion is to be reduced and kept at tolerable levels without unnecessary capital investment in additional transportation facilities.

The measurement of each alternative plan against this standard is accomplished by comparing the total costs incurred in transportation system expansion and improvement, as detailed in Chapter 5 of this report. On this basis the "no build," the highway-supported transit, and the transit-supported highway alternative plans met this standard in descending order, respectively, for both the controlled centralized and controlled decentralized land use plans.

[4] *Four categories of local planning and engineering actions to facilitate traffic flow and minimize capital investment in transportation facilities have been identified in SEWRPC Benchmark Report No. 6, "Procedure for Preparing a Regional Transportation Systems Management Plan and Regional Transportation Improvement Program." The first category consists of actions to ensure the efficient use of existing road space. This category includes actions to improve traffic operations, such as channelization of traffic, use of one way streets, improved traffic signalization, freeway ramp metering, and use of reversible traffic lanes; preferential treatment for public transit and other high occupancy vehicles, including reserved lanes for buses, preferential access to freeways for buses, and preferential treatment for high occupancy vehicles at signals and at parking facilities; management and control of parking through elimination of on-street parking during peak traffic flow periods, regulation of number and pricing of public and private parking facilities, favored parking by short-term users over long-term users, and provision of fringe area parking to facilitate transfer to transit vehicles; and efforts to reduce the impact of peak period travel through changes in work schedules and fare structures. The second category of actions would reduce vehicle use in congested areas and would include encouragement of carpooling, limitation of automobile access to specific geographic subareas, establishment of automobile free zones, closure of selected streets to vehicular or through traffic, and restrictions on truck delivery. The third category consists of actions to improve transit service, including route deviation and demand-responsive service, changes in routing and scheduling, provision of express bus service and park-and-ride services, provision of shuttle transit services, the institution of transit fare policies that encourage transit use, simplified fare collection systems, provision of shelters and other passenger amenities, and improved passenger information services. The fourth category of actions is aimed at increasing internal transit management efficiency, including improved transit marketing programs, institution of cost accounting and other management techniques, improved transit vehicle maintenance policies, and improved operation surveillance and communications techniques.*

Table 244

ARTERIAL STREET AND HIGHWAY SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION BY COUNTY OVER THE PERIOD 1976-2000: ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

County and Cost Item	Cumulative Arterial Street and Highway System Costs: 1976-2000 (dollars)					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Kenosha County						
Capital Cost						
Arterial	51,097,000	155,883,000	204,685,000	47,570,000	169,705,000	214,764,000
Nonarterial	52,061,000	50,341,000	50,341,000	82,811,000	81,091,000	81,091,000
Operation and Maintenance Cost						
Arterial	33,785,000	45,100,000	44,702,000	33,785,000	46,684,000	46,449,000
Nonarterial	45,233,000	44,796,000	44,796,000	50,089,000	49,653,000	49,653,000
Resurfacing Cost						
Arterial	18,160,000	15,222,000	15,257,000	18,783,000	15,177,000	15,417,000
Nonarterial	15,801,000	15,627,000	15,627,000	16,585,000	16,411,000	16,411,000
Total	216,137,000	326,969,000	375,408,000	249,623,000	378,721,000	423,785,000
Equivalent Annual Cost	8,645,500	13,078,800	15,016,300	9,984,900	15,148,800	16,951,400
Milwaukee County						
Capital Cost						
Arterial	54,179,000	403,147,000	1,014,054,000	54,179,000	401,418,000	1,006,222,000
Nonarterial	114,583,000	111,019,000	111,019,000	49,882,000	46,318,000	46,318,000
Operation and Maintenance Cost						
Arterial	304,246,000	306,323,000	323,448,000	304,246,000	305,863,000	321,828,000
Nonarterial	184,312,000	183,098,000	183,098,000	174,142,000	172,927,000	172,927,000
Resurfacing Cost						
Arterial	175,728,000	120,065,000	120,554,000	175,728,000	120,119,000	121,056,000
Nonarterial	66,017,000	65,436,000	65,436,000	64,497,000	63,917,000	63,917,000
Total	899,065,000	1,189,088,000	1,817,609,000	822,674,000	1,110,562,000	1,732,268,000
Equivalent Annual Cost	35,962,600	47,563,500	72,704,400	32,906,900	44,422,500	69,290,700
Ozaukee County						
Capital Cost						
Arterial	25,728,000	78,238,000	83,724,000	25,207,000	81,307,000	84,959,000
Nonarterial	38,221,000	37,304,000	37,304,000	81,633,000	80,715,000	80,715,000
Operation and Maintenance Cost						
Arterial	25,523,000	27,833,000	28,783,000	25,523,000	28,109,000	29,074,000
Nonarterial	25,079,000	25,206,000	25,206,000	32,054,000	32,182,000	32,182,000
Resurfacing Cost						
Arterial	18,434,000	10,671,000	10,776,000	18,524,000	10,634,000	10,805,000
Nonarterial	9,185,000	9,116,000	9,116,000	10,604,000	10,535,000	10,535,000
Total	142,170,000	188,368,000	194,909,000	193,545,000	243,482,000	248,270,000
Equivalent Annual Cost	5,686,800	7,534,700	7,796,400	7,741,800	9,739,300	9,930,800
Racine County						
Capital Cost						
Arterial	67,280,000	178,351,000	236,728,000	65,316,000	178,973,000	235,589,000
Nonarterial	40,362,000	37,528,000	38,451,000	37,627,000	34,793,000	35,716,000
Operation and Maintenance Cost						
Arterial	49,119,000	57,176,000	60,701,000	49,119,000	57,427,000	60,616,000
Nonarterial	48,674,000	48,009,000	48,152,000	48,247,000	47,582,000	47,725,000
Resurfacing Cost						
Arterial	25,623,000	18,371,000	17,711,000	26,223,000	18,389,000	17,673,000
Nonarterial	17,951,000	17,693,000	17,715,000	17,929,000	17,671,000	17,693,000
Total	249,009,000	357,128,000	419,458,000	244,461,000	354,835,000	415,012,000
Equivalent Annual Cost	9,960,400	14,285,100	16,778,300	9,778,400	14,193,400	16,600,500

Table 244 (continued)

County and Cost Item	Cumulative Arterial Street and Highway System Costs: 1976-2000 (dollars)					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Walworth County						
Capital Cost						
Arterial	43,556,000	79,273,000	82,943,000	43,556,000	79,273,000	81,704,000
Nonarterial	26,951,000	24,685,000	24,685,000	37,765,000	35,498,000	35,498,000
Operation and Maintenance Cost						
Arterial	33,571,000	35,032,000	35,267,000	33,571,000	35,065,000	35,272,000
Nonarterial	45,372,000	45,086,000	45,145,000	47,129,000	46,843,000	46,902,000
Resurfacing Cost						
Arterial	21,541,000	18,056,000	18,175,000	21,541,000	18,056,000	18,175,000
Nonarterial	18,556,000	18,516,000	18,580,000	18,960,000	18,919,000	18,984,000
Total	189,547,000	220,648,000	224,795,000	202,522,000	233,654,000	236,535,000
Equivalent Annual Cost	7,581,900	8,825,900	8,991,800	8,100,900	9,346,200	9,461,400
Washington County						
Capital Cost						
Arterial	56,390,000	154,254,000	153,616,000	56,295,000	170,065,000	164,132,000
Nonarterial	62,063,000	58,279,000	58,925,000	105,327,000	101,543,000	102,189,000
Operation and Maintenance Cost						
Arterial	35,730,000	40,994,000	41,735,000	35,730,000	43,345,000	42,970,000
Nonarterial	39,836,000	38,931,000	39,130,000	46,852,000	45,947,000	46,146,000
Resurfacing Cost						
Arterial	20,720,000	14,223,000	14,339,000	20,734,000	14,237,000	14,449,000
Nonarterial	14,513,000	14,163,000	14,253,000	16,096,000	15,745,000	15,835,000
Total	229,252,000	320,844,000	321,998,000	281,034,000	320,882,000	385,721,000
Equivalent Annual Cost	9,170,100	12,833,800	12,879,900	11,241,400	12,835,300	15,428,800
Waukesha County						
Capital Cost						
Arterial	124,255,000	449,696,000	506,173,000	123,838,000	342,267,000	540,255,000
Nonarterial	122,795,000	118,384,000	118,687,000	183,600,000	179,189,000	179,491,000
Operation and Maintenance Cost						
Arterial	98,976,000	111,807,000	120,551,000	98,976,000	112,597,000	121,489,000
Nonarterial	83,144,000	82,452,000	82,499,000	92,946,000	92,253,000	92,300,000
Resurfacing Cost						
Arterial	53,753,000	31,859,000	33,085,000	53,818,000	31,770,000	33,054,000
Nonarterial	30,497,000	30,415,000	30,422,000	32,566,000	32,481,000	32,491,000
Total	513,420,000	824,613,000	891,417,000	585,744,000	790,557,000	906,780,000
Equivalent Annual Cost	20,536,800	32,984,500	35,656,700	23,429,800	31,622,300	36,271,200
Southeastern Wisconsin Region						
Capital Cost						
Arterial	422,484,000	1,380,460,000	2,281,923,000	415,959,000	1,423,008,000	2,327,625,000
Nonarterial	457,036,000	437,539,000	439,410,000	578,644,000	559,147,000	561,019,000
Operation and Maintenance Cost						
Arterial	580,949,000	624,264,000	655,188,000	580,949,000	629,091,000	657,699,000
Nonarterial	471,651,000	467,577,000	468,026,000	491,460,000	487,386,000	487,835,000
Resurfacing Cost						
Arterial	333,958,000	228,466,000	229,897,000	335,351,000	228,383,000	230,630,000
Nonarterial	172,520,000	170,966,000	171,149,000	177,237,000	175,683,000	175,866,000
Total	2,438,598,000	3,309,272,000	4,245,593,000	2,579,600,000	3,502,698,000	4,440,674,000
Equivalent Annual Cost	97,543,900	132,370,900	169,823,700	103,184,000	140,107,900	177,627,000

Source: SEWRPC.

Table 245

COMPARISON OF THE USER AND SYSTEM COSTS AND BENEFIT/COST RATIOS
ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Alternative Plan		Road User Costs[a] 1976-2025 (millions of dollars)	Construction, Operation, and Maintenance Costs[a] 1976-2025 (millions of dollars)	Incremental Benefits (millions of dollars)	Incremental Costs (millions of dollars)	Benefit-Cost Ratio
Land Use	Transportation					
Controlled Centralization	"No Build"	$43,117.0	$1,751.3	--	--	--
	Highway-Supported Transit Plan	42,189.7	2,855.3	927.3	1,104.0	0.84
	Transit-Supported Highway Plan	41,703.3	3,170.3	1,413.7	1,419.0	1.00
Controlled Decentralization	"No Build"	42,921.3	1,773.1	--	--	--
	Highway-Supported Transit Plan	42,128.4	2,829.7	792.9	1,056.6	0.75
	Transit-Supported Highway Plan	41,788.8	3,248.6	1,132.5	1,475.5	0.77

[a]*Present worth in 1975 of costs incurred between 1975 and 2025 under proposed transportation system alternatives.*

Source: SEWRPC.

Standard No. 4 indicates that the amount of energy utilized in operating the transportation system, particularly the petroleum-based motor fuels, should be minimized. To determine the relative degree to which each of the six alternative regional transportation plans met this standard, an analysis was made of the estimated total annual consumption of motor vehicle fuel. The results of this analysis are summarized in Table 246. For automobiles and trucks, the indicated motor fuel consumption data were determined as a function of the vehicle type, operating speed, the amount of travel on each link in the transportation network, and the type of highway facility travelled. Rates of fuel consumption for gasoline and diesel engine powered vehicles at different speeds representative of the efficiency of these vehicles in 1972 were used in the analysis. These rates are set forth in a table contained in Appendix H. For gasoline powered vehicles, including automobiles and gasoline powered trucks, different rates of fuel consumption were used for freeway and arterial facilities, travel on freeway facilities being somewhat more efficient than travel on standard arterials. For diesel powered trucks, fuel usage was determined by applying a variable rate of fuel consumption depending upon vehicle speed to the total amount of vehicle miles of travel by diesel powered vehicles. Transit diesel fuel usage was determined by applying an average rate of fuel consumption for all vehicle speeds to the total amount of vehicle miles of travel by transit vehicles.

As indicated in Table 246, total annual motor fuel consumption, including gasoline and diesel fuel, approximated 576 million gallons in 1972 in the Region. In comparing the three alternative transportation plans prepared to serve the controlled centralization land use plan, the highway-supported transit plan has the smallest estimated increase in fuel consumption over the 1972 level associated with it. Fuel consumption under this alternative could be expected to increase by 302 million gallons per year to about 878 million gallons per year, an increase of about 52 percent. Fuel consumption under the transit-supported highway plan could be expected to increase by about 349 million gallons per year, or about 61 percent, to a total of 925 million gallons per year; while fuel consumption under the "no build" plan could be expected to increase by about 392 million gallons per year, or 68 percent, to a total of 968 million gallons per year.

Under the controlled decentralization land use plan, a similar pattern emerges. Fuel consumption under the highway-supported transit plan could be expected to increase by about 325 million gallons per year, or 56 percent, to a total of 901 million gallons per year; while fuel consumption under the transit-supported highway plan could be expected to increase by about 363 million gallons, or 63 percent, to a total of 939 million gallons per year; and under the "no build" plan, by about 402 million gallons per year, or 70 percent, to a total of 978 million gallons per year. In comparing the two alternative land use plans, then, it can be concluded that fuel consumption may be expected to be increased somewhat under a diffused land use pattern such as that represented by the controlled decentralization land use plan.

An additional analysis was conducted to determine the possible effect of anticipated changes in gasoline powered vehicle efficiency upon fuel consumption levels. Recent

Table 246

COMPARISON OF MOTOR FUEL CONSUMPTION BY VEHICLES TRAVELING IN THE REGION BY VEHICLE TYPE 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Vehicle Type	Annual Motor Fuel Consumption (millions of gallons)						
		Proposed 2000					
		Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1972	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Annual Consumption							
Street and Highway							
Gasoline	546	933	837	886	947	862	901
Diesel	22	29	26	26	25	25	25
Subtotal	568	962	863	912	972	887	926
Transit (Diesel)	8	6	15	13	6	14	13
Total	576	968	878	925	978	901	939
Percent Increase over 1972	--	68	52	65	70	56	63
Estimated Total Annual Consumption with 50 Percent Increase in Gasoline Vehicle Efficiency	--	657	599	629	662	614	639

Source: SEWRPC.

studies by the U.S. Environmental Protection Agency and the U.S. Department of Transportation indicate that about a 70 percent improvement in automobile efficiency, as expressed in miles per gallon, can be achieved by 1985.[5] To determine the possible effects of such increased efficiency on annual motor fuel consumption in the Region, it was assumed that gasoline powered vehicle efficiency would increase by 50 percent, the lower figure being selected as a conservative approach, which would reflect the presence of light trucks in the gasoline powered vehicle fleet. This assumption would result in an increase in gasoline powered vehicle efficiency from an average of 13 miles per gallon to an average of 19 miles per gallon. The results of this analysis are also set forth in Table 246.

Under this assumption, the estimated annual consumption of motor fuel in all cases would increase over the 1972 level, but to much lesser degrees than under an assumption of no increase in the 1972 level of efficiency. Under the controlled centralization land use plan, motor fuel consumption could be expected to increase over 1972 levels by about 81 million gallons per year, or 14 percent; 23 million gallons per year, or 4 percent; and 53 million gallons per year, or 9 percent, under the "no build," highway-supported transit, and transit-supported highway plans, respectively. Under the controlled decentralization land use plan, motor fuel consumption could be expected to increase from the present level by 86 million gallons per year, or 15 percent; 38 million gallons, or 7 percent per year; and 63 million gallons, or 11 percent per year, for the "no build," highway-supported transit and transit-supported highway plans, respectively.

Not only would a 50 percent increase in gasoline vehicle efficiency significantly affect total annual motor fuel consumption in the Region under all alternative plans considered, it would also serve to significantly narrow the differences in fuel consumption noted above under the alternative transportation plans. For example, whereas the difference in annual motor fuel consumption between the highway-supported transit and transit-supported highway plans as designed to serve the controlled centralization land use plan was 47 million gallons under an assumption of no increase in gasoline powered vehicle efficiency, this difference would be reduced to 30 million gallons with a 50 percent increase in vehicle efficiency. Similarly, the difference in annual fuel consumption between the highway-supported transit and transit-supported highway plans as prepared to serve the controlled decentralization land use plan would be reduced from about 38 million gallons to about 25 million gallons.

[5] *Alexander French "Transportation Energy Considerations," Transportation Engineering Journal, ASCE, Vol. 102, No. TEI, February 1976, p. 37.*

Objective No. 3—Provide A Flexible, Balanced Transportation System

The third transportation objective is to achieve a flexible, balanced transportation system which will provide the appropriate types of transportation needed by all residents of the various subareas of the Region at an adequate level of service and which will permit ready adaptation to both changes in travel demand and in transportation technology and traffic management. This objective is supported by 18 specific standards.

Standard No. 1 indicates that arterial streets and highways should be provided at intervals of no more than one-half mile in each direction in urban high-density areas, at intervals of no more than one mile in each direction in urban medium-density areas, at intervals of no more than two miles in each direction in urban low-density and suburban residential areas, and at intervals of no less than two miles in each direction in rural areas. This standard has been essentially met under each of the alternative transportation plans because it served as an input to the plan design process. In this connection, it is important to note that the preparation of seven county jurisdictional highway system plans since adoption of the initial regional transportation plan in 1966 served to ensure, to the maximum extent practicable, the designation of an arterial street and highway system properly related to this standard.

Standard No. 2 indicates that freeways should be considered for those travel corridors in the Region which provide intercommunity service and where the potential average weekday traffic exceeds 30,000 vehicles per day in urban areas and 15,000 vehicles per day in rural areas. This standard was not applied to the "no build" alternative plan since all of the freeway facilities included in that plan were already in service, or were considered to be fully committed.

With respect to the controlled centralization land use plan, all of the 41 miles of proposed freeways included in the highway-supported transit alternative plan would meet the warrants. Under the transit-supported highway plan, about 137 of the 177 miles of proposed new freeways would meet the traffic warrants. Those facilities not meeting the warrant include: USH 16 from STH 67 to the Jefferson County line; the Airport Spur Freeway; the Lake Freeway south from STH 158 to the Illinois State line; and the Belt Freeway from IH 94 to USH 41 and from STH 15 to IH 94 south. With respect to the controlled decentralization land use plan, all of the 41 miles of proposed freeways included in the highway-supported transit plan would meet the traffic warrants. Under the transit-supported highway plan, 140 of the proposed 177 miles of new freeways would meet the traffic warrants. The 37 miles not meeting the warrants include: USH 16 from STH 67 to the Jefferson County line; the Airport Spur Freeway; and the Belt Freeway from IH 94 to USH 41 and from STH 15 to the Lake Freeway.

Standard No. 3 indicates that intraregional mass transit facilities and services should be provided as warranted to connect noncontiguous urban development with the urban center of an urbanized area, within urbanized areas to serve all residential neighborhoods, and to connect such neighborhoods to a variety of land uses found within the urbanized area. This standard further indicates that the provision of such mass transit facilities and services shall be considered if such service can meet at least 50 percent of the associated operating costs, with the remaining operating costs to be provided for through public subsidy, or if the provision of such services can be identified as significantly contributing to the revenue of other routes or to the total system. This standard further assumes that all of the capital costs would be provided for through public subsidy and would not, therefore, be recovered even in part through fare box revenue. Currently, the federal government provides grants for 80 percent of mass transit capital costs. It is assumed that the remaining 20 percent would be subsidized at the local and/or state levels of government.

Analyses of the costs associated with the provision of mass transit facilities and services within the urbanized areas of the Region under all six alternative transportation system plans and of the equivalent fare box revenue[6] obtained through the operation of such facilities and services indicates that, in all cases, the standard would be met. With respect to the three alternative transportation plans prepared to serve the controlled centralization land use plan, the percent of total costs covered by equivalent fare box revenue would approximate 118 percent under the "no build" alternative, 55 percent under the highway-supported transit alternative, and 74 percent under the transit-supported highway alternative. With respect to the three alternative transportation plans prepared to serve the controlled decentralization land use plan, the percent of total costs met by the equivalent fare box revenue would approximate 113 percent under the "no build" alternative, 50 percent under the highway-supported transit alternative, and 66 percent under the transit-supported highway alternative.

In considering the above data, it is important to recognize that these estimates are based upon the operation of the total mass transit system for the Region proposed under each alternative plan. This is appropriate for system level planning. At the project planning level, however, it may be necessary for implementing agencies to apply the standard, as appropriate, to individual routes or system segments. In addition, it is important to understand the assumptions concerning fare box revenue that were made for this analysis. Under each of the "no build" alternative plans, it was assumed that the basic transit fare in the Milwaukee urbanized area would remain at 50 cents with attendant present zone and premium fares. In the Racine and Kenosha urbanized areas, a 25 cent base fare was assumed, with an additional 25 cent fare for travel from Racine to the University of Wisconsin-Parkside Campus

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[6] *The term "equivalent fare box revenue" is defined as the anticipated revenue which would be collected if all riders paid at the full-fare rate. Under this analysis, all one-half fare riders—such as the elderly and handicapped during off peak travel hours—are considered to have paid a full-fare.*

and a further additional 25 cent fare between Racine and Kenosha. Under each of the highway system transit plans, it was assumed that the basic transit fare throughout the Region would be 25 cents with no zone or premium fares. For each of the transit system highway plans in the Milwaukee urbanized area, a basic 50 cent fare was assumed with no zone or premium fares, and in the Kenosha and Racine urbanized areas, a basic 25 cent fare was assumed with no zone or premium fares.

Standard No. 4 provides that the public subsidy required per transit ride should be minimized. As applied to the controlled centralization land use plan, the "no build" best meets this standard, requiring a subsidy per ride of 4 cents. The highway-supported transit plan would require a subsidy per ride of 26 cents, while the transit-supported highway plan would require a subsidy per ride of 28 cents. As applied to the controlled decentralization land use plan, the "no build" plan would also best meet this standard, requiring a subsidy per ride of 6 cents. The highway-supported transit plan would require a subsidy per ride of 31 cents, while the transit-supported highway plan would require a subsidy per ride of 39 cents.

Standard No. 5 indicates that the provision of primary—that is rapid-transit service should be considered in all travel corridors within the urbanized areas of the Region where the equivalent fare box revenues from such service can meet at least 50 percent of the associated operating costs, with the remaining operating costs provided through public subsidy. This standard further assumes that all of the capital costs would be provided through public subsidy. In order to apply this standard to the alternative transportation plans, two warrant curves were developed, one assuming a 25 cent basic transit fare and the other a 50 cent basic transit fare.

The estimated average daily revenue passenger loadings on proposed transitways included in the alternative transportation plans, together with the estimated lengths of the associated transitways, are identified in Table 247. The lengths of the transitways are important since the transit warrant curves are a function of both anticipated passenger loadings and transitway lengths. Since no primary rapid transit service is proposed in either of the "no build" plans, comparisons were made only for the highway-supported transit and transit-supported highway plans.

Under the highway-supported transit plan prepared to serve the controlled centralization land use plan, a total of 37 miles of primary rapid transit service is proposed. Of this total, about 27 miles would meet the required standard. Under the transit-supported highway plan prepared to serve the controlled centralization land use plan, a total of 20 miles of primary rapid transit service is proposed, all of which would meet the standard. Under the highway-supported transit plan prepared to serve the controlled decentralization land use plan, 14 miles of primary rapid transit service are proposed, all of which would meet the standard. Under the transit-supported highway plan prepared to serve the controlled decentralization plan, in which 20 miles of primary rapid transit service is proposed, all would meet the requisite standard.

Table 247

ESTIMATED DAILY PASSENGER VOLUMES ON PROPOSED TRANSIT WAYS 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Transitways		Estimated Daily Passenger Volumes			
		Controlled Centralization Land Use Plan		Controlled Decentralization Land Use Plan	
Name	Length (miles)	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
East-West	8.3	68,200	25,500	55,200	23,500
East Side Milwaukee Central Business District to W. Brown Deer Road	11.0	39,600	--	--	--
Milwaukee Central Business District to IH 43	5.6	--	15,900	30,900	17,100
Park West	2.4	6,400	--	--	--
Northwest	6.1	--	21,100	--	18,800
Stadium South	1.5	8,400	--	--	--
Zoo	6.2	12,800	--	13,300	--
South	7.1	17,800	--	--	--

Source: SEWRPC.

Standard No. 6 indicates that primary or secondary intraregional mass transit service should be provided as necessary to reduce peak loadings on arterial streets and highways in order to maintain a desirable level of transportation service between component parts of the Region. This standard has been met under both the highway-supported transit and transit-supported highway alternative plans because it served as an input to the plan design process. This standard would not be met under the "no build" alternative.

Standard No. 7 indicates that primary and secondary mass transit service should be extended as warranted to perform a collection and distribution function in order to maximize the convenience of the transit service. This standard has been met under both highway-supported transit and both transit-supported highway alternative plans because it served as an input to the plan design process. This standard has not been met under the "no build" alternative plans.

Standard No. 8 indicates that urban residential land shall be considered as served by mass transit when such land is within specified distances of primary, secondary, and tertiary mass transit service. The number of square miles served by transit in the Kenosha, Milwaukee, and Racine urbanized areas under each of the alternative transportation plans is identified in Tables 248, 249, and 250. In the Kenosha urbanized area, the highway-supported transit and transit-supported highway plans under both the controlled centralization and controlled decentralization land use plans would serve nearly 37 square miles and from 88 to 95 percent of the urbanized area population. In the Racine urbanized area the highway-supported transit and transit-supported highway plans under both land use plans would serve about 43 square miles and about 97 to 98 percent of the urbanized area population.

In the Milwaukee urbanized area, the transit service area under the highway-supported transit plan designed to serve the controlled centralization land use plan would approximate 445 square miles, whereas the service area under the transit-supported highway plan would approximate 450 square miles. Comparable data for the highway-supported transit and transit-supported highway plans designed to serve the controlled decentralization plan are 436 square miles and 431 square miles, respectively. The percent of the Milwaukee urbanized area population served under all alternative plans would not differ greatly, ranging from 93-to-95 percent.

Tables 248, 249, and 250 also present comparative data pertaining to the characteristics and utilization of the transit systems proposed under the alternative transportation system plans. Of particular interest are the data relating to total estimated daily revenue passengers on each system. In the Milwaukee urbanized area, the estimated number of revenue passengers per average weekday, which approximated 178,000 in 1972, could be expected to decrease to about 169,000 under the "no build" transportation plan; to increase to over 643,000 under the highway-supported transit plan; and to increase to about 301,000 under the transit-supported highway plan, as those plans were prepared to serve the controlled centralization land use plan. As prepared to serve the controlled decentralization land use plan, transit use could be expected to decline to about 129,000 revenue passengers per average weekday under the "no build" transportation plan; to increase to 523,000 under the highway-supported transit plan; and to increase to 264,000 under the transit-supported highway plan.

In the Kenosha urbanized area, the estimated number of revenue passengers per average weekday, which approximated 2,800 in 1972, could be expected to increase to about 5,800 under the "no build" transportation plan and to about 23,000 under the highway-supported transit plan and the transit-supported highway plan, as those plans were prepared to serve the controlled centralization land use plan. As prepared to serve the controlled decentralization land use plan, transit use could be expected to reach about 6,100 under the "no build" transportation plan and 24,000 under the highway-supported transit and transit-supported highway plans.

In the Racine urbanized area, the estimated number of revenue passengers per average weekday, which approximated 3,100 in 1972, could be expected to increase to about 12,000 under the "no build" transportation plan and to about 26,000 under the highway-supported transit and transit-supported highway plans, as those plans were prepared to serve the controlled centralization land use plan. As prepared to serve the controlled decentralization land use plan, transit use could be expected to reach about 12,000 under the "no build" transportation plan and 27,000 under the highway-supported transit and transit-supported highway plans.

Standard No. 9 indicates that mass transit routes should be direct in alignment with a minimum number of turning movements and that the route configuration should be such as to minimize duplication of service and to minimize transfers which would discourage transit use. This standard has been met, to the degree practicable, under each of the alternative transportation plans because it served as an input to the plan design process. In addition, it can be emphasized that under conditions of low headways, the use of a transfer cannot be considered detrimental. In the design of transit systems, provisions for transfer from various levels of transit service can be considered and facilitated. Some differences do exist, however, in the estimates of the total number of transfers which would be required under each plan in each urbanized area. Transfer data is set forth in Tables 248, 249, and 250 for the Kenosha, Milwaukee, and Racine urbanized areas respectively.

In the Milwaukee urbanized area, the average number of transfers per transit trip approximated 0.4 in 1972. For the alternative transportation plans prepared to serve the controlled centralization land use plan, the average number of transfers per transit trip could be expected to approximate 0.4 under the "no build" alternative plan, 0.7 under the highway-supported transit plan, and 0.6 under the transit-supported highway plan. The estimated average number of transfers per transit trip for the alternative transportation plans prepared to serve the controlled decentralization land use plan could be expected to approxi-

Table 248

COMPARISON OF TRANSIT SERVICE, SYSTEM UTILIZATION, AND PERFORMANCE CHARACTERISTICS IN THE KENOSHA URBANIZED AREA: 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Characteristic	Existing 1972	Proposed 2000					
		Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Service Area							
Square Miles	20.2	27.9	36.7	36.7	27.9	36.7	36.7
Population	83,900	121,800	128,400	128,400	124,800	131,700	131,700
Percent of Urbanized Area Population	97.0	90.0	95.0	95.0	82.9	87.6	87.6
System Characteristics							
Daily Vehicle Miles							
Primary	--	--	--	--	--	--	--
Secondary	--	--	--	--	--	--	--
Tertiary	1,140	1,800	4,770	4,770	1,800	4,770	4,770
Total	1,140	1,800	4,770	4,770	1,800	4,770	4,770
Vehicle Requirements							
Peak Period	12	18	29	29	18	29	29
Midday	6	18	19	19	18	19	19
Daily Seat Miles	43,300	81,000	214,650	214,650	81,000	214,650	214,650
Median Headway (Minutes)							
Peak Period	60	30	20	20	30	20	20
Midday	60	30	30	30	30	30	30
Daily Operating Cost	$1,370	$2,160	$5,720	$5,720	$2,160	$5,720	$5,720
Operating Cost Per							
Vehicle Mile	$ 1.20	$ 1.20	$ 1.20	$ 1.20	$ 1.20	$ 1.20	$ 1.20
Basic Fare	$ 0.25	$ 0.25	$ 0.25	$ 0.25	$ 0.25	$ 0.25	$ 0.25
System Utilization							
Daily Revenue Passengers	2,800	5,800	23,000	23,000	6,100	24,400	24,400
Percent Utilization— Passenger Miles Used Per Seat Miles Available	22.2	14.0	24.9	24.9	15.3	26.0	26.0
Average Number of Transfers Per Trip	0.6	0.0	0.1	0.1	0.0	0.0	0.0
System Performance							
Passengers Per Vehicle Mile	2.5	3.2	4.8	4.8	3.4	5.1	5.1
Passenger Miles Per Vehicle Hours	50.6	66.5	121.4	121.4	72.9	126.8	126.8
Passenger Miles Per Daily Operating Cost	7.0	5.2	9.3	9.3	5.7	9.8	9.8
Operating Cost Per Passenger	$ 0.49	$ 0.37	$ 0.25	$ 0.25	$ 0.35	$ 0.23	$ 0.23
Rides Per Capita	6.0	13.8	51.9	51.9	14.2	53.7	53.7

Source: SEWRPC.

Table 249

COMPARISON OF TRANSIT SERVICE, SYSTEM UTILIZATION, AND PERFORMANCE CHARACTERISTICS IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Characteristic	Existing 1972	Proposed 2000					
		Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Service Area							
Square Miles	164.8	221.7	445.0	449.6	221.7	436.0	431.1
Population	1,043,600	1,062,500	1,437,800	1,436,600	945,000	1,297,600	1,297,300
Percent of Urbanized Area Population	82.3	70.4	95.3	95.2	67.6	92.8	92.8
System Characteristics							
Daily Vehicle Miles							
Primary	1,410	5,470	70,340	52,840	5,180	63,790	55,550
Secondary	--	--	72,020	52,410	--	63,970	50,480
Tertiary	60,670	56,010	122,460	106,670	47,690	119,340	110,690
Total	62,080	61,480	264,820	211,920	52,870	247,100	216,720
Vehicle Requirements							
Peak Period	442	436	1,462	1,161	370	1,342	1,134
Midday	220	241	901	686	202	850	690
Daily Seat Miles	3,220,640	3,074,000	13,241,000	10,596,000	2,643,500	12,355,000	10,836,000
Median Headway (Minutes)							
Peak Period	24.0	19.8	11.5	14.3	22.0	11.5	13.5
Midday	28.0	24.0	16.0	19.8	30.0	16.0	18.5
Daily Operating Cost	$75,700	$71,600	$289,600	$233,200	$61,400	$261,000	$237,800
Operating Cost Per Vehicle Mile	$ 1.22	$ 1.16	$ 1.09	$ 1.10	$ 1.16	$ 1.10	$ 1.09
Basic Fare	$ 0.40	$ 0.50	$ 0.25	$ 0.50	$ 0.50	$ 0.25	$ 0.50
System Utilization							
Daily Revenue Passengers	177,800	168,800	643,100	300,900	129,400	523,000	263,500
Percent Utilization— Passenger Miles Used Per Seat Miles Available	36.5	18.5	29.7	17.2	17.1	27.0	15.2
Average Number of Transfers Per Trip	0.4	0.4	0.7	0.6	0.4	0.6	0.6
Number of Trips to Central Business District	29,000	26,000	63,500	39,000	21,700	56,100	35,400
System Performance							
Passenger Per Vehicle Mile	2.9	2.7	2.4	1.4	2.4	2.1	1.2
Passenger Miles Per Vehicle Hours	210.1	123.1	241.1	135.8	113.4	218.2	120.6
Passenger Miles Per Daily Operating Cost	15.5	8.0	13.6	7.8	7.4	12.8	6.9
Operating Cost Per Passenger	$ 0.43	$ 0.42	$ 0.45	$ 0.76	$ 0.47	$ 0.50	$ 0.90
Rides Per Capita	50.2	46.1	129.7	60.7	39.7	116.9	58.9

Source: SEWRPC.

Table 250

COMPARISON OF TRANSIT SERVICE, SYSTEM UTILIZATION, AND PERFORMANCE CHARACTERISTICS IN THE RACINE URBANIZED AREA: 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Characteristic	Existing 1972	Proposed 2000					
		Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
		"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Service Area							
Square Miles	17.5	30.3	42.8	42.8	30.3	42.8	42.8
Population	100,600	126,800	146,000	146,000	127,900	147,600	147,600
Percent of Urbanized Area Population	87.3	85.0	97.9	97.9	83.9	96.8	96.8
System Characteristics							
Daily Vehicle Miles							
Primary	--	--	--	--	--	--	--
Secondary	--	--	--	--	--	--	--
Tertiary	1,560	3,200	6,420	6,420	3,200	6,420	6,420
Total	1,560	3,200	6,420	6,420	3,200	6,420	6,420
Vehicle Requirements							
Peak Period	10	26	36	36	26	36	36
Midday	10	26	25	25	26	25	25
Daily Seat Miles	29,600	144,000	288,900	288,900	144,000	288,900	288,900
Median Headway (Minutes)							
Peak Period	40	30	20	20	30	20	20
Midday	40	30	30	30	30	30	30
Daily Operating Cost	$1,870	$3,840	$7,700	$7,700	$3,840	$7,700	$7,700
Operating Cost Per							
Vehicle Mile	$ 1.20	$ 1.20	$ 1.20	$ 1.20	$ 1.20	$ 1.20	$ 1.20
Basic Fare	$ 0.25	$ 0.25	$ 0.25	$ 0.25	$ 0.25	$ 0.25	$ 0.25
System Utilization							
Daily Revenue Passengers	3,100	11,900	26,200	26,200	12,000	26,700	26,700
Percent Utilization— Passenger Miles Used Per Seat Miles Available	36.9	14.0	21.9	21.9	14.4	23.3	23.3
Average Number of Transfers Per Trip	0.5	0.0	0.1	0.1	0.0	0.1	0.1
Number of Trips to Central Business District	300	1,200	2,300	2,300	1,300	2,600	2,600
System Performance							
Passenger Per Vehicle Mile	2.0	3.7	4.1	4.1	3.8	4.2	4.2
Passenger Miles Per Vehicle Hours	45.5	65.2	109.1	109.1	66.8	115.9	115.9
Passenger Miles Per Daily Operating Cost	5.8	5.3	8.2	8.2	5.4	8.7	8.7
Operating Cost Per Passenger	$ 0.60	$ 0.32	$ 0.29	$ 0.29	$ 0.32	$ 0.29	$ 0.43
Rides Per Capita	5.2	27.2	52.0	52.0	27.2	52.5	52.5

Source: SEWRPC.

mate 0.4 under the "no build" plan, 0.6 under the highway-supported transit plan, and 0.6 under the transit-supported highway plan.

In the Kenosha urbanized area, the average number of transfers per transit trip approximated 0.6 in 1972. For the alternative transportation plans prepared to serve the controlled centralization land use plan, the number of transfers per transit trip could be expected to approach zero under the "no build" alternative plan, 0.1 under the highway-supported transit plan, and 0.1 under the transit-supported highway plan. The estimated average number of transfers per transit trip for the alternative transportation plans prepared to serve the controlled decentralization land use plan could be expected also to approach zero under the "no build" plan, 0.1 under the highway-supported transit plan, and 0.1 under the transit-supported highway plan.

In the Racine urbanized area, the average number of transfers per transit trip approximated 0.5 in 1972. For the alternative transportation plans prepared to serve the controlled centralization land use plan, the average number of transfers per transit trip could be expected to approach zero under the "no build" alternative plan, 0.1 under the highway-supported transit plan, and 0.1 under the transit-supported highway plan. The estimated average number of transfers per transit trip for the alternative transportation plans prepared to serve the controlled decentralization land use plan could be expected also to approach zero under the "no build" plan, 0.1 under the highway-supported transit plan, and 0.1 under the transit-supported highway plan.

Standard No. 10 indicates that operating headways, or the time between vehicles operating over fixed routes and schedules, for tertiary mass transit service within an urbanized area should be designed to provide service at headways capable of accommodating passenger demand at the recommended load standards, but should not exceed 30 minutes during weekday peak periods nor 60 minutes during weekday offpeak periods and weekend periods. Median headway data are set forth in Tables 248, 249, and 250 for the Kenosha, Milwaukee, and Racine urbanized areas, respectively. In the Kenosha urbanized area, the median headway would be reduced by plan design during the peak period from 60 minutes in 1972 to 30 minutes under the "no build" transportation system plans and to 20 minutes under the transit-supported highway and highway-supported transit transportation system plans. Midday median headways, which were set by design at 60 minutes in 1972, would be reduced to 30 minutes under all of the six transportation plans considered.

In the Milwaukee urbanized area, median headways during the peak period, which averaged 24 minutes in 1972, would be reduced to about 20 minutes under the "no build" transportation plan when designed to serve the controlled centralization land use plan, and 11 minutes and 14 minutes, respectively, for the highway-supported transit and transit-supported highway plans. A similar pattern in peak period median headways is found under the controlled decentralization land use plan where such headways would be reduced to an average of 22 minutes under the "no build" plan, 11 minutes under the highway-supported transit plan, and 13 minutes under the transit-supported highway plan. Midday median headways, which averaged 28 minutes in 1972 in the Milwaukee urbanized area, would be similarly significantly reduced under five of the six alternative transportation system plans. Under the controlled centralization land use plan, midday median headways would be reduced to 24 minutes under the "no build" plan, 16 minutes under the highway-supported transit plan, and 20 minutes under the transit-supported highway plan. Under the controlled decentralization plan, the midday median headways would be increased to 30 minutes under the "no build" plan and reduced to 16 and 19 minutes, respectively, under the highway-supported transit and transit-supported highway plans.

In the Racine urbanized area, median headways during the peak period, which averaged 40 minutes in 1972, would be reduced to 30 minutes under the "no build" transportation system plans and to 20 minutes under the transit-supported highway and highway-supported transit transportation system plans. Midday median headways, which averaged 40 minutes in 1972, would be reduced to 30 minutes under all six of the transportation plans considered.

Standard No. 11 relates to transit stop spacing for the primary, secondary, and tertiary transit systems. Under this standard, primary transit stops are to be provided at terminal areas and at no less than one mile intervals on line haul sections. On secondary transit routes, stops should be provided at terminal areas, at intersections with other mass transit routes, and at land uses identified as major traffic generators. On the tertiary transit routes, stops should be from 600 to 1,200 feet apart. This standard has been met under each of the alternative transportation plans because it served as an input to the plan design process.

Standard No. 12 indicates that mass transit routes should be located sufficiently near concentrations of demand in the central business districts of the urbanized areas so that 90 percent of the mass transit users need walk no more than one block to or from their destination. This standard has been met under each of the alternative transportation plans because it served as input to the plan design process.

Standard No. 13 indicates that the proportion of mass transit ridership to the Milwaukee central business district should be increased to a level of at least 30 percent of total person trips made to the central business district. Analyses of the alternative transportation plans as applied to serve the controlled centralization land use plan indicate that this standard would be met only under the highway-supported transit alternative. Under that alternative, about 43 percent of total person trips to the Milwaukee central business district would be accommodated by mass transit. The "no build" alternative would accommodate about 23 percent of such trips by transit, while the transit-supported highway alternative would accommodate about 27 percent of such trips by transit. When the three alternative transportation plans are designed to serve the controlled decentralization land use plan, a similar pattern evolves, with about 40 percent of total person trips to the Milwaukee central business district made by transit under the highway-supported transit alternative, 26 percent under the transit-supported highway alternative, and 21 percent under the "no build" alternative.

Standard No. 14 indicates that specialized transportation service should be available within the urban transit service areas to meet the transportation needs of those portions of the elderly and handicapped population unable to avail themselves of regular transit service, and specialized transportation service should also be available within the rural portions of the Region to provide transit service at least one day per week. This standard could be met equally well under any of the transportation plans considered. Because of the specialized nature of the services required to meet this standard, a special regional planning effort has been mounted to determine the magnitude of the need for specialized transportation service for the elderly and handicapped throughout the Region and to further determine the most cost-effective manner in which to meet this need.

Standard No. 15 indicates that parking should be provided at transit stations to accommodate the total parking demand generated by trips which change from automobile to mass transit modes at such stations. This standard has been met under each of the alternative transportation plans because it served as input to the plan design process, while under the "no build" alternative the standard is not met because of the uncertainties of retaining the use of park ride lots for transit.

Standard No. 16 provides that, on a gross area basis, parking in the central business districts in urbanized areas of the Region should be provided at specified levels per 1,000 automobile destinations. In the Kenosha urbanized area, the standard specifies that 140 automobile parking spaces should be provided per 1,000 automobile destinations. In 1972 there were 290 parking spaces per 1,000 automobile destinations. Under the alternative transportation plans prepared to serve the controlled centralization land use plan, the number of parking spaces in the Kenosha central business district per 1,000 automobile destinations in that district would approximate 240 under the "no build" alternative plan, 275 under the highway-supported transit plan, and 230 under the transit-supported highway plan, all predicated upon an assumption that there would be no increase in the total number of parking spaces provided in the Kenosha central business district. Similarly, under the transportation alternatives prepared to support the controlled decentralization plan, about 235 parking spaces per 1,000 automobile destinations would be provided in the Kenosha central business district under the "no build" plan, about 255 under the highway-supported transit plan, and about 225 under the transit-supported highway plan.

In the Milwaukee urbanized area, the standard specifies that there be provided 235 automobile parking spaces per 1,000 automobile destinations. In 1972 there were 410 parking spaces per 1,000 automobile destinations. Under the alternative transportation plans prepared to serve the controlled centralization land use plan, the number of parking spaces in the Milwaukee central business district per 1,000 automobile destinations in that district would approximate 360 under the "no build" alternative plan, 470 under the highway-supported transit plan, and 380 under the transit-supported highway plan, all predicated upon an assumption that there would be no increase in the gross number of parking spaces provided in the Milwaukee central business district. Similarly, under the transportation alternatives prepared to support the controlled decentralization plan, there would be provided in the Milwaukee central business district about 375 parking spaces per 1,000 automobile destinations under the "no build" plan, about 495 under the highway-supported transit plan, and about 400 under the transit-supported highway plan.

In the Racine urbanized area, the standard specifies that there should be provided 140 automobile parking spaces per 1,000 automobile destinations. In 1972 there were 310 parking spaces per 1,000 automobile destinations. Under the alternative transportation plans prepared to serve the controlled centralization land use plan, the number of parking spaces in the Racine central business district per 1,000 automobile destinations in that district would approximate 270 under the "no build" alternative plan, 275 under the highway-supported transit plan, and 260 under the transit-supported highway plan, all predicated upon an assumption that there would be no increase in the gross number of parking spaces provided in the Racine central business district. Similarly, under the transportation alternatives prepared to support the controlled decentralization plan, there would be provided in the Racine central business district about 240 parking spaces per 1,000 automobile destinations under the "no build" plan, about 260 under the highway-supported transit plan, and about 235 under the transit-supported highway plan.

In all cases, then, the standard would be met without an increase in the number of automobile parking spaces in the central business districts of Kenosha, Milwaukee, and Racine. Accordingly, an implicit recommendation of each alternative plan is to not increase the gross number of parking spaces in the major regional central business districts, recognizing of course that there may be some redistribution of spaces within the districts. The purpose of this parking standard is to properly relate the provision of parking space, automobile use, and transit use. At the present time and assuming no additional parking supply increases during the planning period, the supply of spaces for automobile parking is greater than that suggested within the standards necessary to maintain a balance between auto and transit use to the central business districts. To achieve this balance would require a net reduction in parking spaces; and because transit is primarily suited for providing work trip travel to a concentrated destination such as the central business district, the supply of parking spaces for long-term uses would be those considered for reduction rather than those used for short-term parking.

Standard No. 17 indicates that, in the central business districts of the urbanized areas of the Region, parking should be provided sufficiently near concentrations of demand so that 90 percent of the short-term parkers need walk no more than one block. This standard can be met under all of the alternative transportation plans considered through effective local planning and plan implementation.

Standard No. 18 indicates that the regional transportation system should be capable of being readily adaptable to changes in travel demand and in transportation technology.

Since each of the transportation system plans considered contains a mix of arterial street and highway and transit systems improvements, and since the choice of the particular transit vehicle to be used in heavy transit corridors in the Region is to be determined for the recommended regional transportation system plan, it is considered that this standard is equally well met by all of the alternative plans considered.

Objective No. 4—Minimize Disruption

The fourth transportation objective is to minimize disruption by the transportation system of existing neighborhood and community development, including minimization of adverse effects upon the property tax base and minimization of the deterioration and/or destruction of the natural resource base. This objective is supported by eight specific standards.

Standard No. 1 indicates that the proper use of land for, and adjacent to, transportation facilities should be maximized and the disruption of future development minimized through advance reservation of rights-of-way for transportation facilities. This standard could be met equally well for all alternative transportation plans considered, and can only be effectively met through vigorous plan implementation action by the state and local units and agencies of government concerned. In this respect, it is important to note that corridor refinement and facility centerline and right-of-way delineation studies have been completed over the past 10 years for many of the freeway and standard arterial facilities included in the alternative transportation plans considered, as well as for the transitway in the East-West travel corridor of Milwaukee County. Thus, the basis for protecting necessary right-of-way from further urban development through official mapping has in many cases been provided. In some cases, right-of-way has actually been acquired for facility construction.

Standard No. 2 indicates that the penetration of neighborhood units and neighborhood facility service areas by arterial streets and highways and primary transit routes should be minimized. A precise quantitative evaluation of the extent to which this standard is met depends in large part upon the completion of project planning, including a determination of the precise alignment of new transportation facilities. In addition, it is necessary for local units of government to delineate neighborhood boundaries.

Because the current system planning effort is part of a cycle that has included previous system and project planning efforts, the centerline locations of most proposed transportation facilities have been established. However, not all communities, including specifically the City of Milwaukee, have delineated neighborhood boundaries. Accordingly, it is still not possible to precisely quantify the extent to which each of the four final regional transportation plan alternatives meets this standard. It is known that in some cases—for example, in the Lake Freeway corridor in the City of Oak Creek and in the Kenosha and Racine Planning Districts—neighborhood units have been established and adjusted in a manner fully coordinated with the proposed transportation facility. In other areas, however, such as the Stadium Freeway North, neighborhoods have not been delineated and it is not known whether proposed development and redevelopment in this corridor can be readily adjusted to the proposed transportation facility.

Over time it is believed that existing urban development will readjust to new major transportation facility locations. Disruption of existing neighborhood units caused by transportation facility construction is at least partly offset by the resultant improvement in traffic conditions in existing neighborhoods. New major transportation facilities will tend to reduce traffic volumes not only on other surface arterial streets but in many cases on collector and minor streets in the neighborhood. This is particularly true in older, developed urban areas with a grid street pattern. Based upon all of the foregoing considerations, it is believed that this standard could be met under all alternative transportation system plans.

Standard No. 3 provides that the dislocation of households, businesses, industries, and other buildings caused by the reconstruction of existing, or the construction of new, transportation facilities, should be minimized. In order to estimate the extent to which the alternative transportation plans meet this standard, an estimate was made of the number of residential and nonresidential units that would have to be displaced and relocated because of transportation system improvements included in each plan. The results of this analysis are set forth in Table 251 by county.

The "no build" plans under both land use plans are estimated to dislocate nine residential units and four residential structures. Under the controlled centralization land use plan, the highway-supported transit plan would require relocation of about 260 residential and about 50 nonresidential units, whereas the transit-supported highway plan would require relocation of about 2,800 residential and 280 nonresidential units. Under the controlled decentralization land use plan, the highway-supported transit plan would require relocation of about 270 residential units and 50 nonresidential units, and the transit-supported highway plan would require relocation of about 2,840 residential units and 280 nonresidential units. On an overall basis, then, under both land use plans, the highway-supported transit plan would better meet the dislocation standard than would the transit-supported highway plan.

In addition to the direct costs associated with acquisition of land and structures, including relocation costs, the costs to tenants are also an element considered. Further recognized in the dislocation costs, to the extent permitted under current laws, are the costs attendant to searching for new quarters and the potential costs of increased taxes or rental charges at new quarters.

In considering the above data, it is important to recognize that, while the transit-supported highway plans would require the relocation of more residential and nonresidential units than the highway-supported transit plans under both alternative regional land use plans, such additional relocation under the transit-supported highway plans

Table 251

COMPARISON OF LAND-TAKING REQUIREMENTS FOR TRANSPORTATION SYSTEM IMPROVEMENTS IN THE REGION BY COUNTY: 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

County and Taking	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Kenosha County						
Number of Residential Units	–	28	67	--	35	83
Number of Nonresidential Structures	–	5	9	--	5	9
Acquisition, Demolition, and Relocation Cost	–	$ 14,345,000	$ 20,995,000	--	$ 15,741,000	$ 20,923,000
Milwaukee County						
Number of Residential Units	9	77	2,462	9	77	2,462
Number of Nonresidential Structures	4	18	222	4	18	222
Acquisition, Demolition, and Relocation Cost	$3,139,000	$ 47,772,000	$171,328,000	$3,139,000	$ 34,280,000	$171,328,000
Ozaukee County						
Number of Residential Units	--	6	8	--	7	9
Number of Nonresidential Structures	–	2	2	--	2	2
Acquisition, Demolition, and Relocation Cost	–	$ 8,703,000	$ 9,642,000	--	$ 9,397,000	$ 10,217,000
Racine County						
Number of Residential Units	–	57	112	--	57	112
Number of Nonresidential Structures	--	7	11	--	7	11
Acquisition, Demolition, and Relocation Cost	–	$ 12,987,000	$ 20,245,000	--	$ 13,449,000	$ 20,374,000
Walworth County						
Number of Residential Units	–	1	1	--	1	1
Number of Nonresidential Structures	–	2	2	--	2	2
Acquisition, Demolition, and Relocation Cost	–	$ 9,554,000	$ 10,163,000	--	$ 9,554,000	$ 10,163,000
Washington County						
Number of Residential Units	–	16	19	--	27	24
Number of Nonresidential Structures	–	7	7	--	7	7
Acquisition, Demolition, and Relocation Cost	–	$ 9,972,000	$ 10,539,000	--	$ 13,235,000	$ 12,248,000
Waukesha County						
Number of Residential Units	--	72	145	--	72	146
Number of Nonresidential Structures	–	10	23	--	10	23
Acquisition, Demolition, and Relocation Cost	$ 100,000	$ 26,467,000	$ 44,079,000	$ 100,000	$ 28,035,000	$ 46,099,000
Southeastern Wisconsin Region						
Number of Residential Units	9	257	2,814	9	276	2,837
Number of Nonresidential Structures	4	51	276	4	51	276
Acquisition, Demolition, and Relocation Cost	$3,239,000	$129,800,000	$286,991,000	$3,239,000	$123,691,000	$291,352,000

Source: SEWRPC.

would result not only in the provision of additional freeway facilities but often in the provision of additional rapid and modified rapid transit facilities as well. It is for this reason that the transit-supported highway plans have a somewhat better level of primary transit service than do the highway-supported transit plans. In effect, once a corridor has been cleared for the construction of a warranted freeway facility, no additional disruption accompanies the provision of either an exclusive primary transitway in that same corridor or of modified rapid transit service on the freeway facility itself. In considering the relative amounts of dislocation attributed to each transportation alternative, therefore, the total resultant transportation system must be evaluated, rather than just freeway or transitway facilities alone.

Standard No. 4 indicates that the location of transportation facilities in or through primary environmental corridors should be kept to a minimum. To determine the relative extent to which each of the six alternative transportation plans met this standard, an analysis was made of the location of all new or substantially improved transportation facilities proposed under each plan with respect to the primary environmental corridors identified under each regional land use plan. The results of this analysis are summarized in Table 252.

This particular analysis was confined to the highway-supported transit and transit-supported highway alternative plans, since the number of new transportation facilities included in the "no build" alternative plans was very minimal and considered committed. As shown in Table 252, and for the controlled centralization land use plan, the number of miles of new or substantially improved transportation facilities that would of necessity be located within the primary environmental corridor approximates 43 miles for the highway-supported transit plan and 67 miles for the transit-supported highway plan. For the controlled decentralization land use plan, the number of miles of new or substantially improved transportation facilities that would of necessity be located within the primary environmental corridor also approximates 43 miles for the highway-supported transit plan and 67 miles for the transit-supported highway plan. It is important to note that the foregoing analysis has been made at the system planning level and is necessarily general in nature. A more detailed examination, during the project planning and design phases, may indicate that the new or improved transportation facilities could be placed outside the environmental corridor lands. This is particularly possible, of course, where transportation facilities are to be constructed along an alignment approximately parallel to the environmental corridors.

Standard No. 5 indicates that the total amount of land used for new transportation and terminal facilities should be minimized. To estimate the relative extent to which each of the alternative transportation plans meets this standard, an estimate was made of the amount of land required for construction of new transportation facilities included in the alternative plans. This estimate, expressed in terms of the total acquisition cost for land required to carry out each alternative transportation system plan, is set forth in Table 251.

For the Region as a whole, the estimated total cost of acquiring all land needed to provide proposed transportation improvements under the controlled centralization land use plan, not including new collector and local land access streets, would approximate $3 million under the "no build" plan, $130 million under the highway-supported transit plan, and $287 million under the transit-supported highway plan. For the controlled decentralization land use plan, land acquisition costs to carry out the transportation improvement recommendations contained in the "no build" plan would approximate $3 million, in the highway-supported transit plan would approximate $124 million, and land in the transit-supported highway plan would approximate $291 million. Based upon these cost estimates, then, it may be concluded that under either land use plan, the "no build" plan best meets the standard, while the highway-supported transit plan meets the plan standard better than the transit-supported highway plan. Of particular importance is the acquisition of park lands

Table 252

COMPARISON OF RELATIVE IMPACT UPON PRIMARY ENVIRONMENTAL CORRIDORS 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Relationship of New or Improved Transportation Facility to Primary Environmental Corridor	Number of Miles of New or Improved Transportation Facilities					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
New Construction Within Environmental Corridor . .	--	19.5	37.0	--	19.5	37.0
Reconstruction of Existing Facility Within Environmental Corridor . .	--	23.4	29.7	--	23.4	29.7

Source: SEWRPC.

relating to facility improvements. In an urban setting, the provision of park and open space is particularly critical; and plans that reduce such space to accommodate transportation facility improvements should also consider provision of equivalent park space elsewhere in the urban area, preferably within the same neighborhood or community, and should take into account the impact that such park land provision might have upon additional residential or commercial dislocation and its associated costs.

Standard No. 6 indicates that the reduction of the property tax base, as caused by the reconstruction of existing or the construction of new transportation facilities, should be minimized. The analysis set forth above for minimizing the total amount of land needed to provide new and improved transportation facilities under the alternative plans would hold equally true for this standard, on the assumption that the direct impact upon the property tax base of land and building acquisition for transportation facility improvements would be directly proportional to the cost of such land and building acquisition. Accordingly, since under either alternative land use plan the highway-supported transit transportation system plan would require less land taking than the transit-supported highway transportation system plan, it may be concluded that the impact upon the property tax base would be less under the highway-supported transit plan than under the transit-supported highway plan. Thus, the highway-supported transit plan may be considered to better meet this transportation system development standard. While this analysis would indicate that the acquisition of land and buildings results in a direct tax base loss as a result of facility improvements, it can be established that there may, in fact, be no tax base loss to the Region if the property owners relocate elsewhere in the Region. Accordingly, a presumed "cost" due to tax base loss is not used in the benefit-cost analysis of facility improvements under system planning. What may appear as a loss as a result of improvements in one area or to one community may result in a gain in tax base elsewhere. In addition, improvements to transportation facilities have often increased the value of abutting properites so that a tax base gain follows the facility improvement.

Standard No. 7 indicates that the transportation system should be located and designed to minimize the exposure of residents in the Region to harmful, as well as annoying, noise levels. To determine the relative extent to which each of the alternative regional transportation plans met this standard, an analysis was made of the number of miles of arterial streets and highways in the Region under each alternative plan along which traffic-related noise would exceed 70 dba at the probable building setback base line along the rights-of-way. The results of this analysis are summarized in Table 253. The 70 dba noise level is that level at which the U.S. Department of Transportation, Federal Highway Administration, considers highway-related noise to become a potential source of annoyance to adjacent land users. For comparison purposes a 70 dba noise level approximates normal speech at a distance of three feet and the operation of a vacuum cleaner at a distance of about 10 feet. A noise level of 70 dba at the exterior of an ordinary residence would result in a 55 dba interior noise level, about the normal household noise level. The noise impact model described in Chapter IV of this volume was utilized to determine the number of miles of arterial streets and highways which could be expected to produce annoying noise levels.

As indicated in Table 253, there was in 1972 a total of 712 miles of arterial facilities which did not meet the standard, including 38 miles of freeway facilities and 674 miles of standard arterial facilities. All six alternative plans would result in an increase in highway noise impact over the existing 1972 situation, although to differing degrees. This is to be expected since substantial amounts of increased travel are anticipated by the year 2000 under all six alternatives, and none of the alternatives proposes a relatively large number of new highway facilities on which to carry such travel. For the alternative transportation plans prepared to serve the controlled centralization land use plan, the transit-supported highway plan would have the least adverse impact, resulting in a total of about 820 miles of arterial facilities which could be expected to exceed the standard. By contrast, the highway-supported transit plan would have about 863 miles of arterial facilities; and the "no build" plan about 903 miles of arterial facilities which could be expected to exceed the noise level standard. A similar pattern is found for the controlled decentralization land use plan. Under that alternative, the transit-supported highway plan would result in a total of 820 miles of arterial facilities which could be expected to exceed the standard; whereas the highway-supported transit plan would have a total of 865 miles of arterial facilities and the "no build" plan a total of 917 miles which could be expected to exceed the standard.

Under the transit-supported highway plan, the construction of a greater number of freeway facilities results in a better distribution of traffic volumes over the system and, hence, a reduction in the amount of noise generated on the standard arterial street system. Since the "no build" plans propose virtually no improvements to the transportation system, all of the anticipated increase in travel demand must be accommodated on the existing facilities, thus increasing existing noise levels.

In considering the above data, it is important to note that the noise impact model does not take into account the potential for incorporating noise reducing features in transportation facility design, such as the construction of paralleling berms along a freeway or transitway or the depressing of freeways or transitways to deflect noise. Such features can only be considered in the project planning and design phases of facility construction. In this respect, it is also important to note that freeways and transitways provide better opportunities for noise mitigation than do standard surface arterial streets because of more ample rights-of-way and grade separation. Accordingly, since the transit-supported highway plan has a greater combination of freeways and transitways than the highway-supported transit or the "no build" alternative plans, the opportunity for noise mitigation is that much greater.

Table 253

COMPARISON OF MILES OF ARTERIAL STREET AND HIGHWAYS WITH TRAFFIC-RELATED NOISE EXCEEDING 70 DBA BY COUNTY: 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

County	Arterial Miles Exceeding 70 dba						
		Proposed 2000					
		Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	Existing 1972	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Kenosha County							
Freeway	--	--	--	--	--	--	--
Standard Arterial	46	57	52	54	76	74	66
Subtotal	46	57	52	54	76	74	66
Milwaukee County							
Freeway	38	50	49	69	49	48	57
Standard Arterial	330	393	398	365	351	358	322
Subtotal	368	443	447	434	400	406	379
Ozaukee County							
Freeway	--	--	--	--	--	--	--
Standard Arterial	42	30	28	30	35	34	34
Subtotal	42	30	28	30	35	34	34
Racine County							
Freeway	--	--	2	--	--	--	--
Standard Arterial	39	60	61	52	63	59	60
Subtotal	39	60	63	52	63	59	60
Walworth County							
Freeway	--	--	--	--	--	--	--
Standard Arterial	49	51	48	65	60	56	77
Subtotal	49	51	48	65	60	56	77
Washington County							
Freeway	--	--	--	--	--	--	--
Standard Arterial	40	65	41	35	70	44	38
Subtotal	40	65	41	35	70	44	38
Waukesha County							
Freeway	--	5	2	--	5	--	--
Standard Arterial	128	192	182	150	208	192	166
Subtotal	128	197	184	150	213	192	166
Southeastern Wisconsin Region							
Freeway	38	55	53	69	54	48	57
Standard Arterial	674	848	810	751	863	817	763
Total	712	903	863	820	917	865	820

Source: SEWRPC.

Standard No. 8 indicates that the destruction of historic buildings and of historic, scenic, scientific, and cultural sites by the reconstruction of existing or the construction of new transportation facilities should be minimized. Attainment of this standard cannot be measured at the system level of planning, since the standard can only be met through proper attention to historic preservation at the project level of planning. Accordingly, it is considered that this standard could be met equally well under all of the alternative transportation plans considered.

Objective No. 5—Facilitate Traffic Flow

The fifth transportation objective relates to the facilitation of traffic flow between component parts of the Region. This objective is supported by six standards.

Standards Nos. 1, 2, and 3 indicate that the total passenger hours of travel, the total vehicle hours, and total vehicle miles of travel within the Region, respectively, should be minimized. Data pertaining to these standards are set forth in Table 254, including total vehicle miles of travel on the arterial street and highways and on the transit system, total vehicle hours of travel on the arterial streets and highways and the transit system, and total passenger hours of travel on the arterial street and highways and on the transit system.

Arterial street and highway system vehicle miles of travel in the Region in 1972 were estimated at 20.1 million on an average weekday. Under land use development assumptions set forth in the controlled centralization land use

Table 254

COMPARISON OF THE AMOUNT OF TOTAL TRAVEL IN THE REGION 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Travel Characteristics	Existing 1972		Proposed 2000											
			Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
			"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
Vehicle Miles of Travel (thousands)														
Arterial Streets and Highways														
Freeway	6,213	30.9	11,669	36.6	10,306	36.9	13,908	45.9	11,258	35.1	10,206	35.7	13,342	43.7
Standard Arterial	13,911	69.1	20,184	63.4	17,656	63.1	16,396	54.1	20,851	64.9	18,417	64.3	17,209	56.3
Total	20,124	100.0	31,853	100.0	27,962	100.0	30,304	100.0	32,109	100.0	28,623	100.0	30,551	100.0
Transit														
Primary	1	1.5	5	7.6	70	25.4	53	23.8	5	8.6	64	24.7	56	24.6
Secondary	--[a]	--	--[a]	--	72	26.0	52	23.3	--[a]	--	64	24.7	50	21.9
Tertiary	65	98.5	61	92.4	134	48.6	118	52.9	53	91.4	131	50.6	122	53.5
Total	66	100.0	66	100.0	276	100.0	223	100.0	58	100.0	259	100.0	228	100.0
Vehicle Hours of Travel (thousands)														
Arterial Streets and Highways														
Freeway	139	22.7	250	27.5	219	28.3	298	36.5	238	26.5	216	27.6	284	34.9
Standard Arterial	474	77.3	658	72.5	555	71.7	519	63.5	660	73.5	566	72.4	529	65.1
Total	613	100.0	908	100.0	774	100.0	817	100.0	898	100.0	782	100.0	813	100.0
Transit														
Primary	--[a]	--	0.3	5.7	3	17.7	3	20.0	0.3	7.0	3	17.7	3	20.0
Secondary	--[a]	--	--[a]	--	4	23.5	3	20.0	--[a]	--	4	23.5	3	20.0
Tertiary	6	100.0	5	94.3	10	58.8	9	60.0	4.0	93.0	10	58.8	9	60.0
Total	6		5.3	100.0	17	100.0	15	100.0	4.3	100.0	17	100.0	15	100.0
Passenger Hours of Travel (thousands)														
Arterial Streets and Highways	858	93.7	1,235	96.7	1,053	84.6	1,111	92.1	1,221	97.3	1,064	86.2	1,106	92.9
Transit	58	6.3	42	3.3	191	15.4	96	7.9	34	2.7	170	13.8	85	7.1
Total	916	100.0	1,277	100.0	1,244	100.0	1,207	100.0	1,255	100.0	1,234	100.0	1,191	100.0

[a] *Included in tertiary.*

Source: SEWRPC.

plan, vehicle miles of travel on arterial streets would increase to nearly 31.9 million under the "no build" transportation plan, 28.0 million under the highway-supported transit plan, and 30.3 million under the transit-supported highway transportation plan. Corresponding vehicle hours of travel on the arterial street system are 613,000 in 1972 and 908,000, 774,000, and 817,000, respectively, in 2000 for the "no build," highway-supported transit, and transit-supported highway transportation plans. When the transit vehicle hours of travel are added to the vehicle hours of travel on the arterial street system, the "no build" plan would result in a total of about 913,000 hours per day, the highway-supported transit plan about 791,000 hours per day, and the transit-supported highway plan about 832,000 hours per day. Thus, with respect to the controlled centralization land use plan, the highway-supported transit transportation plan best meets the vehicle hour of travel standard. The same pattern holds true when the three transportation plans are designed to serve the controlled decentralization land use plan. In that situation, the "no build" plan would result in a total of 902,000 vehicle hours per day, the highway-supported transit plan a total of 799,000 vehicle hours per day, and the transit-supported highway plan a total of 828,000 vehicle hours per day.

A slightly different relationship exists, however, when total passenger hours of travel on the total transportation system are considered. For those transportation alternatives prepared to serve the controlled centralization land use plan, the transit-supported highway alternative best meets the standard in that it results in an estimated total of 1,207,000 passenger hours of travel per day, whereas the highway-supported transit alternative would generate about 1,244,000 hours per day, and the "no build" alternative about 1,277,000 hours per day. Similarly, under the controlled decentralization land use plan, the transit-supported highway plan would result in a total of 1,191,000 hours per day, the highway-supported transit plan a total of 1,234,000 hours per day, and the "no build" plan a total of 1,255,000 hours per day.

Standard No. 4 indicates that highway transportation facilities should be located and designed to provide adequate capacity—a volume-to-capacity ratio equal to or less than 1.10 based on a 24-hour average weekday traffic volume basis. To determine the degree to which each alternative transportation plan meets this standard, the anticipated travel demand expected to be generated under each plan was assigned to the alternative transportation networks to evaluate the adequacy of the proposed improvements. The levels of service of each of the alternative plans, as measured by volume-to-capacity ratios, are summarized in Table 255.

For the three alternative transportation system plans prepared to serve the controlled centralization land use plan, the transit-supported highway alternative would best meet the standard with about 98 percent of all arterial streets and highways in the Region operating at or under capacity. The highway-supported transit plan would result in 96 percent of arterial streets operating at or under capacity, while the "no build" plan would result in 85 percent of arterial streets and highways operating at or under capacity. Of the three alternatives, both the highway-supported transit and the transit-supported highway plans, as prepared to serve the controlled centralized land use plan, would reduce congestion below the 1972 level.

The same basic relationship exists when the controlled decentralization plan is examined. The transit-supported highway plan would result in 97 percent of arterial streets operating at or under capacity, the highway-supported transit plan 94 percent, and the "no build" alternative 84 percent. Of these three alternatives, only the transit-supported highway plan would reduce congestion below the 1972 level.

Standard No. 5 indicates that mass transit facilities should be located and designed so as to provide adequate transit vehicle capacity to meet existing and potential travel demands. Average maximum load factors are specified in the standard for the primary, secondary, and tertiary levels of service in both peak and off peak time periods. This standard has been met under each of the alternative plans considered because it served as input to the plan design process.

Standard No. 6 indicates that adequate capacity and a sufficiently high level of geometric design should be provided to achieve specified overall travel speeds based on average weekday conditions for the highway and mass transit components of the transportation system. The overall travel speeds specified in the standard were utilized in the design of the alternative regional transportation system plans. Accordingly, it may be concluded that this standard may be met by design under all of the alternative plans.

Objective No. 6—Reduce Accident Exposure

The sixth transportation objective relates to the reduction of accident exposure and the provision of increased travel safety. This objective is supported by three specific standards relating to traffic congestion and vehicle conflicts.

Standard No. 1 indicates that travel on facilities that exhibit the lowest accident exposure should be maximized. Freeways have been found to experience significantly lower accident rates than surface standard arterial facilities. In addition, travel on transit is generally safer for passengers than travel in other vehicles. From the foregoing, it can be concluded that those plans which provide the greatest amount of travel on freeways and transit would best meet this standard.

Among the transportation system plans prepared to serve the controlled centralization land use plan, the transit-supported highway plan would accommodate about 46 percent of vehicle miles of travel on the freeway system, while the highway-supported transit plan would accommodate 37 percent, and the "no build" plan about 37 percent. Similarly, under the controlled decentralization land use plan, the transit-supported highway plan would be expected to accommodate 44 percent of vehicle miles of travel on the freeway system, with the highway-supported transit plan accommodating 36 percent and the "no build" plan

35 percent. For transit, the highway-supported transit plans under each land use plan would result in higher proportions of total person trip-making by transit, since such plans induce transit utilization through a 50 percent publicly subsidized reduction in transit fare, and thus would be considered to better meet this standard for maximizing the proportion of total travel on transit.

In an effort to identify the "safest" alternative transportation plan, an analysis was made of the distribution of passenger miles of travel by mode and facility type on the assumption that the alternative plan which maximizes passenger travel on a combination of freeways and mass transit would best meet this standard. The results of this analysis are identified in Table 255. For the alternative transportation plans prepared to serve the controlled centralization land use plan, the transit-supported highway plan would represent the "safest" plan since it would provide for a total of 48 percent of passenger miles of travel on a combination of the freeway and mass transit systems. Comparable figures for the highway-supported transit and "no build" alternatives are 43 percent and 38 percent, respectively. Similarly, for the controlled decentralization land use plan, the transit-supported highway plan would accommodate 46 percent of passenger miles of travel on a combination of the freeway and mass transit systems, as compared to 41 percent for the highway-supported transit alternative and 36 percent for the "no build" alternative.

A comparison of anticipated traffic accident experience and cost on the transportation system in the Region under each of the alternative regional transportation system plans over the period 1976-2000 is set forth in Table 256. Accident rates and associated accident costs have been developed as documented in Appendix E of this volume. With respect to those alternative transportation system plans prepared to serve the controlled centralization land use plan, the total cost of accidents in southeastern Wisconsin over the 1976-2000 period would approximate 5.07 billion for the "no build" transportation plan, 4.65 billion for the highway-supported transit plan, and 4.55 billion for the transit-supported highway plan. With respect to those plans prepared to serve the controlled decentralization land use plan, the total accident costs would approximate 5.16 billion under the "no build" plan, 4.75 billion under the highway-supported transit plan, and 4.65 billion, under the transit-supported highway plan.

Standard No. 2 indicates that traffic congestion and vehicle conflicts should be reduced by maintaining a volume-to-capacity ratio on the arterial street system equal to or less than 0.9 based on 24-hour average weekday traffic volumes. As shown in Table 257, among the alternative transportation system plans prepared to serve the controlled centralization land use plan, the transit-supported highway plan best meets this standard in that 88 percent of all arterial streets and highways in the Region would be expected to operate under design capacity. Under the highway-supported transit and "no build" plans, the number of miles of arterial streets and highways that could be expected to operate under design capacity are 82 percent and 70 percent, respectively. For the alternative transportation system plans prepared to serve the controlled decentralization plan, the same basic relationship is found: the number of miles of arterial streets and highways operating under design capacity approximates 84 percent for the transit-supported highway plan, 78 percent for the highway-supported transit plan, and 66 percent for the "no build" plan.

Standard No. 3 indicates that the incidence of accidents occurring at railroad grade crossings should be minimized by providing warning devices or grade separation, if warranted. This particular standard could be met through local planning and plan implementation activity under all of the alternative transportation system plans considered.

Table 255

DISTRIBUTION OF PASSENGER MILES OF TRAVEL IN THE REGION BY MODE AND FACILITY TYPE 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

Mode/Facility Type	Passenger Miles of Travel on an Average Weekday (thousands)											
	Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Freeways	15,870	36.1	14,016	33.3	18,915	43.8	15,311	34.7	13,880	32.7	18,145	41.9
Mass Transit	601	1.4	4,048	9.6	1,938	4.5	485	1.1	3,461	8.2	1,775	4.1
Subtotal	16,471	37.5	18,064	42.9	20,853	48.3	15,796	35.8	17,341	40.9	19,920	46.0
Standard Arterials	27,450	62.5	24,012	57.1	22,299	51.7	28,357	64.2	25,047	59.1	23,404	54.0
Total	43,921	100.0	42,076	100.0	43,152	100.0	44,153	100.0	42,388	100.0	43,324	100.0

Source: SEWRPC.

Table 256

COMPARISON OF TRAFFIC ACCIDENT EXPERIENCE AND COST ON THE TRANSPORTATION SYSTEM IN THE REGION BY COUNTY: ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

County and Accident Characteristics	Street and Highway System Cumulative Accident Experience and Cost: 1976-2000					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Kenosha County						
Number of Property Damage Accidents	156,300	165,400	151,600	172,800	183,000	172,500
Number of Injuries	50,800	53,500	49,100	56,100	59,100	56,200
Number of Fatalities	1,080	1,140	1,040	1,180	1,266	1,180
Cost of Accidents (million dollars)	418	441	404	460	487	460
Milwaukee County						
Number of Property Damage Accidents	1,593,900	1,384,400	1,408,000	1,487,600	1,299,900	1,312,800
Number of Injuries	332,000	288,000	291,000	310,100	270,100	270,800
Number of Fatalities	2,700	2,340	2,360	2,510	2,190	2,200
Cost of Accidents (million dollars)	2,386	2,070	2,094	2,227	1,941	1,950
Ozaukee County						
Number of Property Damage Accidents	84,900	76,400	79,400	103,800	92,400	95,200
Number of Injuries	28,200	24,900	26,000	33,800	30,000	31,100
Number of Fatalities	600	530	550	720	640	670
Cost of Accidents (million dollars)	232	205	213	278	247	257
Racine County						
Number of Property Damage Accidents	190,300	186,300	167,500	195,600	191,100	175,200
Number of Injuries	61,800	60,500	54,800	63,400	62,000	57,200
Number of Fatalities	1,310	1,280	1,210	1,340	1,290	1,200
Cost of Accidents (million dollars)	508	497	456	521	507	469
Walworth County						
Number of Property Damage Accidents	103,100	99,900	103,300	109,500	105,800	109,300
Number of Injuries	33,300	32,300	33,400	35,300	34,200	35,300
Number of Fatalities	710	680	710	750	720	750
Cost of Accidents (million dollars)	275	265	275	291	281	291
Washington County						
Number of Property Damage Accidents	132,100	110,000	108,100	151,300	128,300	126,200
Number of Injuries	42,400	36,100	35,400	48,700	41,900	41,200
Number of Fatalities	900	770	750	1,030	900	870
Cost of Accidents (million dollars)	349	297	291	401	346	338
Waukesha County						
Number of Property Damage Accidents	328,700	306,800	290,000	362,100	333,900	314,900
Number of Injuries	107,700	100,400	96,200	118,300	109,000	104,200
Number of Fatalities	2,280	2,140	2,040	2,470	2,310	2,210
Cost of Accidents (million dollars)	884	826	789	968	896	855
Southeastern Wisconsin Region						
Number of Property Damage Accidents	2,589,300	2,329,200	2,307,900	2,582,700	2,334,400	2,306,100
Number of Injuries	656,200	595,700	585,900	665,700	606,400	595,900
Number of Fatalities	9,580	8,800	8,660	10,000	9,310	9,080
Cost of Accidents (million dollars)	5,052	4,601	4,522	5,146	4,705	4,620

Table 256 (continued)

Transit System and Accident Experience	Transit System Cumulative Accident Experience and Cost: 1976-2000					
	Controlled Centralization Land Use Plan			Controlled Decentralization Land Use Plan		
	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan	"No Build" Transportation System Plan	Highway-Supported Transit Transportation System Plan	Transit-Supported Highway Transportation System Plan
Southeastern Wisconsin Region						
Number of Passenger Accidents . .	10,700	35,100	20,200	9,900	31,300	18,600
Number of Vehicle Accidents . . .	24,800	68,600	57,500	22,900	64,900	58,600
Number of Fatalities. . .	40	110	60	40	90	60
Cost of Accidents (million dollars).	16	46	30	15	41	32
Total Cost of Accidents (million dollars) . . .	5,068	4,647	4,552	5,161	4,746	4,652

Source: SEWRPC.

Objective No. 7—Aesthetic Quality

The seventh transportation objective relates to the achievement of a transportation system with a high aesthetic quality whose major facilities would possess the proper visual relation to the land and cityscape. This objective is supported by two specific standards.

Standard No. 1 indicates that transportation facility construction plans should be developed using sound geometric, structural, and landscape design standards which consider the aesthetic quality of the transportation facilities and the areas through which they pass. Like the first standard, this standard can only be met through proper facility design during plan implementation. Accordingly, it is considered that this standard can be equally well met by all of the alternative transportation plans considered.

Standard No. 2 indicates that transportation facilities should be located to avoid destruction of visually pleasing buildings, structures, and natural features and to avoid interference with vistas to such features. This standard can only be met through careful facility design during plan implementation. Accordingly, it is considered that this standard could be met equally well under all of the alternative transportation plans considered.

Summary—Satisfaction of Objectives and Standards

The foregoing discussion concerning the scaling of the alternative regional transportation system plans against the transportation system development objectives and standards set forth in Chapter II of this volume is summarized in tabular form in Table 258 for the controlled centralization land use plan and Table 259 for the controlled decentralization land use plan. These tables indicate, based upon the foregoing discussion, whether or not a given standard is met under each of the plans, or whether the standard could be met under each of the plans. Where possible, quantification is provided to determine the relative degree to which the standards have been met. This overall summary comparison provides the basis for the application of the rank-based expected value method of plan evaluation discussed in the following section of this chapter.

PLAN EVALUATION—APPLICATION OF RANK-BASED EXPECTED VALUE METHOD

As noted in the introductory section of this chapter, the plan evaluation described in the foregoing sections of this chapter was supplemented by application of a method of plan evaluation which seeks to assign a value to each alternative plan. The method used is an adaptation of the rank-based expected value method used in corporate and military decision making. In essence, this method limits the plan evaluation problem to one of rank ordering each alternative under each of the stated development objectives.

The difficult problems associated with uncertainty of plan implementation are also recognized in the rank-based expected value method of plan evaluation through the medium of probability estimation. Some alternative plans, while theoretically more desirable, may have a low probability of implementation; and, in the application of the method, such plans are assigned a lower value for probability of implementation. Other plans, while theoretically less desirable on the basis of their ability to attain development objectives, may have a higher actual value because of a greater likelihood of implementation. This concept of considering the uncertainties of plan implementation in plan evaluation is particularly

Table 257

COMPARISON OF THE DISTRIBUTION OF MILES OF ARTERIAL STREET AND HIGHWAY FACILITIES OPERATING AT VARIOUS SERVICE LEVELS IN THE REGION BY COUNTY 1972 AND 2000 ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS

County and Service Level	Miles of Arterial Facility													
			Proposed 2000											
			Controlled Centralization Land Use Plan						Controlled Decentralization Land Use Plan					
	Existing 1972		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan		"No Build" Transportation System Plan		Highway-Supported Transit Transportation System Plan		Transit-Supported Highway Transportation System Plan	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
Kenosha County														
Under Design Capacity[a]	243.1	8.1	198.5	6.0	231.4	6.7	267.1	7.5	163.9	5.0	174.8	5.1	227.0	6.4
At Design Capacity[b]	14.7	0.5	57.9	1.8	55.3	1.6	70.0	2.0	85.0	2.6	93.8	2.7	81.8	2.3
Over Design Capacity[c]	22.0	0.7	75.2	2.3	59.2	1.7	21.0	0.6	82.7	2.5	77.3	2.2	49.3	1.4
Subtotal	279.8	9.3	331.6	10.1	345.9	10.0	358.1	10.1	331.6	10.1	345.9	10.0	358.1	10.1
Milwaukee County														
Under Design Capacity[a]	601.4	20.0	465.9	14.2	603.4	17.6	693.6	19.6	521.8	15.9	662.0	19.3	751.5	21.2
At Design Capacity[b]	71.8	2.4	142.6	4.3	135.0	3.9	101.0	2.8	127.3	3.9	95.8	2.8	59.5	1.7
Over Design Capacity[c]	61.0	2.0	139.6	4.3	34.0	1.0	24.2	0.7	99.0	3.0	14.6	0.4	7.8	0.2
Subtotal	734.2	24.4	748.1	22.8	772.4	22.5	818.8	23.1	748.1	22.8	772.4	22.5	818.8	23.1
Ozaukee County														
Under Design Capacity[a]	234.7	7.8	252.2	7.7	291.7	8.5	299.5	8.4	212.0	6.5	257.6	7.5	260.2	7.3
At Design Capacity[b]	10.1	0.3	25.3	0.8	18.0	0.5	10.2	0.3	53.7	1.6	39.2	1.1	34.0	1.0
Over Design Capacity[c]	5.5	0.2	26.6	0.8	0.0	0.0	0.0	0.0	38.4	1.2	12.9	0.4	15.5	0.4
Subtotal	250.3	8.3	304.1	9.3	309.7	9.0	309.7	8.7	304.1	9.3	309.7	9.0	309.7	8.7
Racine County														
Under Design Capacity[a]	310.0	10.3	246.9	7.5	278.5	8.1	375.4	10.6	231.9	7.1	278.4	8.1	343.5	9.7
At Design Capacity[b]	19.1	0.6	72.9	2.2	86.6	2.5	36.7	1.0	70.2	2.1	86.9	2.5	68.8	1.9
Over Design Capacity[c]	20.3	0.7	57.9	1.8	31.1	0.9	2.5	0.1	75.6	2.3	30.9	0.9	2.3	0.1
Subtotal	349.4	11.6	377.7	11.5	396.2	11.5	414.6	11.7	377.7	11.5	396.2	11.5	414.6	11.7
Walworth County														
Under Design Capacity[a]	400.7	13.3	404.8	12.3	430.5	12.5	428.3	12.1	403.5	12.3	405.6	11.8	407.5	11.5
At Design Capacity[b]	2.7	0.1	33.1	1.0	32.3	1.0	34.5	1.0	30.9	0.9	52.1	1.5	53.8	1.5
Over Design Capacity[c]	4.8	0.2	12.7	0.4	0.5	0.0	0.5	0.0	16.2	0.5	5.6	0.2	2.0	0.1
Subtotal	408.2	13.6	450.6	13.7	463.3	13.5	463.3	13.1	450.6	13.7	463.3	13.5	463.3	13.1
Washington County														
Under Design Capacity[a]	320.4	10.7	297.2	9.1	410.2	11.9	415.4	11.7	255.1	7.8	359.8	10.5	363.1	10.2
At Design Capacity[b]	9.7	0.3	53.9	1.6	16.4	0.5	15.9	0.4	78.7	2.4	53.2	1.5	54.0	1.5
Over Design Capacity[c]	9.1	0.3	35.5	1.1	6.9	0.2	3.3	0.1	52.8	1.6	20.5	0.6	17.5	0.5
Subtotal	339.2	11.3	386.6	11.8	433.5	12.6	434.6	12.2	386.6	11.8	433.5	12.6	434.6	12.2
Waukesha County														
Under Design Capacity[a]	581.8	19.3	422.3	12.9	580.1	16.9	653.5	18.4	371.7	11.3	524.5	15.3	640.7	18.1
At Design Capacity[b]	23.8	0.8	119.0	3.6	117.7	3.4	81.8	2.4	139.8	4.3	161.6	4.7	87.3	2.5
Over Design Capacity[c]	42.9	1.4	138.5	4.2	16.7	0.5	11.2	0.3	168.3	5.1	28.4	0.8	18.5	0.5
Subtotal	648.5	21.5	679.8	20.7	714.5	20.8	746.5	21.1	679.8	20.7	714.5	20.8	746.5	21.1
Southeastern Wisconsin Region														
Under Design Capacity[a]	2,692.1	89.4	2,287.8	69.8	2,825.8	82.3	3,132.8	88.3	2,159.9	65.9	2,662.7	77.5	2,993.5	84.4
At Design Capacity[b]	151.9	5.1	504.7	15.4	461.3	13.4	350.1	9.9	585.6	17.9	582.6	17.0	439.2	12.4
Over Design Capacity[c]	165.6	5.5	486.0	14.8	148.4	4.3	62.7	1.8	533.0	16.2	190.2	5.5	112.9	3.2
Subtotal	3,009.6	100.0	3,278.5	100.0	3,435.5	100.0	3,545.6	100.0	3,278.5	100.0	3,435.5	100.0	3,545.6	100.0

[a] *Volume-to-capacity ratio 0.00-0.90; fully adequate and safest operational levels.*

[b] *Volume-to-capacity ratio 0.91-1.10; adequate operational level.*

[c] *Volume-to-capacity ratio over 1.10; congested at times.*

Source: SEWRPC.

important in public works planning. The incremental construction of public works facilities cannot be made on the sole basis of a system plan which cannot be practically implemented.

In plan evaluation, then, the application of the rank-based expected method involves the following sequence of activities:

1. All specific development objectives, n in number, are ranked in order of importance to the general development objectives and assigned values of n, n-1, n-2 . . . to n-(n-1) in descending order.

2. The alternative plans, m in number, are ranked under each of the specific development objectives and assigned a value of m, m-1, m-2 . . . to m-(m-1) in descending rank order.

3. A probability of implementation, p, is assigned to each of the plans being ranked.

4. The value of each alternative plan, V, is then determined by summing the products of n times m times p for each of the specific development objectives.

$$V = p \Sigma (n_1 m_1 + n_2 m_2 + \ldots + n_n m_n)$$

The matrix table shown in Table 260 illustrates a simple theoretical application of the method for three plans and three specific development objectives. In the hypothetical evaluation shown in this table, plan No. 3 would be selected as that plan which best meets the development objectives

Any ranking of an alternative plan for a specific given development objective must be consistent with the ability of the plan to achieve the standards formulated for that objective. To achieve this consistency, it is first necessary to compute a value for each of the alternative plans according to the standards formulated for each specific development objective before arriving at an overall value for each plan in relation to the development objectives. This subsidiary evaluation can utilize a series of matrix tables similar to that given in the preceding example, except that the development standards replace the development objectives in the matrix table and that it is usually not necessary to assign a probability estimate for the standard evaluation.

Hierarchial Structure of Objectives and Standards

In plan evaluation it is important to recognize that the development objectives and standards formulated possess an implicit hierarchy; that is, a multi-level structure relating to differing stages and levels of detail in the land use-transportation planning process, as well as to differing levels of implementation. An example of an objective with its related standards that ranks at the highest level of the hierarchical structure is regional land use development Objective No. 1, which calls for the provision of a supply of land for each use corresponding to the anticipated demand for that use. Such a design requirement can be complied with only at the regional level of plan design, since it is only at this level that total land allocation is ever known. Other objectives and standards stand lower in the hierarchy and may directly effect plan design only at the neighborhood unit level. Examples of these kinds of standards occur under regional land use development Objective No. 5, which specifies design standards for residential areas. Most of the standards supporting this objective can only be met in the last analysis through the detailed design of neighborhood unit development plans, even though a regional plan might provide the framework for such detailed design. It should be noted that the existence of a hierarchy of development objectives and standards should not leave the impression that higher levels in the hierarchy do not affect lower levels. It is quite possible that a feature of a regional plan could prevent or seriously interfere with the attainment of a neighborhood level development objective.

Since regional planning is primarily concerned with land use activities and public works facilities of the kind that have areawide implications, it is apparent that alternative regional land use and transportation plans may not directly affect the attainment of all of the development objectives and standards. Lower level objectives and standards not directly influenced by the regional plans are, nevertheless, required to provide guidelines for planning in the community and neighborhood levels. From a regional viewpoint, it is important that compliance with a lower level standard only be found to be not in conflict with the regional plan.

Rank Order of Alternative Plans

The application of the rank based expected value method of plan evaluation to the two alternative regional land use plans and to the three alternative transportation plans prepared to serve each of the two land use plans required the following steps:

1. The land use and transportation standards were ranked under each objective in order of relative importance. This ranking is reflected in the order in which the standards are presented in Chapter II of this volume. The Commission staff initially rank ordered each standard. On review, the Technical Coordinating and Advisory Committee revised the initially ranking.

2. Each standard was assigned a numerical value based upon the extent to which it was met under each alternative land use and transportation plan. A numerical value of 3, 2, or 1 was assigned to each standard in one of two ways: if the standard was expressed in quantitative terms, the three values were assigned to the alternative plans on the basis of the rank order of the quantified criteria, provided that the differences were considered by the Committee to be significant; if the standard was expressed in qualitative terms, the value was assigned on the basis of whether the

Table 258

COMPARISON OF RELATIVE ABILITY OF THE ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS TO MEET TRANSPORTATION DEVELOPMENT STANDARDS—CONTROLLED CENTRALIZATION LAND USE PLAN

Development Objective and Supporting Standards	Alternative Transportation System Plans					
	"No Build"		Highway-Supported Transit Plan		Transit-Supported Highway Plan	
Objective No. 1—Effectively Serve Regional Land Use Pattern						
1. Serve Urbanized Area Land Uses	Highway	Transit	Highway	Transit	Highway	Transit
Percent of Population Served						
a. Employment Opportunities	92.5	10.8	93.2	20.3	95.8	21.8
b. Major Retail and Service Centers	100.0	41.6	100.0	49.3	100.0	49.5
c. Medical Center Hospital/Clinic	100.0	77.5	100.0	80.4	100.0	76.5
d. Major Outdoor Recreation Center	100.0	74.9	100.0	82.8	100.0	75.5
e. Higher Educational Facility	100.0	83.5	100.0	86.7	100.0	82.2
f. Scheduled Air Transport Airport	100.0	53.6	100.0	56.7	100.0	54.6
2. Adequate Accessibility	$147{,}360 \times 10^6$		$147{,}670 \times 10^6$		$151{,}760 \times 10^6$	
Objective No. 2—Minimize Costs and Energy Utilization						
1. Minimize Sum of Transportation System Capital and Operating Costs	$71,980 Million		$73,102 Million		$73,055 Million	
2. Benefit/Cost Ratio	--		0.84		1.00	
3. Maximize Use of Existing Facilities	$423.9 Million		$1,728.4 Million		$2,523.3 Million	
4. Minimize Energy Utilization, Particularly Petroleum-Based Fuels	968 Million Gallons		878 Million Gallons		925 Million Gallons	
Objective No. 3—Provide Flexible, Balanced Transportation System						
1. Arterial Street and Highway System						
a. Arterial Spacing	Met		Met		Met	
b. Freeway Warrants	Not Met		Met		Met	
2. Transit System						
a. Mass Transit Warrants Percent Cost Paid by Equivalent Farebox Revenue	118		55		74	
b. Minimize Subsidy Per Ride	$0.04		$0.26		$0.28	
c. Primary Rapid Transit Warrants	Not Met		Met		Met	
d. Primary/Secondary Transit to Reduce Peak Hour Congestion	Not Met		Met		Met	
e. Primary/Secondary Transit Collection-Distribution	Not Met		Met		Met	
f. Service Area (square miles)	279.9		524.5		529.1	
Percent of Population of Urbanized Area Served	73.6		95.5		95.4	
g. Transit Route Alignment Transfers/Trip	0.5		0.6		0.5	
h. Median Headways—Peak	19.8 Minutes		11.5 Minutes		14.3 Minutes	
—Midday	24.0 Minutes		16.0 Minutes		19.8 Minutes	
i. Transit Stop Spacing	Met		Met		Met	
j. Transit User Walking Distance in Central Business District	Met		Met		Met	
k. Percent Transit to Milwaukee Central Business District[a]	23		43		27	
l. Elderly-Handicapped Transit Service	Could be Met		Could be Met		Could be Met	
3. Parking						
a. Transit Station Parking	Not Met		Met		Met	
b. Parking Spaces in Central Business District Per 1,000 Auto Central Business District Destinations	327		403		339	
c. Central Business District Walking Distance for Short-Term Parkers	Could be Met		Could be Met		Could be Met	
4. System Adaptability	Could be Met		Could be Met		Could be Met	

Table 258 (continued)

Development Objective and Supporting Standards	Alternative Transportation System Plans		
	"No Build"	Highway-Supported Transit Plan	Transit-Supported Highway Plan
Objective No. 4—Minimize Disruption			
1. Advance Right-of-Way Reservation	Could be Met	Could be Met	Could be Met
2. Minimize Penetration of Neighborhood Units	Met	Could be Met	Could be Met
3. Minimize Disolcation of Households and Nonresidential Structures	4 Nonresidential Units	51 Nonresidential Units	276 Nonresidential Units
4. Minimize Penetration of Environmental Corridors	Met	42.9	66.7
5. Minimize Land Used for Transportation and Terminal Facilities	$3.2 Million	$129.8 Million	$287.0 Million
6. Minimize Property Tax Base Reduction	$3.2 Million	$129.8 Million	$287.0 Million
7. Minimize Harmful and Annoying Noise Exposure	903 Miles	863 Miles	820 Miles
8. Minimize Destruction of Cultural Sites	Could be Met	Could be Met	Could be Met
Objective No. 5—Facilitate Traffic Flow			
1. Minimize Passenger Hours of Travel	1,277,000 Hours/Day	1,244,000 Hours/Day	1,207,000 Hours/Day
2. Minimize Vehicle Hours of Travel	913,000 Hours/Day	791,000 Hours/Day	832,000 Hours/Day
3. Minimize Vehicle Miles of Travel	31,919,000 Miles/Day	28,238,000 Miles/Day	30,527,000 Miles/Day
4. Adequate Street and Highway Capacity (volume-to-capacity ratio equal to or less than 1.1)	85.2 Percent	95.7 Percent	98.2 Percent
5. Adequate Transit Capacity (load capacity of less than 1.0)	Met	Met	Met
6. Overall Travel Speeds	Met	Met	Met
Objective No. 6—Reduce Accident Exposure			
1. Maximize Travel on Facilities with Lowest Accident Exposure	37.5 Percent of Passenger Miles of Travel	42.9 Percent of Passenger Miles of Travel	48.3 Percent of Passenger Miles of Travel
2. Maintain Volume-to-Capacity Ratio Equal to or Less Than 0.9	69.8 Percent	82.3 Percent	88.3 Percent
3. Provide Railroad Grade Separation or Warning Devices as Warranted	Could be Met	Could be Met	Could be Met
Objective No. 7—Aesthetic Quality			
1. Minimize Destruction of Visually Pleasing Objects and Vistas	Could be Met	Could be Met	Could be Met
2. Aesthetic Quality Design Standards	Could be Met	Could be Met	Could be Met

[a] *Does not include those trips made by persons residing in group quarters, trips made by nonresidents of the Region, or trips made by persons in school buses.*

Source: SEWRPC.

standard was fully met (3), partially met (2), or could be met through community, neighborhood, or private planning efforts (1).

3. Once each alternative plan had been assigned a value under each standard, a plan value was computed for each specific regional development objective by multiplying the value of the plan under each supporting standard by the rank order of the standard under each objective, and summing these products for each alternative plan.

4. With respect to each specific development objective, the resulting plan values were then assigned rank order values on the basis of the results of the steps above. These computations are shown in matrix form in Appendix Tables I-1, I-2, and I-3. The results of these computations are shown in summary form in Tables 261, 262, and 263.

5. Each of the land use and transportation development objectives were then rank ordered. The Technical Coordinating and Advisory Committee

Table 259

COMPARISON OF RELATIVE ABILITY OF THE ALTERNATIVE REGIONAL TRANSPORTATION SYSTEM PLANS TO MEET TRANSPORTATION DEVELOPMENT STANDARDS—CONTROLLED DECENTRALIZATION LAND USE PLAN

Development Objective and Supporting Standards	Alternative Transportation System Plans					
	"No Build"		Highway-Supported Transit Plan		Transit-Supported Highway Plan	
Objective No. 1—Effectively Serve Regional Land Use Pattern						
1. Serve Urbanized Area Land Uses	Highway	Transit	Highway	Transit	Highway	Transit
Percent of Population Served						
a. Employment Opportunities	91.7	8.6	79.6	12.3	92.6	12.9
b. Major Retail and Service Centers	100.0	41.6	100.0	46.1	100.0	45.6
c. Medical Center Hospital/Clinic	100.0	66.0	100.0	77.5	100.0	79.2
d. Major Outdoor Recreation Center	100.0	69.3	100.0	78.9	100.0	78.0
e. Higher Educational Facility	100.0	81.0	100.0	88.3	100.0	88.9
f. Scheduled Air Transport Airport	100.0	53.2	100.0	49.6	100.0	50.8
2. Adequate Accessibility	$154{,}260 \times 10^6$		$152{,}710 \times 10^6$		$162{,}500 \times 10^6$	
Objective No. 2—Minimize Costs and Energy Utilization						
1. Minimize Sum of Transportation System Capital and Operating Costs	$71,918 Million		$73,092 Million		$73,276 Million	
2. Benefit/Cost Ratio	--		0.75		0.77	
3. Maximize Use of Existing Facilities	$417.4 Million		$1,676.1 Million		$2,566.6 Million	
4. Minimize Energy Utilization, Particularly Petroleum-Based Fuels	978 Million Gallons		901 Million Gallons		939 Million Gallons	
Objective No. 3—Provide Flexible, Balanced Transportation System						
1. Arterial Street and Highway System						
a. Arterial Spacing	Met		Met		Met	
b. Freeway Warrants	Not Met		Met		Met	
2. Transit System						
a. Mass Transit Warrants Percent Cost Paid by Equivalent Farebox Revenue	113		50		66	
b. Minimize Subsidy Per Ride	$0.06		$0.31		$0.39	
c. Primary Rapid Transit Warrants	Not Met		Met		Met	
d. Primary/Secondary Transit to Reduce Peak Hour Congestion	Not Met		Met		Met	
e. Primary/Secondary Transit Collection-Distribution	Not Met		Met		Met	
f. Service Area (square miles)	279.9		515.5		510.6	
Percent of Population of Urbanized Area Served	70.9		92.7		92.7	
g. Transit Route Alignment Transfers/Trip	0.5		0.6		0.6	
h. Median Headways—Peak	22 Minutes		11.5 Minutes		13.5 Minutes	
—Midday	30 Minutes		16.0 Minutes		18.5 Minutes	
i. Transit Stop Spacing	Met		Met		Met	
j. Transit User Walking Distance in Central Business District	Met		Met		Met	
k. Percent Transit to Milwaukee Central Business District[a]	21		40		26	
l. Elderly-Handicapped Transit Service	Could be Met		Could be Met		Could be Met	
3. Parking						
a. Transit Station Parking	Not Met		Met		Met	
b. Parking Spaces in Central Business District per 1,000 Auto Central Business District Destinations	324		399		335	
c. Central Business District Walking Distance for Short-Term Parkers	Could be Met		Could be Met		Could be Met	
4. System Adaptability	Could be Met		Could be Met		Could be Met	

Table 259 (continued)

Development Objective and Supporting Standards	Alternative Transportation System Plans		
	"No Build"	Highway-Supported Transit Plan	Transit-Supported Highway Plan
Objective No. 4—Minimize Disruption			
1. Advance Right-of-Way Reservation	Could be Met	Could be Met	Could be Met
2. Minimize Penetration of Neighborhood Units	Met	Could be Met	Could be Met
3. Minimize Dislocation of Households and Nonresidential Structures	4 Nonresidential Units	41 Nonresidential Units	276 Nonresidential Units
4. Minimize Penetration of Environmental Corridors	Met	42.9	66.7
5. Minimize Land Used for Transportation and Terminal Facilities	$3.2 Million	$123.7 Million	$291.4 Million
6. Minimize Property Tax Base Reduction	$3.2 Million	$123.7 Million	$291.4 Million
7. Minimize Harmful and Annoying Noise Exposure	917 Miles	865 Miles	820 Miles
8. Minimize Destruction of Cultural Sites	Could be Met	Could be Met	Could be Met
Objective No. 5—Facilitate Traffic Flow			
1. Minimize Passenger Hours of Travel	1,255,000 Hours/Day	1,234,000 Hours/Day	1,191,000 Hours/Day
2. Minimize Vehicle Hours of Travel	902,000 Hours/Day	799,000 Hours/Day	828,000 Hours/Day
3. Minimize Vehicle Miles of Travel	32,167,000 Miles/Day	28,882,000 Miles/Day	30,779,000 Miles/Day
4. Adequate Street and Highway Capacity (volume-to-capacity ratio equal to or less than 1.1)	83.8 Percent	94.5 Percent	96.8 Percent
5. Adequate Transit Capacity (load capacity of less than 1.0)	Met	Met	Met
6. Overall Travel Speeds	Met	Met	Met
Objective No. 6—Reduce Accident Exposure			
1. Maximize Travel on Facilities with Lowest Accident Exposure	35.8 Percent	40.9 Percent	46.0 Percent
2. Maintain Volume-to-Capacity Ratio Equal to or Less Than 0.9	65.9 Percent	77.5 Percent	84.4 Percent
3. Provide Railroad Grade Separation or Warning Devices as Warranted	Could be Met	Could be Met	Could be Met
Objective No. 7—Aesthetic Quality			
1. Minimize Destruction of Visually Pleasing Objects and Vistas	Could be Met	Could be Met	Could be Met
2. Aesthetic Quality Design Standards	Could be Met	Could be Met	Could be Met

[a] *Does not include those trips made by persons residing in group quarters, trips made by nonresidents of the Region, or trips made by persons in school buses.*

Source: SEWRPC.

agreed with the initial Commission staff rank ordering of the land use objectives, but changed some of the initial Commission staff rank ordering of the transportation objectives. The rank order utilized in the final computation of plan values is that agreed upon by the Technical Coordinating and Advisory Committee.

6. Each alternative plan was then assigned a value under each development objective in descending rank order.

7. A plan implementation probability value was then selected for each alternative plan and the value of each plan computed. The probabilities used were those agreed upon by the Technical Coordinating and Advisory Committee.

Alternative Land Use Plans: Plan implementation probability values of 0.7 and 0.8 were assigned by the Commission staff and the Technical Coordinating and Advisory Committee to the controlled centralization plan and the controlled decentralization plan alternatives, respectively.

Table 260

HYPOTHETICAL APPLICATION OF RANK BASED EXPECTED VALUE METHOD OF PLAN EVALUATION

Plan	Specified Development Objective	Balanced Allocation of Land Rank Order Value of Objective n = 2 Rank Order Value of Plan, m	Natural Resource Conservation Rank Order Value of Objective n = 3 Rank Order Value of Plan, m	Facility Costs Rank Order Value of Objective n = 1 Rank Order Value of Plan, m	Plan Value, V $V = p \Sigma (n_1 m_1 + n_2 m_2 + n_3 m_3)$
1	Probability of Implementation p = 0.6	3	1	1	0.6 [(2 x 3) + (3 x 1) + (1 x 3)] = 7.2
2	Probability of Implementation p = 0.5	2	2	1	0.5 [(2 x 2) + (3 x 2) + (1 x 1)] = 5.5
3	Probability of Implementation p = 0.9	1	3	2	0.9 [(2 x 1) + (3 x 3) + (1 x 2)] = 11.7

Source: SEWRPC.

Table 261

COMPARISON OF THE RELATIVE ABILITY OF ALTERNATIVE LAND USE PLANS TO MEET LAND USE DEVELOPMENT OBJECTIVES

Land Use Objective	Rank Order of Alternative Plan	
	Controlled Centralization	Controlled Decentralization
Balanced allocation of land use	1	1
Compatible arrangement of land uses	1	1
Protection, wise use, and development of natural resource base	1	1
Properly relate development to transportation and utility systems	2	1
Conserve and develop healthy, safe, convenient, and attractive residential areas	1	1
Preserve, develop, and redevelop variety of industrial and commercial sites	1	1
Preserve and provide open space	1	1
Preserve land areas for agricultural uses	2	1

Source: SEWRPC.

The controlled decentralization plan was assigned a somewhat higher probability of implementation because of the conformance of the plan to current development trends and because the plan requires fewer public land use controls for implementation than does the other alternative.

In considering these assigned probabilities, it was recognized that there are certain factors and forces at work which may affect the relative degree to which each of the plans could be implemented and which could in the extreme, even reverse the order of probability of implementation between the two alternative land use plans. Of particular importance in this respect is the somewhat uncertain future of the continued availability of relatively cheap motor fuel. Should motor fuel rise sharply in price, it may be that, in spite of individual preferences, residents of the Region would be forced to collectively seek a more compact land use development pattern, a pattern more nearly like that under the controlled centralization plan than under the controlled

Table 262

COMPARISON OF THE RELATIVE ABILITY OF ALTERNATIVE TRANSPORTATION SYSTEM PLANS TO MEET TRANSPORTATION SYSTEM DEVELOPMENT OBJECTIVES UNDER THE CONTROLLED CENTRALIZATION LAND USE PLAN

Transportation Objective	Rank Order of Alternative Plan		
	No Build	Highway Supported Transit	Transit Supported Highway
Effectively serve regional land use pattern	1	2	3
Minimize cost and energy use	3	1	2
Provide flexible, balanced transportation system	1	3	2
Minimize disruption	3	2	1
Facilitate traffic flow	1	3	2
Reduce accident exposure	1	2	3
Aesthetic quality	1	1	1

Source: SEWRPC.

Table 263

COMPARISON OF THE RELATIVE ABILITY OF ALTERNATIVE TRANSPORTATION SYSTEM PLANS TO MEET TRANSPORTATION SYSTEM DEVELOPMENT OBJECTIVES UNDER THE CONTROLLED DECENTRALIZATION LAND USE PLAN

Transportation Objective	Rank Order of Alternative Plan		
	No Build	Highway Supported Transit	Transit Supported Highway
Effectively serve regional land use pattern	1	2	3
Minimize cost and energy use	3	2	1
Provide flexible, balanced transportation system	1	3	2
Minimize disruption	3	2	1
Facilitate traffic flow	1	3	2
Reduce accident exposure	1	2	3
Aesthetic quality	1	1	1

Source: SEWRPC.

decentralization plan. Similarly, publicly regulated private utility extension and service policies may be changed from those currently in effect to constrain the rate of growth in electric power utilization by encouraging energy conservation and ensuring that extensions of utility service are paid for directly by those benefited. Electric power service has been considered virtually ubiquitous in the Region and under current policy is, in effect, extended upon demand to potential domestic users in all parts of the Region. The costs of such extension are only partially borne by the consumer directly benefited. If such policies were to be changed to require the directly benefited consumer to fully pay the costs of extensions necessary to provide service, the impact upon urban development patterns could be substantial, again favoring a more compact settlement pattern. Finally, continued uncertainty with respect to the ability of residents in the Region to finance the purchase of single-family homes, despite personal preferences, may also mitigate against a high probability of implementation for the controlled decentralization plan. Notwithstanding the foregoing, however, the assigned probability of implementation factors to the two alternative land use plans reflect the continued availability of relatively cheap motor fuel, no significant change in private utility extension policies, and the continued ability on the part of a significant portion of the residents of the Region to secure financing for the construction of new single-family homes.

The final result of the application of the rank based expected value method of plan evaluation to the alternative regional land use plans, given these probabilities of implementation, is set forth in Table 264. From this table

Table 264

COMPUTATION OF PLAN VALUES FOR ALTERNATIVE REGIONAL LAND USE PLANS

Alternative Plan	Probability of Implementation	Objective 1 Rank Order Equals 3 Rank Order Value of Plan[a]	Objective 2 Rank Order Equals 2 Rank Order Value of Plan[a]	Objective 3 Rank Order Equals 2 Rank Order Value of Plan[a]	Objective 4 Rank Order Equals 2 Rank Order Value of Plan[a]	Objective 5 Rank Order Equals 1 Rank Order Value of Plan[a]	Objective 6 Rank Order Equals 1 Rank Order Value of Plan[a]	Objective 7 Rank Order Equals 1 Rank Order Value of Plan[a]	Objective 8 Rank Order Equals 1 Rank Order Value of Plan[a]	Plan Value	Rank Order
Controlled Centralization	0.7	1	1	1	2	1	1	1	2	11.2	1
Controlled Decentralization	0.8	1	1	1	1	1	1	1	1	10.4	2

[a] *Based on rank order value as shown in Appendix Table I-1.*

Source: SEWRPC.

it can be seen that the controlled centralization plan has a higher rank order than the controlled decentralization plan despite a slightly lower assigned probability of implementation. This is due to the superiority of the controlled centralization plan over the controlled decentralization plan with respect to meeting two important land use development objectives. Under Objective No. 4, which deals with the proper relationship of new urban development to supporting transportation and utility systems, the controlled centralization plan out-performs the controlled decentralization plan with respect to such standards as the location of urban development where readily serviceable by public sanitary sewer, water supply, and mass transit facilities. Under Objective No. 8, dealing with the perservation of prime and other agricultural lands, the controlled centralization plan again outperforms the controlled decentralization plan with respect to both standards involved. This result indicates that the controlled centralization plan on the whole better meets the regional land use development objectives than the controlled decentralization plan.

Alternative Transportation Plans: With respect to the alternative transportation plans, the Commission staff initially assigned plan implementation probability values of 0.3, 0.5, and 0.7 to the No Build plan, the highway-supported transit system plan, and the transit-supported highway system plan, respectively. These values were changed by the Technical Coordinating and Advisory Committee to reflect probability values of 0.3, 0.5, and 0.7 respectively, when those plans are considered in conjunction with the controlled centralization land use plan; and probability values of 0.2, 0.4, and 0.5, respectively, when those same three types of transportation plans are considered in conjunction with the controlled decentralization land use plan.

In each case, the No Build alternative system plan was given a relatively low probability of implementation by the Commission staff and the Technical Coordinating and Advisory Committee in the belief that arterial street and highway and transit improvements will take place within the Region over the planning period even if major freeway and/or transit facilities are not constructed. Rural and suburban highway facilities not involving substantial displacement particularly of homes, businesses, and industries could be expected to be carried out over the planning period because of the structure of the highway aid system. The Commission staff initially assigned a somewhat higher probability of implementation to the transit-supported highway system plan than the highway-supported transit system plan because it was believed that some freeway elements within the Milwaukee urbanized area will be completed as directed by the Milwaukee County electorate in the November 1974 referendum, whereas the historic record of recommended transit facility and service improvements, including transitway implementation, and the concern over the additional subsidy impact associated with reduced transit fares indicated a lower probability of implementing the highway-supported transit system plan.

In considering this Commission staff recommendation, the Technical Coordinating and Advisory Committee adjusted these probabilities to reflect, with respect to the controlled centralization plan, an equal probability of implementation value for both plans, and with respect to the controlled decentralization plan a slightly lesser probability of implementation value for the highway-supported transit system plan. The consensus of the Committee was that necessary political support for transit improvements and transit subsidies seem to be developing, and that some transit-related improvements, particularly public acquisition of the transit companies in the Region, had taken place reflecting a growing commitment to improved transit facilities and services. In addition, the Committee noted that the extensive dislocation involved in the transit-supported highway system plan would appear to reduce its probability of implementation. Therefore, the two plans were given the same probability of implementation, except under the controlled decentralization plan where the Com-

mittee believed that the reduction of population in the Milwaukee urbanized area would tend to create a slightly lower probability of implementation for the highway-supported transit system plan.

As in the case of the assigned probability of implementation to the alternative land use plans, there are certain factors and forces at work which may affect the relative degree to which each of the transportation system plans may be expected to be implemented. The two most significant such factors are the availability of financial resources to provide continued capital investment in, and operating monies for, the transportation system, and the somewhat uncertain future over the availability of relatively inexpensive motor fuel. The availability of revenues for continued construction and maintenance of the highway system and for the development and operation of transit systems, particularly in competition with other public works and services, is becoming a matter of growing public concern. In addition, while public concern over use of the highway trust fund revenues for broadened transportation uses continues, the availability of such highway user tax revenues may decrease with a reduction in motor fuel use. It should be noted, however, that a reduction in motor fuel consumption would not necessarily be accompanied by a decrease in travel demand or by a decrease in automobile use, since such a reduction could be accomplished by improved efficiency of automobile fuel utilization. Conservation efforts to further reduce motor fuel use could reduce the highway user tax resource, lessening its availability for either highway or transit improvements.

In addition to adjusting initial Commission staff recommendations concerning the values assigned to plan implementation probabilities, the Technical Coordinating and Advisory Committee deliberated at great length over the rank ordering of the transportation development objectives and the rank ordering of the standards supporting each objective. For example, whereas the Commission staff had given a relatively low rank order to that objective dealing with the minimizing of cost and energy use, the Committee assigned that objective a very high rank order.

The final result of the application of the rank based expected value method of plan evaluation to the alternative transportation system plans under each land use plan, given the Committee-assigned probability or implementation, is set forth in Table 265. From this table, it can be seen that the transit-supported highway plan has in each case a higher rank order than the highway-supported transit plan and the No Build alternative plan. Thus, the results of this analysis indicate that the transit-supported highway plan better meets the regional transportation development objectives under either land use plan than the highway-supported transit system plan or the No Build plan. It should be noted in this respect that this end result is the same as that initially determined by

Table 265

COMPUTATION OF PLAN VALUES FOR ALTERNATIVE REGIONAL TRANSPORTATION PLANS

Alternative Plan		Probability of Implementation	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6	Objective 7	Plan Value	Rank Order
			Rank Order Equals 4	Rank Order Equals 4	Rank Order Equals 3	Rank Order Equals 3	Rank Order Equals 2	Rank Order Equals 2	Rank Order Equals 1		
Land Use	Transportation		Rank Order Value of Plan[a]	Rank Order Value of Plan[a]	Rank Order Value of Plan[a]	Rank Order Value of Plan[a]	Rank Order Value of Plan[a]	Rank Order Value of Plan[a]	Rank Order Value of Plan[a]		
Controlled Centralization	No Build	0.3	1	3	1	3	1	1	1	9.9	1
	Highway Supported Transit	0.5	2	1	3	2	3	2	1	19.0	2
	Transit Supported Highway	0.5	3	2	2	1	2	3	1	20.0	3
Controlled Decentralization	No Build	0.2	1	3	1	3	1	1	1	6.6	1
	Highway Supported Transit	0.4	2	2	3	2	3	2	1	16.8	2
	Transit Supported Highway	0.5	3	1	2	1	2	3	1	18.0	3

[a] *Based on rank order values as shown in Appendix Tables I-2 and I-3.*

Source: SEWRPC.

the Commission staff using the initially recommended probability of implementation values and the initially recommended rank ordering or transportation development objectives.

Concluding Remarks—Rank Based Expected Value Method

The application of the rank based expected value method of plan evaluation was utilized by the Commission staff and by the Technical Coordinating and Advisory Committee in the evaluation of the alternative land use and transportation plans. However, the Citizens Advisory Committee, while recognizing the utility of the method, determined that it would not be guided by the results of the method in the plan selection process, but would rather let each individual committee member make his own subjective evaluation based upon the plan comparison and evaluation data presented in the foregoing sections of this chapter. The results of the Committees deliberations are reported later in this chapter.

OVERRIDING CONSIDERATIONS

In Chapter II of this volume it was emphasized that full evaluation of the alternative transportation system plans could not be achieved through application of the development objectives and standards alone, but that six overriding considerations would have to be considered in the full plan evaluation process.

First, it was indicated that each proposed transportation plan must constitute an integrated system. Except for the two "no build" alternative transportation plans, each alternative land use and transportation plan proposed herein meets this requirement since the plan design methodology applied dealt with the transportation elements as an integrated system and incorporated the application of traffic simulation models for quantitative plan test. The traffic simulation models were also applied to the existing 1972 arterial street and highway and transit systems, including the committee improvements to those systems documented herein, in order to quantitatively test the performance of the "no build" alternative plans.

Second, it was indicated that, in addition to application of the development standards, an evaluation of each transportation system plan must be made on the basis of cost in order to determine whether attainment of one or more of the standards is beyond the economic and financial capability of the Region, thereby leading to a possible conclusion that the standards cannot be met practically and must be either reduced or eliminated. Total construction and maintenance cost estimates were prepared for the alternative transportation plans and have been documented, together with a benefit-cost analysis, in a preceding section of this chapter. The conclusion of the cost analyses was that, given a continuation of historic public expenditure patterns within the Region, and given full flexibility to use transportation related public revenues for transit as well as highway capital and operating costs, all of the plans were financially attainable.

Third, it was indicated that it was unlikely that any one plan proposal would meet all of the development standards completely and that the extent to which each standard was met, exceeded, or violated must serve as a measure of the ability of each alternative plan proposal relative to the other plan proposals to achieve the specific objective which the given standard complements. An evaluation procedure was accordingly developed to accommodate this consideration and thereby facilitate the plan evaluation and selection process. This procedure consists of an adaptation of the rank-based expected value method of evaluation applied in corporate decision making, and the results were described in the preceding section of this chapter.

Fourth, it was indicated that certain objectives and standards may be in conflict and require resolution through compromise and that meaningful plan evaluation can take place only through a comprehensive assessment of each of the alternative plans against all of the objectives and standards. Application of the rank-based expected value method of plan evaluation as recorded above assists in achieving this necessary comprehensive assessment, and any compromise necessary to resolve conflicts are accommodated in the ranking of development standards and objectives.

Fifth, it was indicated that the standards must be very judiciously applied to areas or facilities which are already partially or fully developed since strict application might indicate the requirement of extensive renewal for the alternative land use plans through evaluation of those plans against the development standards largely on the basis of the incremental land use proposals, rather than on the basis of the ultimate land use pattern proposed. For the alternative transportation system plans, however, the evaluation was based upon the full ultimate system; and careful consideration was given to the need for facility reconstruction.

Finally, it was indicated that an overall evaluation of each proposed land use and transportation plan combination must be made with regard to its effect on ambient air quality in southeastern Wisconsin. Such an analysis was made as part of the concurrent planning effort by the Commission to prepare a regional air quality maintenance plan and the results of that analysis are reported in the subsequent section of this chapter.

AMBIENT AIR QUALITY ANALYSES

Under the initial regional land use-transportation study, the Commission had prepared estimates of the relative amounts of air pollutants produced by alternative transportation systems and used these estimates in a relative manner in its evaluation of alternative plan proposals. The effect of such emissions on ambient air quality, however, was not considered. Rather than simply intensifying the study of air pollution under the continuing regional land use-transportation study by evaluating the impact on ambient air quality of the alternative regional transportation plans, the Commission determined to mount

a comprehensive regional air quality maintenance planning program that would include consideration of all point, line, and area sources of pollution and relate such sources to land use, as well as to transportation system development, thereby not only meeting federal requirements for the evaluation of the impacts on ambient air quality of alternative regional transportation plans, but also federal requirements for the preparation of a comprehensive regional air quality maintenance plan for the seven-county Southeastern Wisconsin Region.

The discussion presented herein of the regional ambient air quality analyses conducted under the concurrent regional air quality maintenance planning program represents only a brief and preliminary summary drawn from the documentation provided in a companion planning report presently under preparation.[7] This companion planning report will provide full documentation of the inventory data, forecast techniques, and analytical results employed in reaching the conclusions presented herein.

Regional Ambient Air Quality—
Base Line 1973 and Projected 2000 Levels

At the present time there are six pollutant species for which federal and state air quality standards have been promulgated: particulate matter, sulfur oxides (measured as sulfur dioxide), carbon monoxide, nitrogen dioxide, hydrocarbons, and photochemical oxidants. A primary standard has been promulgated for each pollutant which specifies the maximum concentration of the pollutant that should be permitted to occur in the ambient air in order to protect human health. A secondary standard has also been promulgated for each pollutant which specifies the maximum concentration of the pollutant that should be permitted to occur in the ambient air in order to protect animal and plant life and property from damage. Together, attainment of the primary and secondary standards are deemed essential to the protection of the public health, safety, and welfare from known or reasonably anticipated adverse effects of a particular air pollutant.

The national ambient air quality standards are set forth in summary form in Table 266. These standards were developed on the basis of experimental and observational data which recognized that each pollutant, due to its particular chemical composition and physical characteristics, produces a different response at varying levels of concentration in the organism into which it may be introduced. Accordingly, ambient air quality must be examined from the standpoint of identifying the sources and resultant ambient air concentrations of each pollutant specie considered individually.

In order to be able to forecast the ambient air concentrations of each pollutant in the plan design year of 2000 under the land use and transportation system development assumptions contained in each alternative regional land use-transportation plan combination, it was first necessary to establish emissions and the attendant ambient air concentrations of each pollutant for a base year. The selected base year was 1973 for all pollutants except sulfur dioxide. Since reliable air quality monitoring data for sulfur dioxide were not available until 1976, that year was selected as the base year for this pollutant species. The base year emission inventories were conducted in accordance with procedures set forth in a series of staff memoranda approved by the SEWRPC Technical Coordinating and Advisory Committee on Regional Air Quality Maintenance Planning.[8] These inventory procedures followed approved U. S. Environmental Protection Agency guidelines and procedures. The ambient air quality concentration of each pollutant was determined by utilizing the base year emissions inventory as input to an ambient air quality simulation model developed for the Commission by the University of Wisconsin-Madison. This model is described in summary form in Chapter IV of this volume and in greater detail in SEWRPC Planning Report No. 28. The model was then used to simulate base year conditions with respect to each pollutant species and calibrated against measured ambient air quality at selected locations through the Region. The ambient air quality simulation model thus becomes the singularly most important analytical device for relating regional land use and transportation plans to regional air quality maintenance plans. The model provides the means by which pollutant concentrations in the atmosphere can be calculated given various sets of meteorological conditions and pollutant emissions attendant to alternative patterns of land use and transportation system development.

The following sections provide a brief description of of the six pollutant species for which federal and state standards have been established. In addition, the following sections present the results of the ambient air quality simulation model application for the base year and for the plan design year 2000 alternative regional land use and transportation plans.

Particulate Matter

Particulate matter consists of very small particles of solid matter, such as soot, dust, and fly ash which may be temporarily suspended in the atmosphere. The particulate matter may be accompanied by bacteria, viruses, pollens, and spores. Particulate matter may be corrosive and irritating in nature and may thereby cause and aggravate various human disorders and damage the respiratory system. Some particulates, such as poisonous metals, may be toxic, and others, such as asbestos, may

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[7] *See SEWRPC Planning Report No. 28, A Regional Air Quality Maintenance Plan for Southeastern Wisconsin.*

[8] *See Regional Air Quality Maintenance Planning Program Staff Memoranda No. 2, "Inventory—Ambient Air Quality"; No. 3, "Inventory—Point Source Emissions"; No. 4, "Inventory—Area Source Emissions"; and No. 5, "Inventory—Line Source Emissions."*

Table 266

SUMMARY OF NATIONAL AMBIENT AIR QUALITY STANDARDS ISSUED APRIL 30, 1971, AND REVISED SEPTEMBER 15, 1973

Pollutant	Period of Measurement or Calculation	Concentration (Weight of Pollutant per Cubic Meter of Ambient Air Corrected to 25°C and 760 mm of Hg)	
		Primary Standard	Secondary Standard
Particulate Matter (PM)	Annual (Geometric Mean) 24 hour	75 μg 260 μg[a]	60 μg 150 μg[a]
The primary sources of particulate matter are industrial processes, power generation, and space heating. The primary and secondary standards have been exceeded in the Region.[b]			
Sulfur Oxides (SO_x) (measured as sulfur dioxide)	Annual (Arithmetic Mean) 24 hour 3 hour	80 μg (0.03 ppm) 365 μg (0.14 ppm)[a] --	-- -- 1,300 μg (0.5 ppm)[a]
The primary sources of sulfur oxides are industrial processes, power generation, and space heating. The status of sulfur dioxide levels in the Region is unknown at the present time.			
Carbon Monoxide (CO)	8 hour 1 hour	10 mg (9 ppm)[a] 40 mg (35 ppm)[a]	Same as Primary Same as Primary
The primary source of carbon monoxide is gasoline-powered motor vehicles. The 8 hour primary air quality standard has been exceeded in the Region.			
Hydrocarbons (HC) (nonmethane measured as methane)	3 hour (6 A.M. to 9 A.M.)	160 μg (0.24 ppm)[a]	Same as Primary
The primary source of hydrocarbons is gasoline-powered motor vehicles. From a limited amount of hydrocarbon air quality data taken by a mobile monitoring van situated in Kenosha County during the summary of 1975 violations in the hydrocarbon standard have been shown to occur.			
Nitrogen Dioxide (NO_2)	Annual (Arithmetic Mean)	100 μg (0.05 ppm)	Same as Primary
The primary sources of nitrogen dioxide are gasoline-powered motor vehicles, industrial processes, power plants, and space heating. The status of nitrogen dioxide levels in the Region is unknown at the present time.			
Photochemical Oxidants (O_x) (measured as ozone)	1 hour	160 μg (0.08 ppm)[a]	Same as Primary
The primary sources of pollutants which contribute toward the formation of ozone are gasoline-powered motor vehicles and industrial processes. The primary air quality standard has been exceeded in the Region.			

[a] *Concentration not to be exceeded more than once per year.*

[b] *Although exceedances of the air quality standards have been monitored and continue to be observed, ambient air particulate matter levels declined between 1970 and 1975.*

Source: Code of Federal Regulations Title 40, Part 50, 1973.

be carcinogenic. Particulate matter may also soil and corrode buildings and other real and personal property, damage clothing, injure plants, and contribute to soil and water pollution.

In the base year 1973, concentrations of particulate matter in the atmosphere of the Region were recorded that exceeded both the primary and secondary annual and 24-hour standards. The highest annual average particulate concentration monitored during 1973 was 121 micrograms per cubic meter (geometric mean) recorded at the ambient air quality monitoring station located at 1750 S. Kinnickinnic Avenue in the City of Milwaukee, a concentration about 60 percent above the primary annual standard and about 100 percent above the secondary annual standard. In addition, available monitoring data from the 35 particulate matter monitoring sites operated in the Region during 1973 indicated that the concentration of particulates in the ambient air at seven other locations exceeded the primary and secondary annual average standards, six in Milwaukee County and one in Racine County; and that the concentration at two additional locations exceeded only the secondary annual average standard, one in Milwaukee County and one in Kenosha County.

The highest and second highest monitored 24-hour average particulate concentrations were 463 and 458 micrograms per cubic meter recorded at stations located at 1040 W. Canal Street and 330 E. Greenfield Avenue in the City of Milwaukee, respectively. The 24-hour primary and secondary standards for particulate matter may not be exceeded more than once annually. It is, therefore, the second highest measured value which must be compared to the standard. The second highest concentration was about 76 percent above the primary standard (260 micrograms per cubic meter) and 200 percent above the secondary standard (150 micrograms per cubic meter). Concentrations exceeding the primary and secondary 24-hour average particulate matter standards are generally to be expected when the annual average standards are exceeded at a monitoring location. In total during 1973 particulate matter concentrations in excess of the primary standard were recorded on 38 days at six different monitoring locations within the Region. Particulate matter concentrations above the secondary 24-hour standard but below the primary 24-hour standard were recorded on 169 days at 15 different monitoring locations.

A base year inventory was conducted of particulate matter emissions, as well as of sulfur oxide, carbon monoxide, nitrogen oxides, and hydrocarbon emissions by point, area, and line sources. For the purposes of the regional air quality maintenance planning program, point sources were defined as large discrete sources, such as stacks associated with industrial operations; line sources were defined as transportation related emission sources, predominantly motor vehicles operating over arterial streets and highways; and area sources were defined as the aggregation of the many small, highly diffused sources of emissions, such as residential space heating, agricultural tilling operations, and recreational power boat operations, which may not individually be major contributors of pollution but which may collectively have a significant impact on ambient air quality.

The air quality simulation model was used with the base year emissions inventory to determine the resultant average annual and the record worst case average 24-hour ambient air concentrations under the meteorological conditions which occurred during 1973. The meteorological data which served as input to the air quality simulation model consisted of the relative frequency of wind speed and direction for each Pasquill stability class[9] as determined from observations taken at three-hour intervals during 1973 at the National Weather Service Station located at General Mitchell Field in Milwaukee County, and a fixed mixing height[10] for each stability class determined by the University of Wisconsin-Madison, Air Quality Modeling Group.

The resulting simulated particulate matter concentrations were found to be consistently somewhat below the levels actually monitored in the Region. The difference between the monitored levels and the simulated levels may be attributed to the presence of particulate matter from the following four sources: the transformation of gaseous aerosols in the atmosphere to particles through coalescence or condensation; the transportation of particulate matter into the Region from extra-regional sources by the prevailing wind patterns; naturally occurring background particulate concentrations which would exist even if all present human activities within the Region were eliminated; and emissions unaccounted for in the point, line, and area source emissions inventory due to limitations in the inventory methodology itself. Based upon an analysis of particulate matter levels monitored at remote locations in the state, it was estimated that about one-third of the differences in the measured and simulated particular concentrations may be attributed to the naturally occurring atmospheric levels and processes, and the remaining two-thirds to the transport of particulate matter from extra-regional sources and to the limitations of the emissions inventory itself.

The estimated annual average concentrations of particulate matter in the Region for the base year 1973 are shown on Map 41. From this map it can be seen that the primary and secondary particulate matter standards

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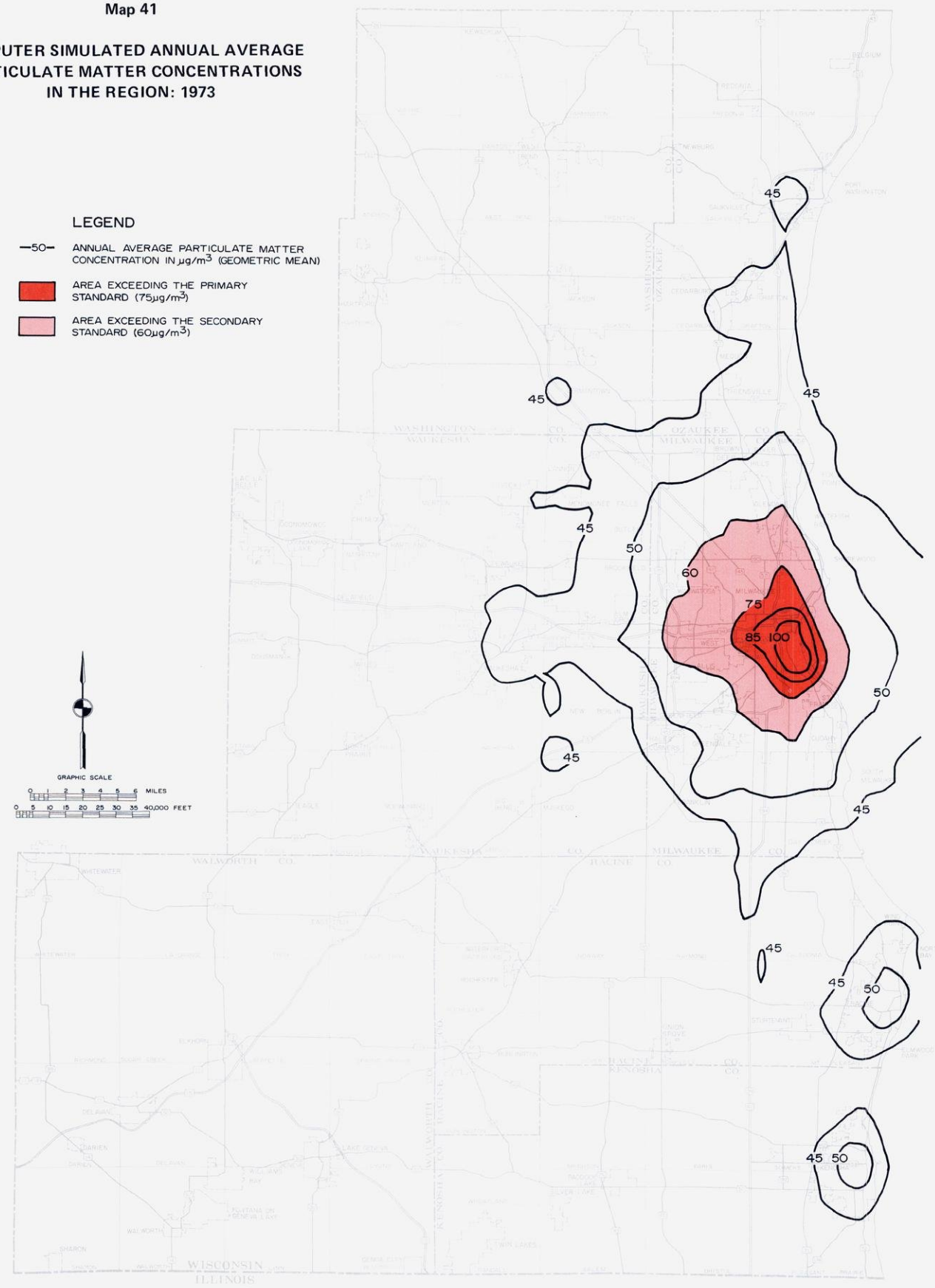
[9] *The Pasquill stability class index (Dr. F. Pasquill-British Meteorologist) is calculated from: total cloud cover, the height of the cloud ceiling, wind speed, and the amount of sunlight received at the earth surface. The index is a measure of turbulence in the lower atmosphere broadly categorized as an unstable (turbulent), neutral, or stable condition.*

[10] *The mixing height defines the vertical extent to which pollutants may be transported upward in the atmosphere due to mechanical or thermal transfer.*

Map 41

COMPUTER SIMULATED ANNUAL AVERAGE PARTICULATE MATTER CONCENTRATIONS IN THE REGION: 1973



As evidenced by the above map, in 1973 the highest annual average particulate matter concentrations in the Region were experienced in Milwaukee County. During this year, the primary air quality standard for particulate matter—75 $\mu g/m^3$ annual geometric mean—was exceeded over an approximately 25 square mile area, while the secondary standard—60 $\mu g/m^3$ annual geometric means—was exceeded over an additional approximately 87 square mile area.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

were exceeded in 1973 only in central Milwaukee County. The area identified on Map 41 as exceeding both the primary and secondary standards is centered over the Menomonee River Valley, extending as far north as Hampton Avenue, as far west as 76th Street, and as far south as Howard Avenue. The area identified as exceeding only the secondary standard extends as far north as Silver Spring Drive, as far west as Mayfair Road, and as far south as Layton Avenue.

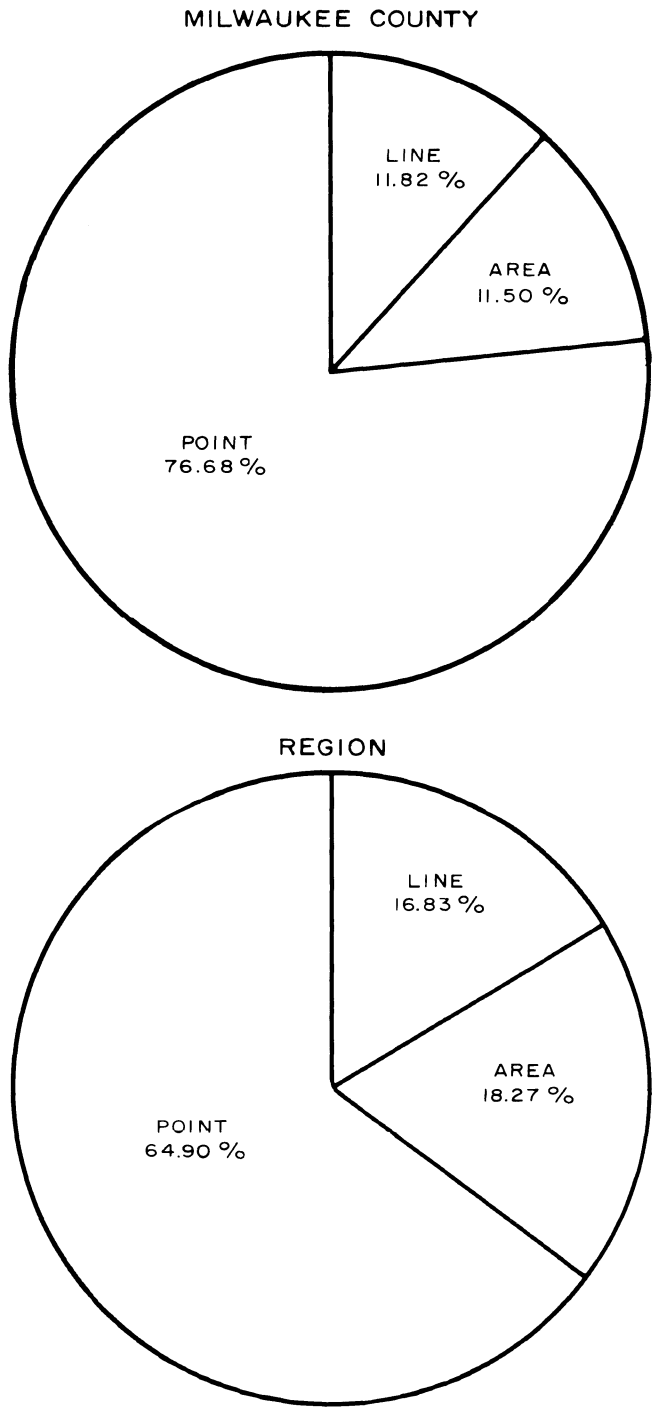
It is interesting to examine the relative contributions of point, line, and area sources to the estimated particulate matter concentrations. Data from the monitoring station located in the central business district of the City of Milwaukee, indicated that the total annual arithmetic mean concentration of particulate matter in 1973 was 96 micrograms per cubic meter, or approximately 83 micrograms per cubic meter on a geometric average annual basis. The relative contribution from each categorical pollutant source in the base year to the ambient air concentration at this station was estimated as follows: point sources, about 12 percent; line sources, about 25 percent; area sources, about 25 percent; and background, atmospheric, and extra-regional sources, about 38 percent. This example is only for one station and the relative contributions from each source category may vary from site to site depending on its proximity to a large point source, a major highway, or some other dominating pollutant emission source.

It should be noted that, although the simulated area and line source concentrations together account for about 50 percent of the monitored particulate matter concentrations, while point sources account for only 12 percent, the relative amount of particulate matter emissions from each of the three inventoried source categories do not occur in the same proportion. As can be seen in Figure 40, point sources produced nearly 77 percent of the particulate matter emissions in Milwaukee County in 1973, while area and line sources accounted for slightly more than 23 percent. For the Region as a whole, point sources produced approximately 65 percent of the total particulate matter emissions compared with 18 and 17 percent for area and line sources, respectively. The reason that point sources do not influence the ambient air concentrations of particulate matter to the same degree as the area and line sources is that the emissions from point sources are generally introduced into the atmosphere through tall stacks, and thereby dispersed over a much greater distance and through a larger volume of air before influencing air quality at ground levels.

Following establishment of the base year level of particulate matter pollution, the ambient air quality simulation model was utilized to determine the potential impact on particulate matter pollution of the six alternative combination regional development plans. Based on these regional development alternatives, one point source, two area source, and six line source emission forecasts were developed for particulate matter, as well as for the other four primary pollutant species. These emission forecasts

Figure 40

RELATIVE CONTRIBUTION OF PARTICULATE MATTER EMISSIONS FROM POINT, AREA, AND LINE SOURCES IN MILWAUKEE COUNTY AND THE REGION: 1973



Source: SEWRPC.

were then utilized as input to the simulation model and the model used to estimate average annual particulate matter concentrations in the year 2000 under each alternative plan combination. The best available technology was used in the projection of point source pollutant emissions. In the case of forecasting electrical energy demand and subsequent emissions from power plants, however, the generation capacity of such facilities within the Region, both existing and projected, was somewhat lower than the total demand forecast for the year 2000. It was assumed that the difference between the supply and demand forecasts would be made up through such measures as the purchase of electrical power from outside the Region and conservation techniques. The regional air quality maintenance planning program is also undertaking an examination of alternative energy forecasts, other than the "existing trend" in fuel type and use as incorporated into the present forecast, and of the resultant probable impacts on air quality.

The results of the simulation modeling effort for the year 2000 indicated that continued violations of the annual primary and secondary particulate matter standards could be expected to occur in portions of Milwaukee County. The similarity of the estimated year 2000 concentrations among the six development alternatives is such as to indicate that particulate pollution must be addressed regardless of the alternative land use or transportation plan selected. In fact, the results are strikingly similar for all plans considered. In order to illustrate the similarity of the six development alternatives, ambient air quality data attendant to two plans—the controlled centralization land use plan with the transit-supported highway plan and the controlled decentralization land use plan with the highway-supported transit plan—are presented herein. These two plans represent the maximum variation between all of the alternative plan combinations considered with respect to population distribution and transportation movements, and thus the extremes with respect to the potential effects on ambient air quality. Because such problems could be expected to occur only in subareas of the Region, areal refinements of any land use and transportation plans for Milwaukee County may be called for.

The estimated average annual particulate matter concentrations in the atmosphere of the Region under conditions representing the controlled centralization land use plan and the transit-supported highway plan are shown on Map 42. As can be seen, the primary and secondary particulate matter standards can be expected to be violated over central Milwaukee County, with the area centering again on the Menomonee River Valley and extending as far north as Capitol Drive, as far west as 76th Street, and as far south as Cleveland Avenue. The area in which only the secondary standard would be exceeded would be as far north as Silver Spring Drive, as far west as Mayfair Road, and as far south as Grange Avenue. A similar pattern emerges under development conditions set forth in the controlled decentralization land use plan and the highway-supported transit plan (see Map 43). Although not reproduced herein, the remaining maps representing the four other alternative development combinations exhibit very similar results lying between the two extremes presented.

The area in Milwaukee County which presently experiences and is forecast to experience violations in the primary and secondary annual particulate matter standards is densely populated. The residents in this area depend heavily on the central business district and its fringe area for employment. They also represent that segment of the regional population that may best avail themselves of public transportation. The maximum utilization which can be reasonably expected of mass transit facilities, however, does not appear to appreciably reduce ambient air particulate matter concentrations over the County as may be seen from a comparison of Maps 42 and 43. It is evident, therefore, that additional air pollution control measures will have to be implemented if the ambient air quality particulate matter standards are to be achieved and maintained.

Accordingly, it will be necessary under the regional air quality maintenance planning program to develop additional air pollution control strategies for particulate matter for central Milwaukee County irrespective of what combination of regional development alternatives emerge as the final recommended regional land use and transportation plans. Such strategies could include but need not be limited to the control of fugitive dust from unpaved private roads and parking lots in the heavily industrialized Menomonee River Valley; the control of fugitive dust from coal, stone, salt, and other open aggregate storage piles; the enforcement of more stringent emission standards on the effluent produced by industrial processes; and the control of road dust from public arterial and nonarterial streets and highways through a program of street cleaning and washing. Each of the possible air pollution control strategies is being tested and evaluated as a part of the regional air quality maintenance planning program.

Carbon Monoxide

Carbon monoxide is a toxic pollutant because it combines with the hemoglobin of the blood in such a manner as to reduce the oxygen carrying ability of the bloodstream. Exposure to excessive levels of carbon monoxide may aggravate coronary vascular disease and may cause headaches, impaired reactions, and death. The air quality standards for carbon monoxide are measured in milligrams per cubic meter rather than micrograms per cubic meter as for the other pollutants. Two standards have been established, one for an eight-hour average (10 milligrams per cubic meter) and a second for a one-hour average (40 milligrams per cubic meter). In the case of this pollutant specie the primary and secondary standards are identical.

Carbon monoxide monitoring was initiated in the Southeastern Wisconsin Region in July 1973 when seven monitoring stations, six in Milwaukee County and one in Racine County, were placed into operation. The highest eight-hour average carbon monoxide concentration

recorded during the period from July 1973 through June 1974 was 11 milligrams per cubic meter at the station located at 606 W. Kilbourn Avenue, in the central business district of the City of Milwaukee, a level only slightly in excess of the standard. The highest one-hour concentration of carbon monoxide recorded over the same monitoring period was 31 milligrams per cubic meter recorded at the monitoring station located at 1225 S. Carferry Drive on Jones Island in the City of Milwaukee. This concentration level is below the maximum permitted under the standard.

The results of applying the ambient air quality simulation model to the Region for the base year 1973 given the results of the emissions inventory and assuming adverse meteorological conditions are shown on Map 44. The eight-hour average standard for carbon monoxide in 1973 was violated in only a very small area of the Region, in the central portion of Milwaukee County. The maximum concentration within this area was estimated to be 23 milligrams per cubic meter. The large difference between the computer simulated 8-hour maximum carbon monoxide concentration and the actual monitoring data from the station on Kilbourn Avenue may be attributed to the fact that the simulation model is intended to estimate the concentrations over a large area while a particular monitoring site can only sample the air at a single location. The monitoring site may, therefore, be removed from the point at which the maximum concentration would occur. Also, the monitoring stations are elevated approximately 30 feet above ground whereas the simulated concentrations are for ground level receptors. These concentrations must be attributed primarily to emissions from line and area sources, since carbon monoxide emissions from point sources are negligible. Similarly, the area of the Region in which the maximum one-hour average carbon monoxide standard in the Region in 1973 was exceeded is shown on Map 45. This area is quite small and is located slightly north and west of the Milwaukee central business district. Within this area the highest concentration level was estimated at 76 milligrams per cubic meter, approximately twice the maximum permitted under the standard. As with the difference in the 8-hour maximum carbon monoxide concentrations between the computer simulated value and the monitored value, the calculated maximum 1-hour carbon monoxide concentration does not correspond in location to the monitoring station on Jones Island.

The U. S. Environmental Protection Agency has issued regulations limiting the amount of pollutants, including carbon monoxide—which may be produced by motor vehicles. It is quite likely, however, that these emission factors will be revised in the near future for three reasons: current legislation allows for limited time extensions for achieving the statutory motor vehicle emission standards; Congressional action changing the time table for achieving these standards or making them less stringent is expected; and new data on the existing emission control devices, such as catalytic converters, is becoming available and may influence decisions as the acceptance of such devices or the development of new control measures. The carbon monoxide emission factors used in the regional air quality maintenance planning program for projecting the line source emissions relied on the best available and most current data.

Motor vehicle emission factors have been developed for each vehicle model year between 1966 and 1990 which consider vehicle age, vehicle type—light duty gasoline, heavy duty gasoline, and heavy duty diesel—operational mode, and adjustments for speed and ambient air temperature. On the basis of current vehicle pollution emission control regulations which have been used in developing the projected levels of carbon monoxide emissions, carbon monoxide emission may be expected to be reduced 80 percent below current levels because motor vehicle operation represents the greatest source of carbon monoxide. Any subsequent reduction in the stringency of emission control regulations now in force may result in a corresponding increase in carbon monoxide levels above the levels projected in the regional air quality maintenance planning program.

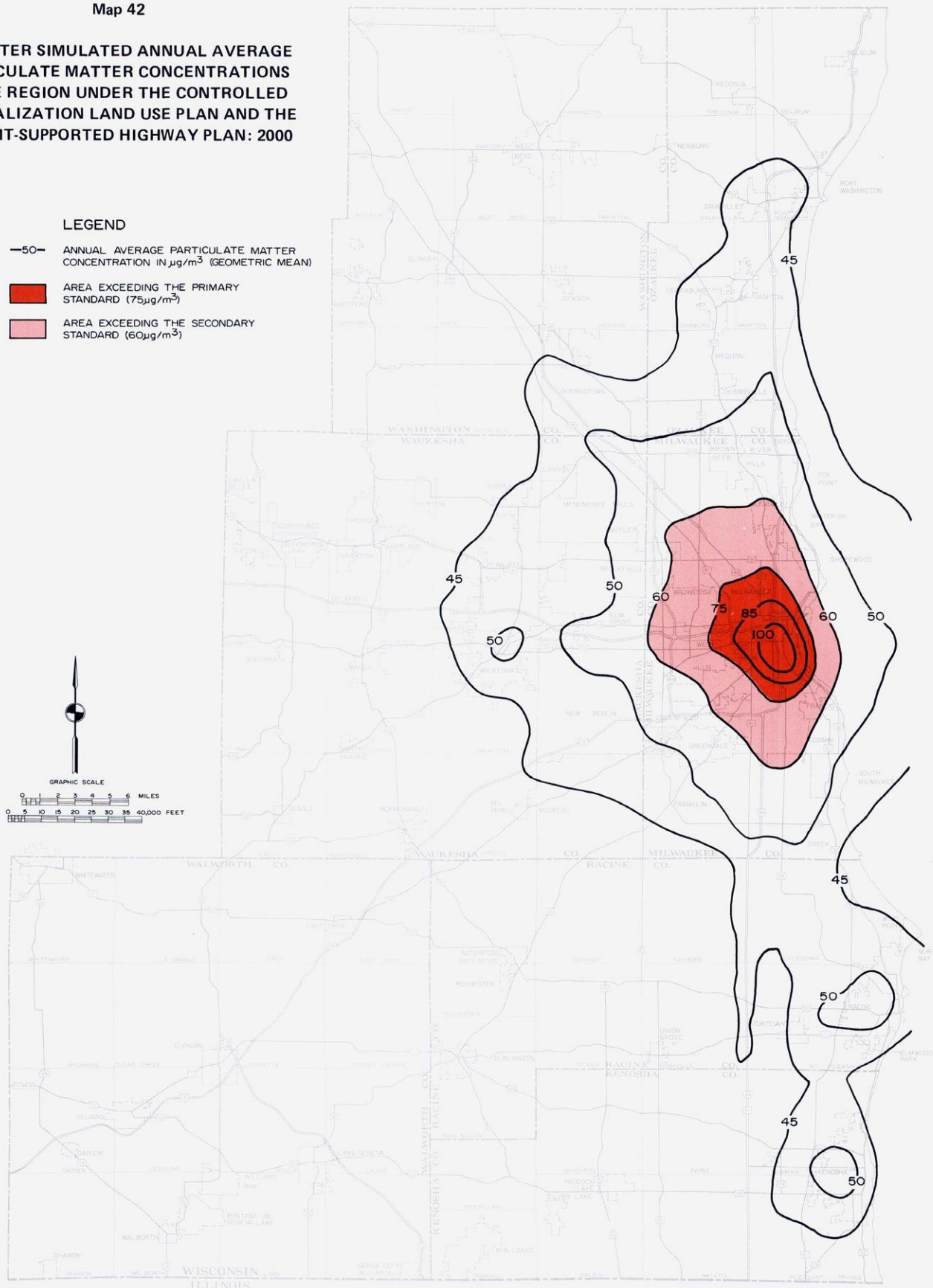
Based upon the assumption that existing emission control regulations will be maintained, the ambient air quality simulation model application indicates that the concentrations of carbon monoxide in the atmosphere of the Region may be expected to be reduced to well below the established eight-hour and one-hour standards with no significant difference indicated among the various plan combinations. Accordingly, carbon monoxide pollution cannot be a significant factor in selecting from among the alternative regional land use and transportation plans.

Nitrogen Dioxide, Hydrocarbons, and Photochemical Oxidants

Oxides of nitrogen may react in the atmosphere to form nitric acid, which may cause or contribute to respiratory disorders and which is harmful to plant life. Nitrogen dioxide exerts its primary toxic effect on the lungs. Oxides of nitrogen may also react with sodium, potassium, or other metals to form soluble nitrates which, when washed out of the atmosphere by rain, may contribute to the fertility of surface waters and thereby to surface water pollution. Absorption of ultraviolet light energy by nitrogen dioxide results in its dissociation into nitric oxide and free oxygen atoms. These oxygen atoms react with the atmospheric oxygen to form ozone. A small portion of the oxygen atoms and ozone react also with certain hydrocarbons to form radical intermediates and various chemical compounds. In a very complex manner, the free radical intermediates and ozone react with the nitric oxide produced initially. One result of these reactions is the very rapid oxidation of the nitric oxide to nitrogen dioxide and an increased concentration of ozone. Hydrocarbons, through photochemical reaction in the atmosphere as described above, contribute to the formation of "smog" of which ozone is a component. Ozone is a lung and eye irritant and may act to suppress the capacity of the body to combat infection. Eye irritation is one of the most frequent air pollution complaints. Ozone may also attack and deteriorate certain materials such as rubber.

Map 42

COMPUTER SIMULATED ANNUAL AVERAGE PARTICULATE MATTER CONCENTRATIONS IN THE REGION UNDER THE CONTROLLED CENTRALIZATION LAND USE PLAN AND THE TRANSIT-SUPPORTED HIGHWAY PLAN: 2000

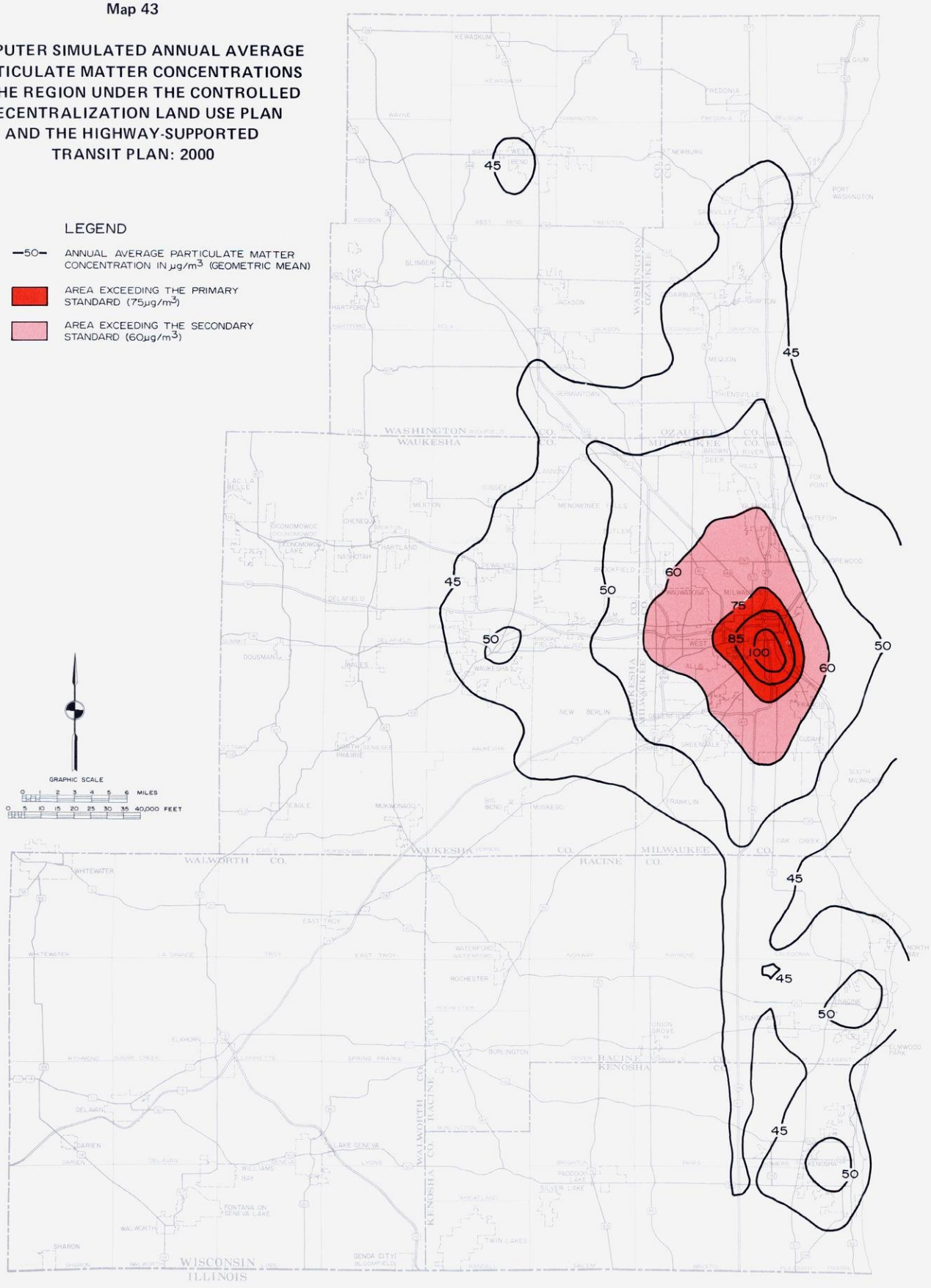


Forecasts to the year 2000 of annual average particulate matter concentrations indicate that both the primary and secondary air quality standards for this pollutant may be expected to be exceeded within the Region under the controlled centralization land use plan and the transit-supported highway plan. The area within which the primary annual average air quality standard may be expected to be exceeded was confined to essentially the same approximately 25 square mile area of Milwaukee County in which the standard was exceeded in 1973. The area forecast to exceed the secondary annual average particulate matter air quality standard increased from about 87 square miles in 1973 to approximately 107 square miles by the year 2000.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

Map 43

COMPUTER SIMULATED ANNUAL AVERAGE PARTICULATE MATTER CONCENTRATIONS IN THE REGION UNDER THE CONTROLLED DECENTRALIZATION LAND USE PLAN AND THE HIGHWAY-SUPPORTED TRANSIT PLAN: 2000

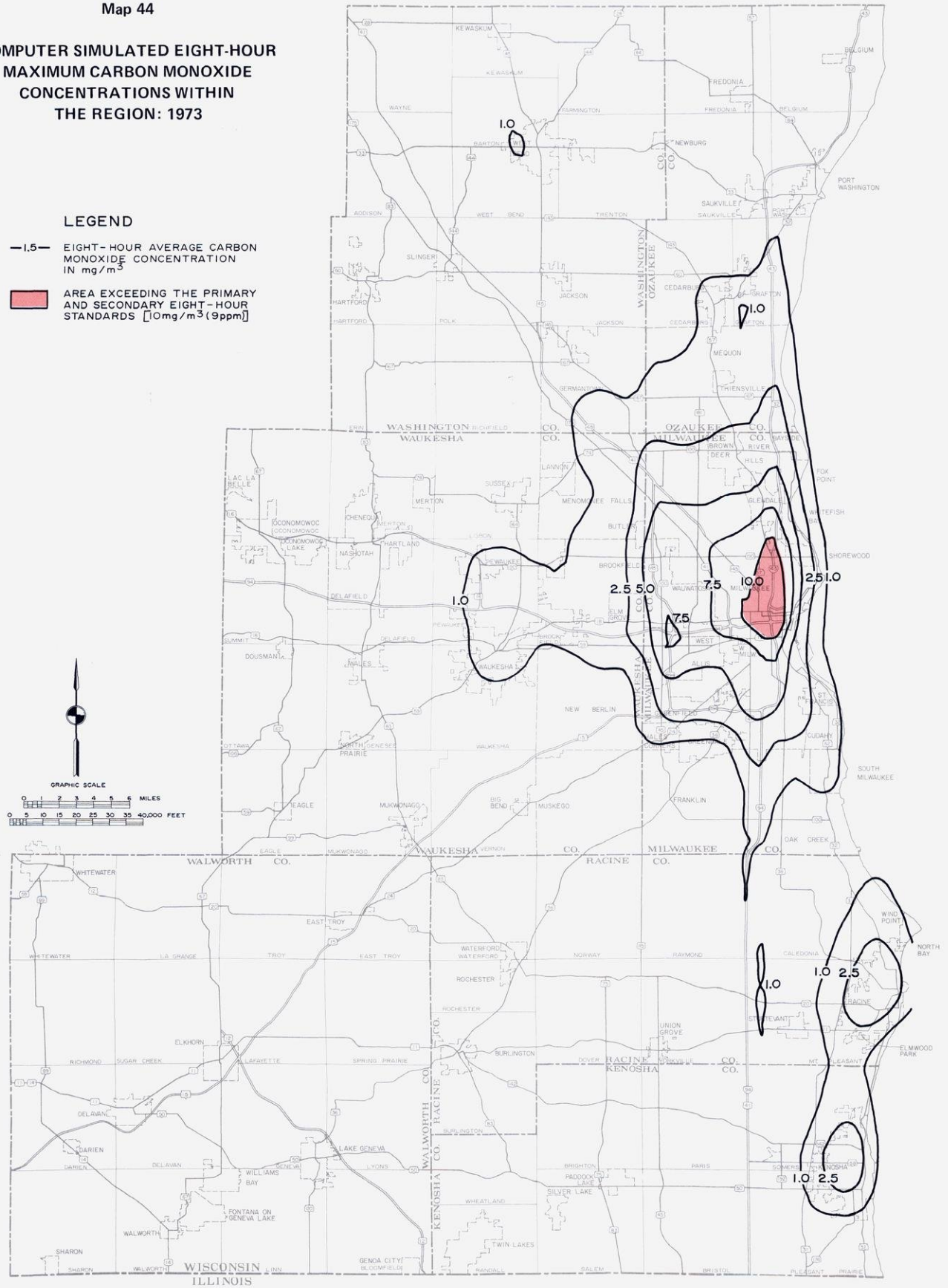


Simulation model studies indicate that the magnitude and areal extent of particulate matter pollution in the Region would not differ appreciably under any of the various combinations of alternative regional land use and supporting transportation system plans considered. This finding is illustrated by comparing Map 43 with Map 42. The areas in which the primary and secondary air quality standards for particulate matter may be expected to be exceeded are over areas which cover essentially the same geographic extent on both maps.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

Map 44

COMPUTER SIMULATED EIGHT-HOUR MAXIMUM CARBON MONOXIDE CONCENTRATIONS WITHIN THE REGION: 1973

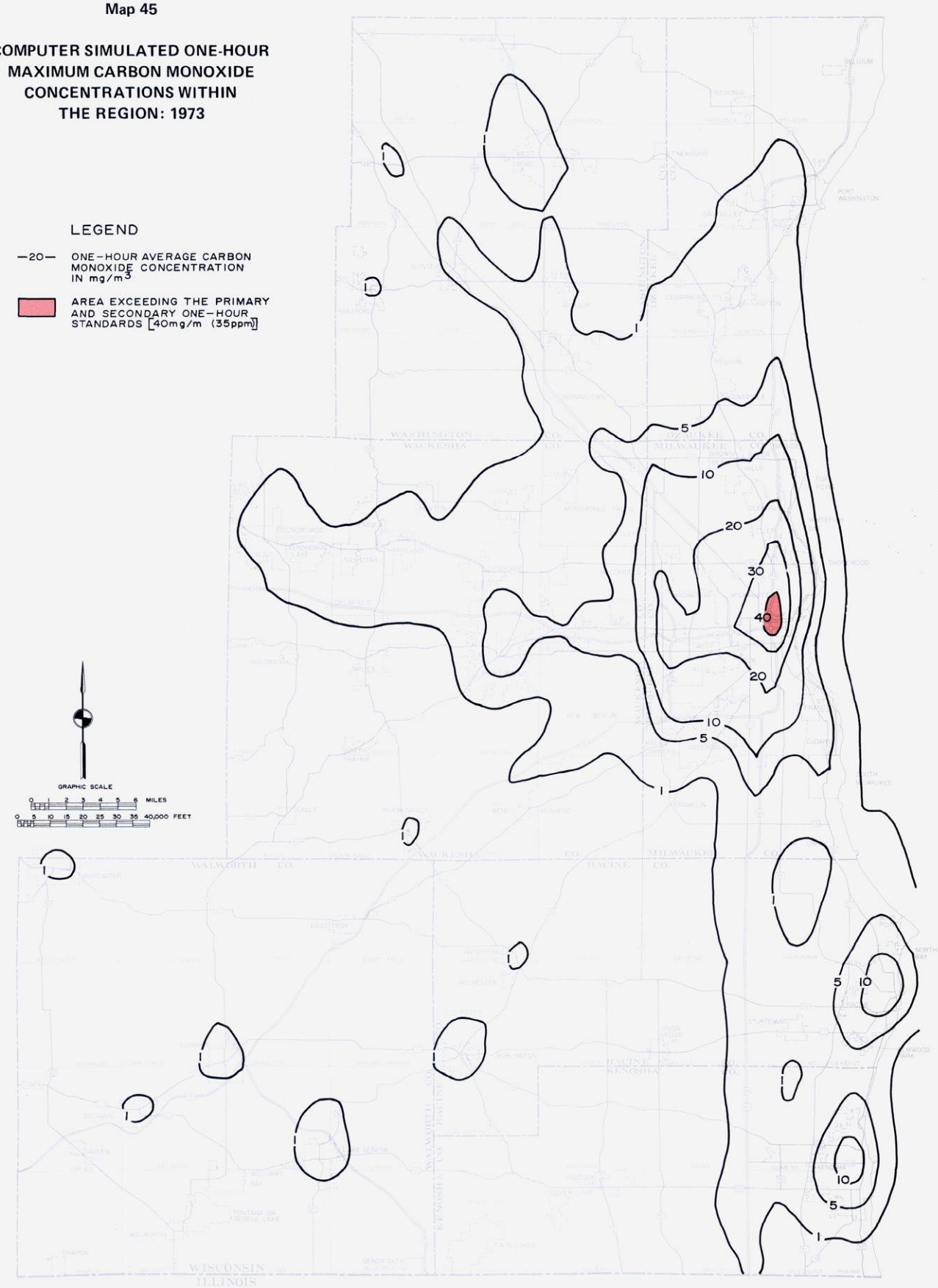


The isopleths of carbon monoxide concentrations shown on the above map represent the maximum eight-hour average of this pollutant which were estimated to have been experienced under the most adverse meteorological conditions during 1973. The eight-hour period for which the conditions are represented on this map is from 5:00 a.m. to 1:00 p.m. on a weekday, a period of heavy traffic flow, and the meteorological conditions are those of a light southerly wind (two meters per second or about four miles per hour). Under these conditions, the eight-hour ambient air quality standard for carbon monoxide may be expected to be exceeded in a nine-square mile area in central Milwaukee County.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

Map 45

COMPUTER SIMULATED ONE-HOUR MAXIMUM CARBON MONOXIDE CONCENTRATIONS WITHIN THE REGION: 1973



Maximum one-hour carbon monoxide concentrations in the Region may be expected to occur on a weekday between 7:00 and 8:00 a.m., when traffic volumes are heavy, and under the most adverse of meteorological conditions. Based on these "worst case" conditions, an area of approximately two square miles in and around the central business district of the City of Milwaukee may be expected to exceed the one-hour carbon monoxide air quality standard of 40 mg/m^3.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

The primary and secondary ambient air quality standards for nitrogen dioxide are identical at 100 micrograms per cubic meter on an average annual basis. At the present time this standard is under review by the U. S. Environmental Protection Agency and may be revised in the near future in order to relate the standard more closely to the atmospheric processes which produce ozone. Monitoring of oxides of nitrogen was discontinued in 1972 due to poor reliability of the measurement method used. Testing of a new method began in 1974.

In an effort to depict the generalized concentrations of nitrogen oxides in the ambient air over the Region in a manner suitable for direct comparison with hydrocarbon concentrations, the base year nitrogen oxide emissions were simulated by application of the ambient air quality simulation model to determine a 6:00 a.m. to 9:00 a.m. average under unfavorable meteorological conditions, represented by a clear summer day with light winds (2 meters per second) and a mixing height of 1,000 meters. Although a mixing height of 1,000 meters does not necessarily represent an unfavorable meteorological condition, the computer simulation model results are not noticeably affected by lowering the mixing height below this value. The results of this analysis are shown on Map 46. This analysis must be used with caution since it does not provide a direct comparison with the established standard. The analysis does, however, indicate the areas where the concentrations are relatively higher or lower and can be used, therefore, as a measure of the relative change in concentration levels which can be expected to occur between the base year and the plan design year under each of the alternative plan combinations.

Estimated ambient air nitrogen oxide concentrations in the Region for the 6:00 a.m. to 9:00 a.m. period for the controlled centralization land use plan and the transit-supported highway system plan are shown on Map 47. Map 48 presents similar results for the controlled decentralization land use plan and the highway-supported transit system plan. From these two maps, it is evident that no significant differences in the ambient air concentrations of nitrogen oxide may be expected between these two alternative plan combinations. While not reproduced herein, a similar conclusion was reached from the model results of the remaining alternative plan combinations. Comparison of the plan design year 2000 levels shown on Maps 47 and 48 with those for the base year shown on Map 46 indicates that the concentration of nitrogen oxides may be expected to be reduced over the plan design period, and that the nitrogen dioxide standard is unlikely to be exceeded within the Region in the year 2000.

Although some sampling of ambient air concentrations of hydrocarbons was undertaken during 1975, insufficient monitoring data exists with respect to this pollutant to indicate whether or not the primary and secondary standard of 160 micrograms per cubic meter between 6:00 a.m. and 9:00 a.m. is currently exceeded throughout the Region, or just at a single location. It is possible, however, through the use of the simulation model to examine the relative concentration of this pollutant in the atmosphere. The results of the application of the model to base year 1973 emissions under the same meteorological conditions as for nitrogen oxides are shown on Map 49. Those areas exceeding the standard in the base year include much of Milwaukee County, portions of the Cities of Kenosha and Racine, and small portions of Waukesha and Washington Counties. In comparison, Maps 50 and 51 present the results of the application of the simulation model to the controlled centralization land use plan and transit-supported highway system plan and to the controlled decentralization land use plan and highway-supported transit system plan, respectively. These maps indicate that a general reduction in hydrocarbon concentrations may be expected to be achieved by the year 2000. However, hydrocarbon concentration levels could be expected to continue to exceed the standard in small subareas of the Region.

The anticipated reduction in hydrocarbon levels may be attributed to the stringent controls placed by the U. S. Environmental Protection Agency on hydrocarbon emissions from motor vehicles. With respect to hydrocarbons, then, it may be concluded that the variation in anticipated hydrocarbon levels between the alternative regional development plan combinations are insignificant and would not affect selection of a recommended land use-transportation plan set.

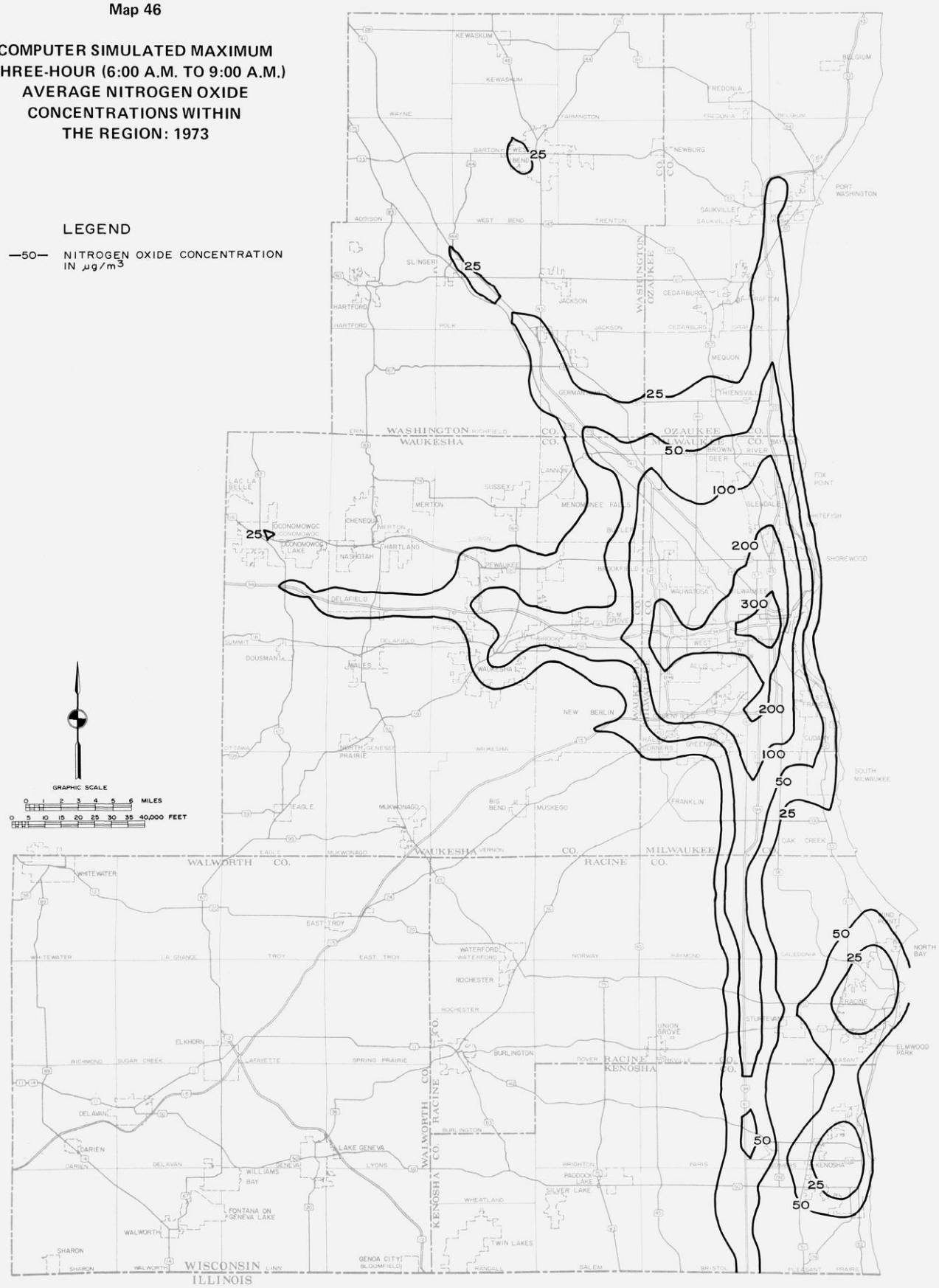
Photochemical oxidants, measured as ozone, are formed in the atmosphere at a rate which is dependent upon the ambient concentrations of hydrocarbon and oxides of nitrogen. At the present time the state of the art of photochemical oxidant modeling does not permit concentration levels to be estimated in order to define the areas of the Region over which the hourly ozone standard, 160 micrograms per cubic meter, is exceeded. Monitored levels of ozone concentrations in the Region from July 1973 to June 1974 have been found to exceed the standard by as much as three times. Since the nitrogen dioxide and hydrocarbon concentrations may be expected to decrease substantially by the year 2000, a concurrent reduction in the ozone levels can be anticipated. Though significant, this reduction in ozone concentration may be expected to result in levels above the ambient air quality standard in the Region. Photochemical oxidants and its precursor emissions are also capable of long-range transport, and consequently a part of the regional oxidant problem in southeastern Wisconsin has its origin outside the seven-county area. A viable solution to the oxidant problem must, therefore, be approached on an interregional basis. Again, however, there are no significant differences among the regional development alternatives with respect to ozone levels, independent of consideration of possible interregional influences, and hence such levels provide no basis for plan selection.

Sulfur Oxides

Oxides of sulfur, particularly sulfur dioxide and trioxide, may react in the atmosphere to form sulfate aerosol including sulphuric acid. This acid, in addition to attacking metals and masonry in structures, is a potent eye and respiratory tract irritant and may cause bronchial and lung disorders.

Map 46

COMPUTER SIMULATED MAXIMUM THREE-HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE NITROGEN OXIDE CONCENTRATIONS WITHIN THE REGION: 1973

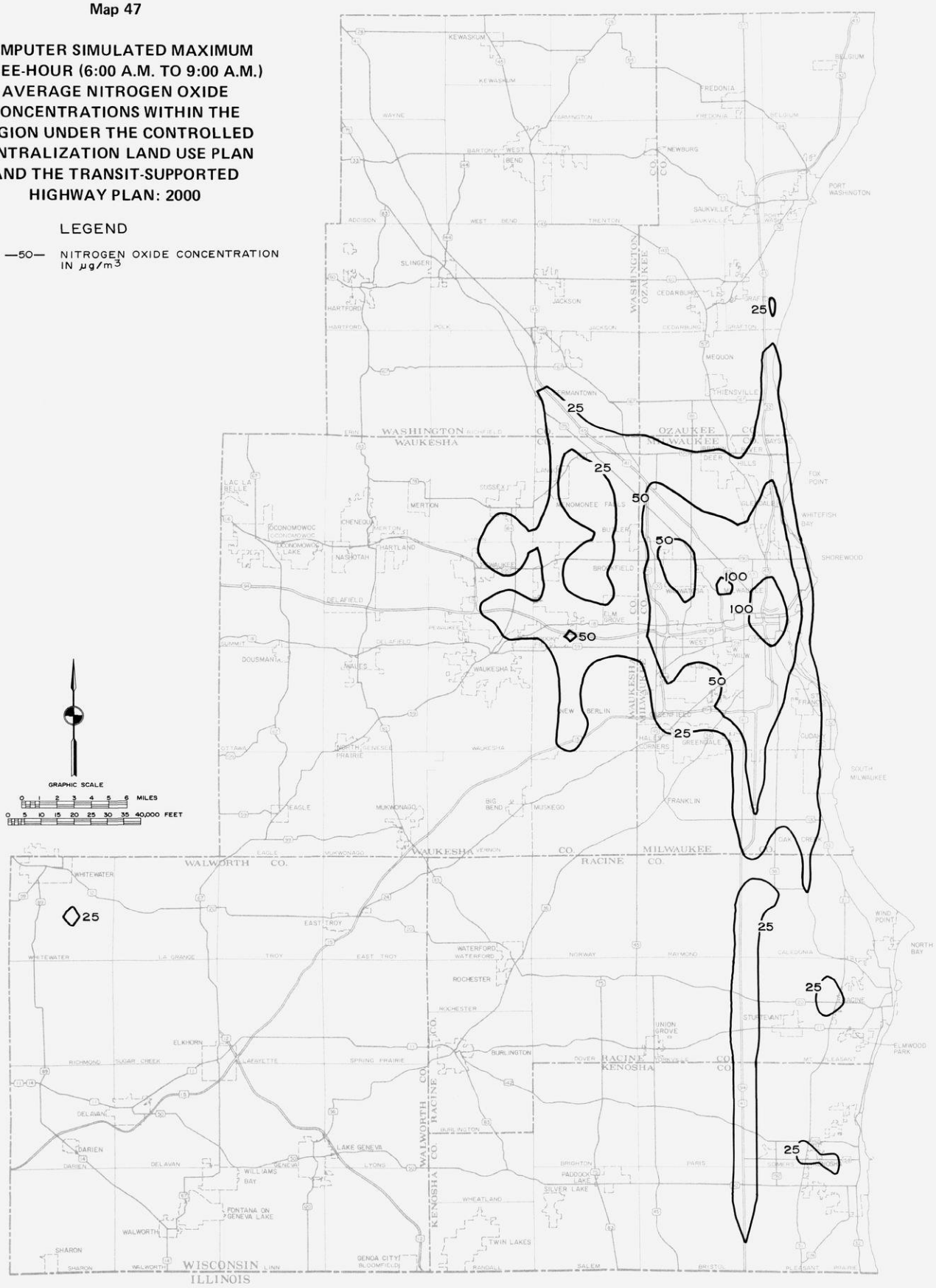


The above map represents only the concentration of nitrogen oxides which may be expected within the Region under 1973 emission source conditions and adverse meteorological conditions. Nitrogen oxides are chemically reactive compounds which, in the presence of sunlight and hydrocarbons form ozone and other oxidant products which may be harmful to human and other animal health. No simulation model has as yet been developed which can adequately replicate these chemical reactions. Although there are presently no three-hour standards for nitrogen oxides, the concentration of this substance in the atmosphere was used as an indicator of the possible formation of excessive amounts of ozone and other oxidant products.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

Map 47

COMPUTER SIMULATED MAXIMUM THREE-HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE NITROGEN OXIDE CONCENTRATIONS WITHIN THE REGION UNDER THE CONTROLLED CENTRALIZATION LAND USE PLAN AND THE TRANSIT-SUPPORTED HIGHWAY PLAN: 2000

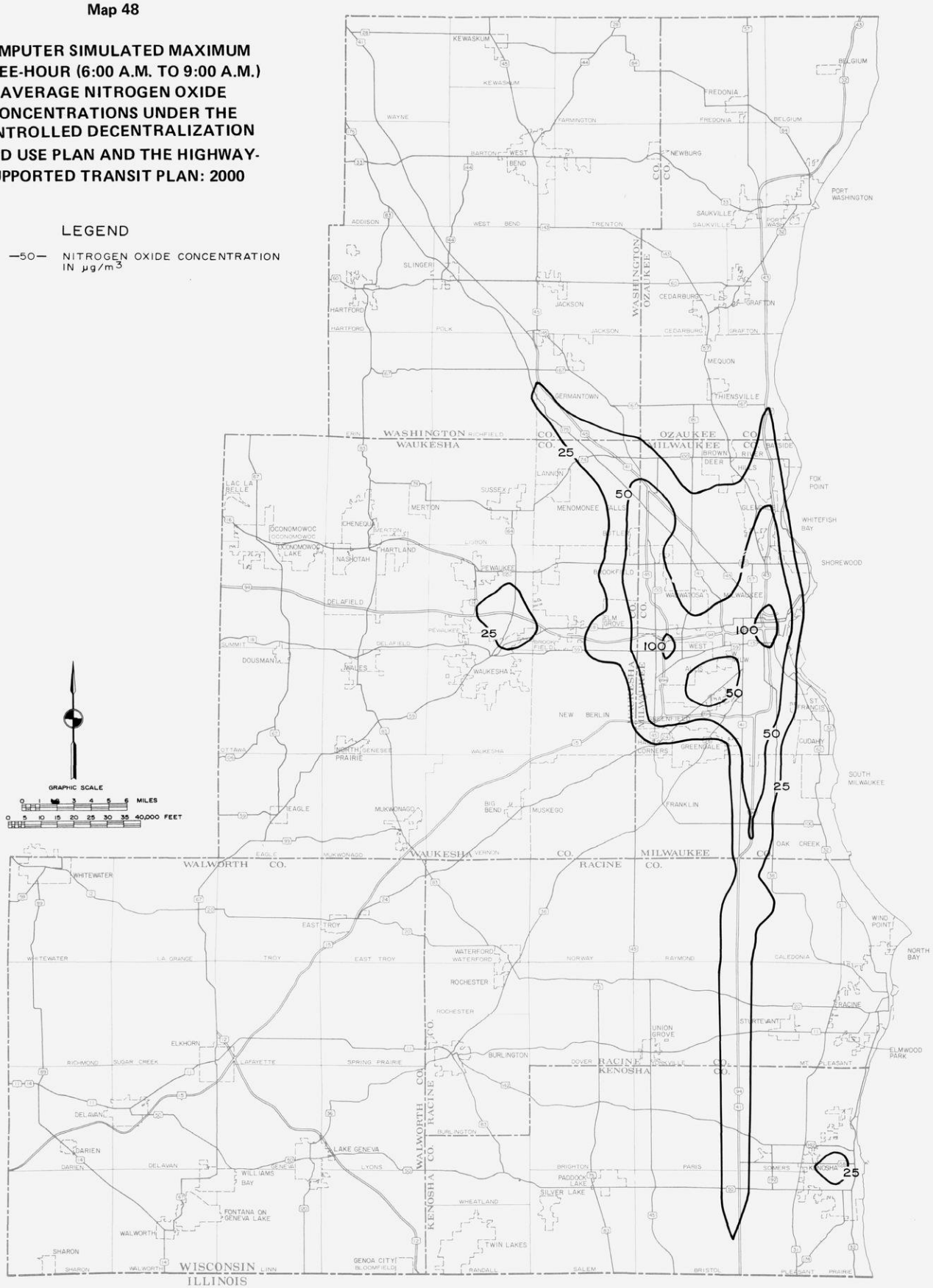


The above map indicates the magnitude and geographic distribution of the maximum three-hour (6:00 a.m. - 9:00 a.m.) concentrations of nitrogen oxides which may be expected to be experienced in the Region in the year 2000 under the controlled centralization land use plan and the transit-supported highway plan. The forecast substantial decrease in nitrogen oxide concentrations over 1973 levels, evident by comparing Maps 46 and 47, would be a result of the successful implementation of the federal motor vehicle emission control program.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

Map 48

COMPUTER SIMULATED MAXIMUM THREE-HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE NITROGEN OXIDE CONCENTRATIONS UNDER THE CONTROLLED DECENTRALIZATION LAND USE PLAN AND THE HIGHWAY-SUPPORTED TRANSIT PLAN: 2000

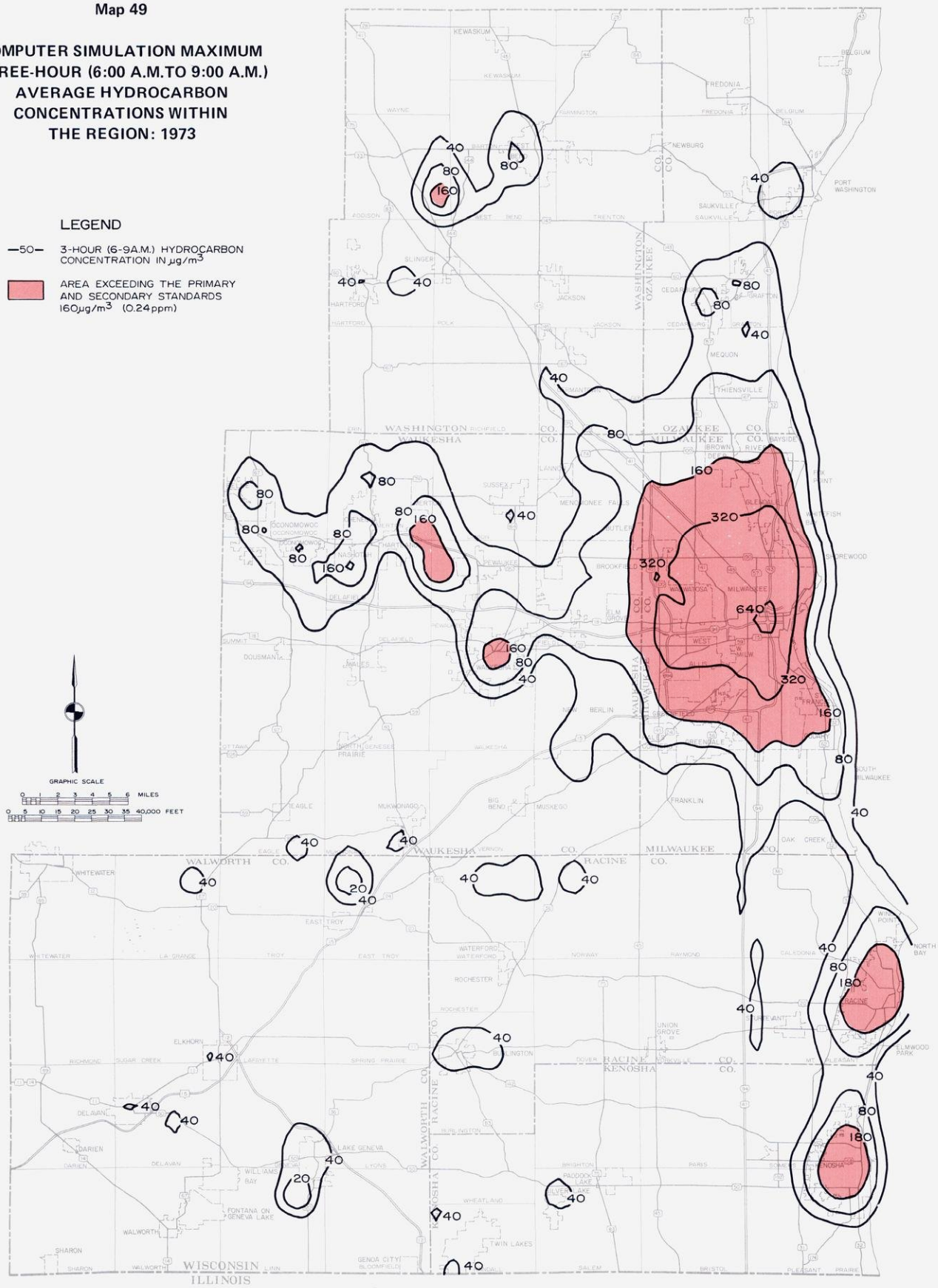


The above map represents the maximum three-hour average nitrogen oxide concentrations in the Region in the year 2000 under the controlled decentralization land use plan and the highway-supported transit plan. Comparison of this map with Map 47 indicates that the relative magnitude and spatial distribution of nitrogen oxide concentrations over the Region in the year 2000 would not be significantly different between any of the alternative land use and transportation plans evaluated.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

Map 49

COMPUTER SIMULATION MAXIMUM THREE-HOUR (6:00 A.M.TO 9:00 A.M.) AVERAGE HYDROCARBON CONCENTRATIONS WITHIN THE REGION: 1973

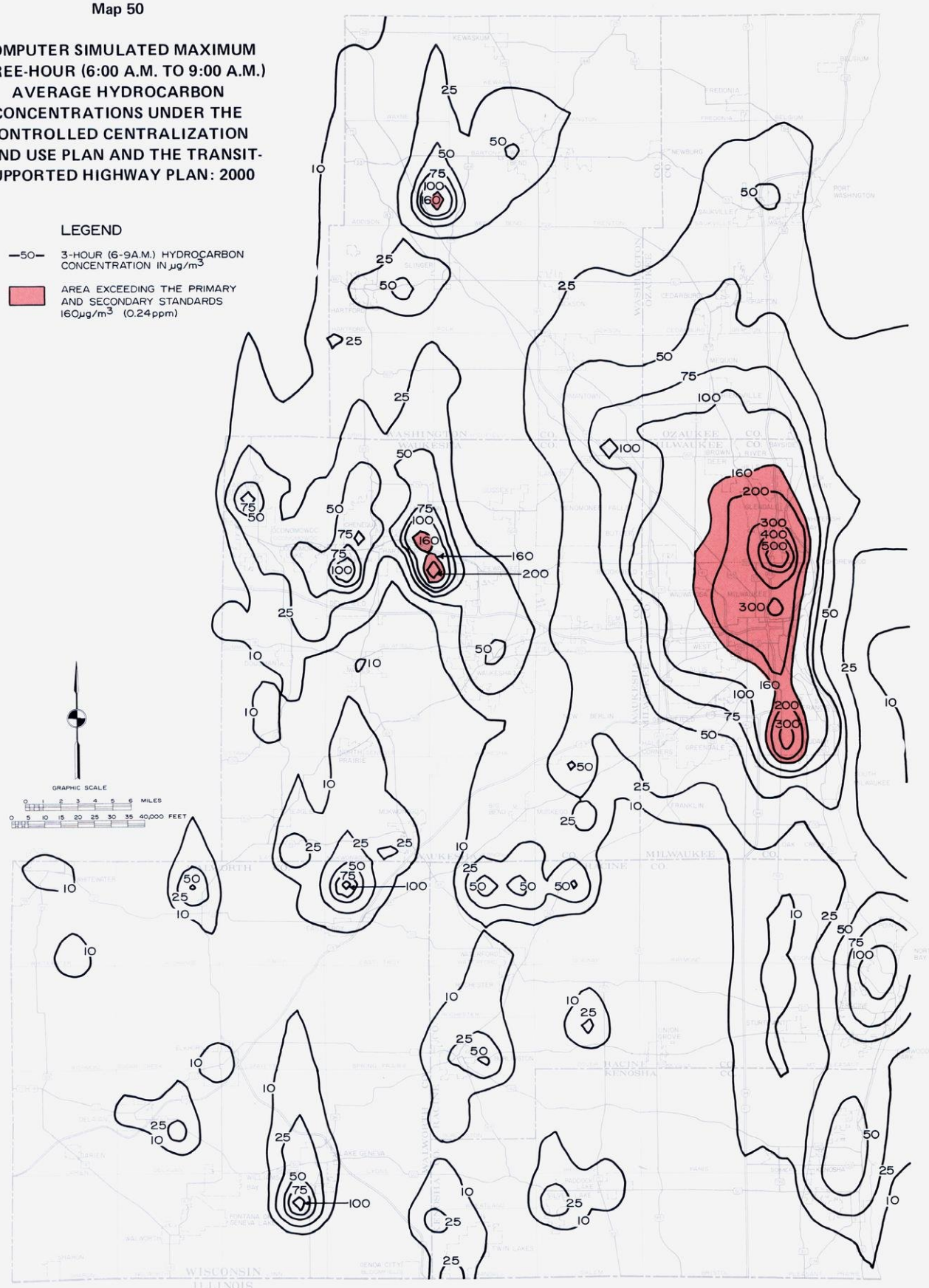


Hydrocarbons are chemically active compounds which react in the presence of sunlight and nitrogen oxides to form oxidant products, such as ozone, which may be harmful to human and other animal health. The map above displays the dispersion of hydrocarbons in the assumed absence of photochemical reactions throughout the Region based on 1973 emissions and meteorological data. Simulation modeling studies indicate that in 1973 the hydrocarbon standard was exceeded over an approximate 146 square mile area in Milwaukee County, a 16 square mile area in Racine County, a 10 square mile area in Kenosha County, a 10 square mile area in Waukesha County, and a two square mile area in Washington County.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

Map 50

COMPUTER SIMULATED MAXIMUM THREE-HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE HYDROCARBON CONCENTRATIONS UNDER THE CONTROLLED CENTRALIZATION LAND USE PLAN AND THE TRANSIT-SUPPORTED HIGHWAY PLAN: 2000

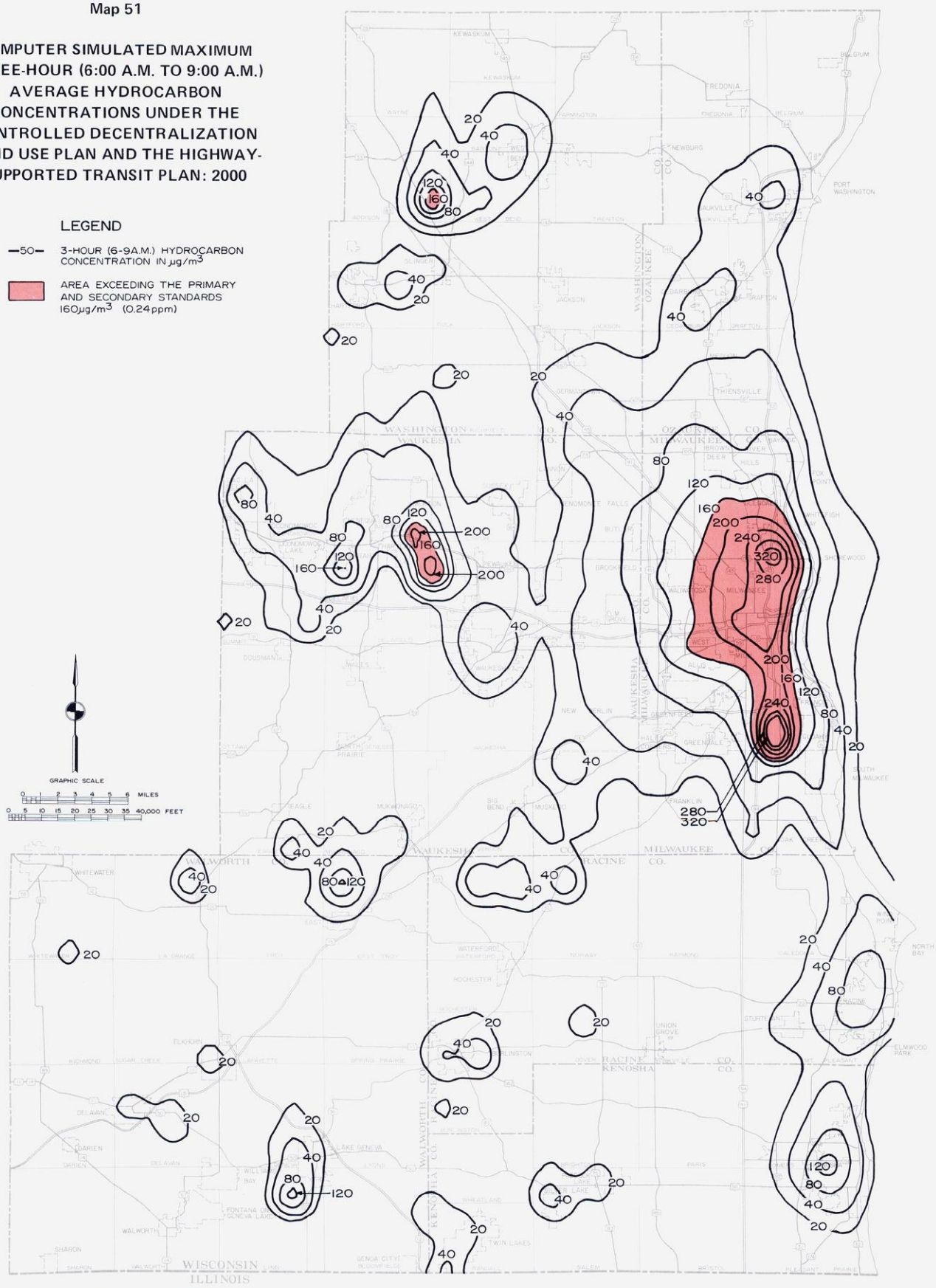


Simulation modeling studies for the year 2000 indicate that average hydrocarbon concentrations over the Region under the controlled centralization land use plan and the transit-supported highway plan will be generally reduced as compared with the 1973 regional levels of this pollutant. Exceedances of the hydrocarbon air quality standard, however, will still occur, particularly in Milwaukee County. Exceedances of the photochemical oxidant standard with attendant harmful effects to human and other animal health are, therefore, also probable in the Region in the year 2000 under this plan combination.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

Map 51

COMPUTER SIMULATED MAXIMUM THREE-HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE HYDROCARBON CONCENTRATIONS UNDER THE CONTROLLED DECENTRALIZATION LAND USE PLAN AND THE HIGHWAY-SUPPORTED TRANSIT PLAN: 2000



Simulation modeling studies for the year 2000 have indicated that regional hydrocarbon levels in the Region under the controlled decentralization land use plan and highway-supported transit plan are nearly identical to the forecast hydrocarbon levels under each of the other plan combinations. In this plan there is also a general reduction in hydrocarbon concentrations throughout the Region as compared with regional hydrocarbon levels in 1973 but areas exceeding the air quality standard may still be found, particularly in Milwaukee County. Exceedances of the photochemical oxidant air quality standard and, consequently, harmful effects on human and other animal health may, therefore, also be expected with this plan combination.

Source: Air Quality Modeling Group, University of Wisconsin-Madison and SEWRPC.

An examination of the monitoring data pertaining to sulfur dioxide—used as a measure of total sulfur oxides—conducted by the Wisconsin Department of Natural Resources (DNR) has indicated that the measurements of this pollutant during the years 1973 through 1975 are substantially in error and do not represent valid and reliable observations of the ambient air quality. The DNR is presently researching procedures whereby the sulfur dioxide data for this period may be adjusted and rendered valid. As an alternative, the regional air quality maintenance planning program is examining the possibility of using the 1976 ambient air quality monitoring data for sulfur dioxide in order to calibrate the simulation model. Consequentially, neither the existing air quality levels nor the forecasted concentrations of sulfur dioxide may be defined at the present time. A complete analysis of both the existing and forecast levels of this pollutant will be reported in the regional air quality maintenance planning report.

Concluding Remarks—Air Quality Analysis

The following conclusions may be drawn from the foregoing discussion:

1. Air pollution caused by particulate matter concentrations may be expected to remain essentially of the same order of magnitude and spatial distribution within the Region throughout the planning period. The energy usage assumptions underlying the pollutant emission forecasts, however, are subject to revision and alternative energy scenarios are presently being examined for their air quality impact under the regional air quality maintenance planning program. Under the present "existing trends" energy forecasts, the simulation modeling results indicate that the primary and secondary annual particulate matter standards will be exceeded in a large area of Milwaukee County. The similarity of estimated year 2000 concentrations among the six development alternatives, however, does not provide a basis for selecting one plan over another. Control strategies will be required no matter what combination of alternative plans is selected as the recommended regional land use-transportation plan.

2. Air pollution caused by carbon monoxide concentrations may be expected to diminish substantially over the planning period due to control regulations reducing carbon monoxide emissions from motor vehicles. Carbon monoxide concentrations for all alternative development plan combinations indicated no difference among the plans and may be expected to be well below established standards. Accordingly, carbon monoxide pollution cannot be a significant factor in selecting a final regional land use-transportation plan.

3. Nitrogen dioxide, hydrocarbon, and photochemical oxidants may be expected to decrease over the planning period, but except for nitrogen dioxide still exceed the specified standards in small subareas of the Region. The variations in anticipated nitrogen dioxide, hydrocarbon, and ozone concentrations between the alternative regional development plan combinations are insignificant and should not, therefore, affect selection of a recommended land use-transportation plan. Additional control strategies for hydrocarbons will be necessary no matter what alternative land use-transportation plan combination is selected as the final recommended land use-transportation plan.

4. The lack of available air quality monitoring data for sulfur dioxide concentrations in the Region preclude any assessment of this pollutant being made at the present time. The regional air quality maintenance planning program will provide an analysis of the existing and forecast levels of sulfur dioxide using the validated air quality monitoring data for 1976.

5. In general, all alternative combination land use and transportation plans produce approximately the same estimated year 2000 ambient air concentrations for each pollutant. There is, accordingly, no intrinsic difference in ambient air quality between the various alternatives. Accordingly, air quality differentiation provides no basis for land use-transportation plan selection.

OTHER ISSUES AND CONSIDERATIONS

In considering the foregoing sections of this chapter dealing with the comparison and evaluation of the alternative regional land use and transportation plans, and in particular the evaluation of the alternative plans against the agreed-upon land use and transportation system development objectives and supporting standards, several issues were raised during advisory committee review that, while important to the comparison and evaluation of the alternative plans, were not directly addressed in the evaluation of the alternatives utilizing the rank based expected value method. The following sections discuss each of these issues.

Land Use Related Issues

Technical and Citizen Advisory Committee deliberations relating particularly to the controlled decentralization land use plan raised several important issues concerning that plan. One item of particular concern to the Technical Advisory Committee was that the analyses presented may have understated the overall adverse impact upon the preservation of prime agricultural land associated with the development concepts expressed in the controlled decentralization plan. Although that plan seeks to minimize the loss of prime agricultural land by allocating unsewered suburban development first to nonprime agricultural and other open lands, the scattered nature of such development and its location in many cases adjacent to prime agricultural lands may make it economically and politically impractical to hold the adjacent prime agricultural lands in agricultural use as recom-

mended in this plan. Consequently, the loss of such lands under the decentralization plan may in fact greatly exceed the estimates used in the evaluation.

Similarly, some members of the Technical and Citizen Advisory Committees expressed concern over the validity of the assumption made under the controlled decentralization plan that nearly all new commercial and industrial development in the Region would take place within the three urban density categories and not be diffused throughout the unsewered suburban density category as well. It was the consensus of the Technical Advisory Committee that it would be likely that local units of government would be under pressures to permit commercial and industrial, as well as residential, development in the proposed suburban areas if the controlled decentralization plan were adopted.

The Technical and Citizen Advisory Committee deliberations also reflected concern over the potential long-term effects of the use of private septic tanks and wells as a permanent means of sewage disposal and water supply. In particular, concern was expressed over the as yet unknown effects of the long-term absorption of septic tank effluent on groundwater quality, and particularly on the nitrate content of the ground water. Adequate basic research concerning this area of groundwater pollution has not as yet been accomplished, although the Commission has requested the University of Wisconsin to undertake such research.

Concern was also expressed by the Technical Advisory Committee about the inability to organize essentially urban development into neighborhoods in the large areas of low density, suburban development proposed in the controlled decentralization plan. Such concern was centered on the lack of provision of local urban services and the physical amenities usually associated with urban development as envisioned in the neighborhood concept promoted by the Commission for many years within the Region as the best means of organizing in a coherent manner urban residential development.

Another serious concern expressed by the Technical Coordinating and Advisory Committee with respect to the controlled decentralization plan involved the implicit underutilization of utility and community facility systems already in place in Milwaukee County. For example, it was noted that metropolitan and major local trunk sewers, particularly in the Cities of Franklin and Oak Creek, are already in place and have been designed to provide service to all of the undeveloped land within those areally large cities. Although not all of the tributary branch and lateral sewers needed to ultimately serve these cities are in place, it is true that certain costly portions of the ultimate system are already in place and would be underutilized if new urban development were not directed to such areas. Similarly, major water supply improvements have been made by the Cities of Milwaukee and Oak Creek, particularly in terms of water treatment plant capacities. Again, such capacities would be seriously underutilized if development were not encouraged to take place in Milwaukee County communities.

In order to properly determine the extent to which existing utilities and community facilities, such as schools, would be underutilized, it would be necessary to prepare for each of the two alternative regional land use plans a complementary set of regional utility and community facility plans. Such an effort would constitute a massive undertaking, involving the need to properly inventory all existing utility and facility systems, prepare objectives and standards related to such systems, prepare forecasts to determine the future need for such systems, and then prepare physical development plans for those systems. While such an effort would be highly desirable in terms of providing additional information to evaluate the alternative regional land use plans, such a massive work effort would be far beyond the budgeted scope of the regional land use-transportation study. Accordingly, no attempt has been made to provide quantification with respect to the implicit underutilization of existing utility and community facility systems under the controlled decentralization plan. Such implicit underutilization can be taken into account, therefore, in plan evaluation only in a qualitative sense.

Considering both alternative regional land use plans, the Citizen Advisory Committee expressed concern over the impact that these plans would have on the adopted regional housing plan. In particular, concern was expressed over the effect of each of the alternative land use plans on the subsidized housing allocation strategy set forth in the adopted regional housing plan.[11] This strategy includes a geographic distribution throughout the Region of the subsidized housing which is necessary for the elimination of substandard and overcrowded living conditions. The recommended strategy distributes the required subsidized housing—nearly 18,000 units—to 49 subareas of the Region on the basis of various indicators relating to the overall suitability of each subarea as a location for housing.[12] Since both alternative year 2000 regional land use plans would alter the adopted 1990 regional land use plan, the Citizen Advisory Committee requested that an analysis be made of the possible impact of each plan on the subsidized housing allocation strategy set forth in the adopted regional housing plan.

The housing allocation strategy is expressed as a series of mathematical formulas with the specific indicators used in the formulas relating to the existing 1970 need for housing, the property tax rate and base, personal income, land availability, employment opportunities, transit service, and the existing amount of subsidized and other low-cost housing. In conducting the requested analysis, it was determined that only those indicators which relate to the provision of transit facilities, land availability, and employment opportunities would be expected to change significantly under the design

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[11] *See SEWRPC Planning Report No. 20, A Regional Housing Plan for Southeastern Wisconsin.*

[12] *Planning analysis areas 16 to 25 in the City of Milwaukee, 43 and 44 in Racine County, and 50 and 51 in Kenosha County were considered as single allocation areas.*

year conditions proposed in the alternative land use plans. Accordingly, in order to identify the impact of each alternative year 2000 land use plan on the subsidized housing allocation strategy set forth in the adopted regional housing plan, the formulas were reapplied assuming the alternative design year conditions with respect to transit service, employment, and land availability.

The results of this analysis are shown in summary form on Map 52. In most cases, the difference between the recommended housing plan allocation and the allocation based on either of the year 2000 alternative regional land use plans are relatively small. Under the controlled centralization land use plan, the subsidized housing quotas would be increased by more than 100 units in only three planning analysis areas—Germantown, Menomonee Falls, and New Berlin—and would be decreased by more than 100 units for only three planning analysis areas—Franklin, Milwaukee, and Racine. The largest absolute difference under the controlled centralization land use plan would occur in the City of Milwaukee where the quota would be reduced by 466 units, a reduction of about 9 percent.

Similarly, under the controlled decentralization land use plan, the quotas would be increased by more than 100 units for only five planning analysis areas—Cedarburg-Grafton, West Bend, Menomonee Falls, New Berlin, and Pewaukee-Sussex—and would be decreased by more than 100 units in only three planning analysis areas—Franklin, Milwaukee, and Racine. The largest absolute difference resulting under the controlled decentralization plan would occur in the City of Milwaukee where the quota would be reduced by 654 units, or 13 percent.

Finally, both the Technical and Citizen Advisory Committees expressed concern over the relative costs associated with each of the alternative land use plans of providing the basic facilities and utilities needed to support new urban development—the so-called infrastructure cost. Accordingly, an analysis of such costs was made utilizing factors developed by the Wisconsin Department of Administration under a special study relating costs to development densities.[13] Under this study, comparative costs on a statewide basis of providing public services under three basic alternative land use development patterns were developed: "urban containment," or a pattern wherein population growth would be encouraged in central cities and already developing suburbs at relatively high densities and including the infilling of vacant parcels; "suburban extension," or a pattern providing for the continuation of existing, uncontrolled patterns of population distribution and land development, including significant portions of "passed over" land; and "exurban dispersion," or a pattern designed to satisfy the stated preferences of Wisconsin residents with low-density, unsewered housing construction generally beyond the current suburban fringe.

For the purpose of this comparative cost analysis, it was assumed that the "urban containment" pattern most closely approximated that portion of the incremental development under both the controlled centralization and controlled decentralization plans which would be provided with public sanitary sewer and water supply services and be included in neighborhood units, and that the "exurban dispersion" pattern most closely approximated that portion of new urban development in both the controlled centralization and controlled decentralization plans that would not be provided with centralized sanitary sewer and water supply services and not be included in neighborhood units. Accordingly, the per housing unit costs for these development patterns set forth in the study report, not including those costs attributable to the construction, operation, and maintenance of transportation systems—these costs being explicitly compared earlier in this chapter for each plan—were applied to the incremental housing that would require new public services and facilities under each alternative regional land use plan.

The results of this analysis are set forth for the controlled centralization land use plan in Table 267 and the controlled decentralization land use plan in Table 268. The estimated total public service capital costs associated with new urban development under the controlled centralization land use plan approximate $1.18 billion, while the public service capital costs associated with the new urban development under the controlled decentralization land use plan approximate $1.34 billion. Thus, the public service capital costs associated with the decentralization plan area about $0.16 billion, or about 13 percent, more than those associated with the centralization plan. The estimated annual public service operating costs associated with the controlled centralization plan approximate $239 million, as compared to about $273 million under the controlled decentralization plan, a difference of about 14 percent.

Transportation Related Issues

The Technical and Citizen Advisory Committee deliberations relating to the alternative regional transportation system plans raised several important issues. One of these dealt with the differences in the arterial street and highway system as identified under the alternative regional transportation system plans and as set forth in the series of adopted county jurisdictional highway system plans. In discussing these differences, it was determined that supplemental, indepth travel corridor analyses would be desirable in those situations where the alternative plans differed significantly from the jurisdictional highway system plans. These supplemental corridor analyses were extremely useful in the synthesis of the final recom-

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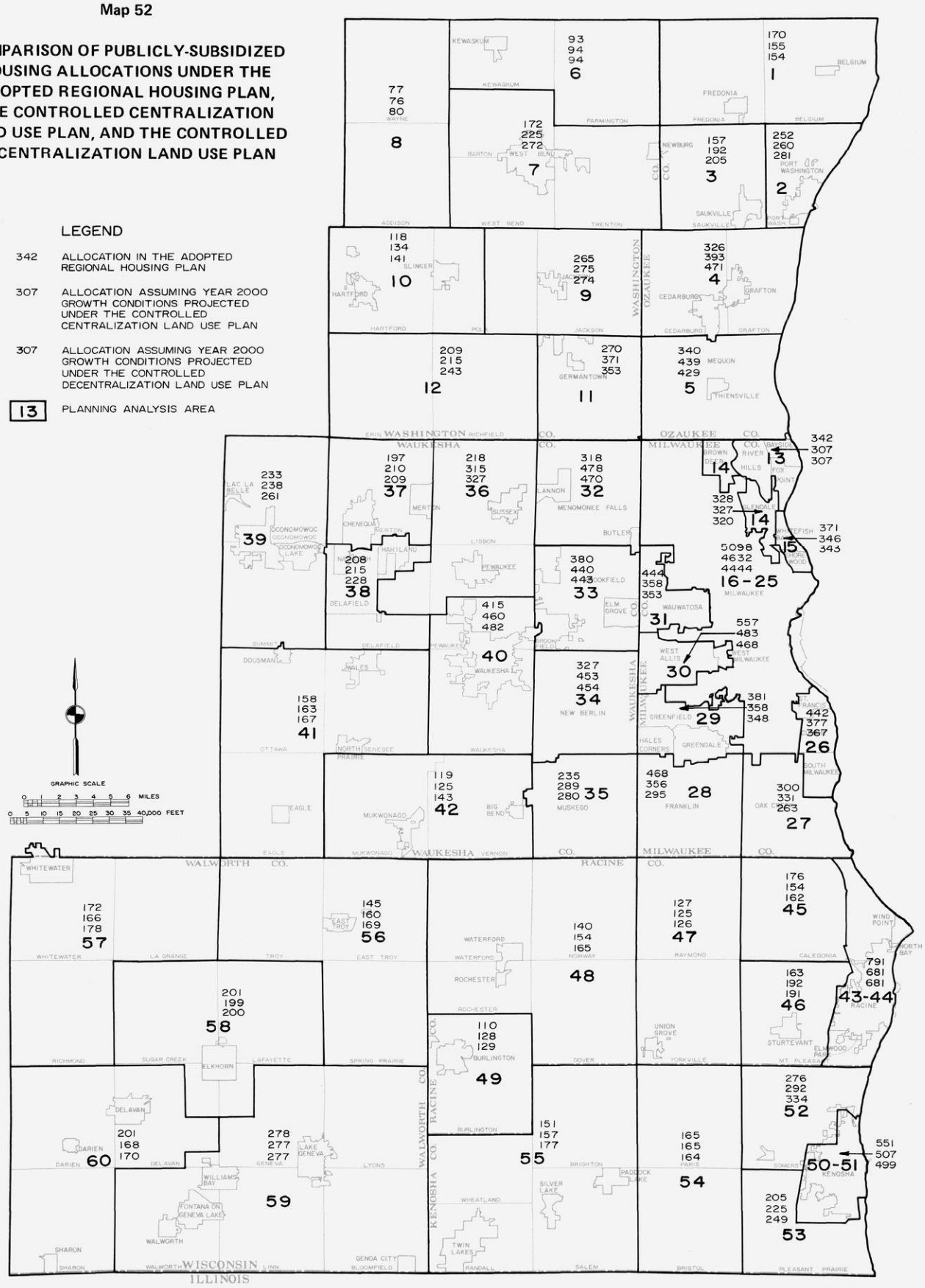
[13] *See The Public Service Costs of Alternative Development Patterns, prepared for the Wisconsin Department of Administration, State Planning Office, by the Real Estate Research Corporation, December 1974. It is important to note the following major assumptions concerning the cost data set forth in this report: 1) land costs for public facilities were excluded; 2) no excess capacity was assumed in existing facilities; and 3) average costs rather than marginal costs were estimated.*

Map 52

COMPARISON OF PUBLICLY-SUBSIDIZED HOUSING ALLOCATIONS UNDER THE ADOPTED REGIONAL HOUSING PLAN, THE CONTROLLED CENTRALIZATION LAND USE PLAN, AND THE CONTROLLED DECENTRALIZATION LAND USE PLAN



A complete evaluation of the alternative land use plans must include an examination of the potential impact of these alternatives on the adopted regional housing allocation strategy. This strategy distributes the estimated regional subsidized housing need—about 17,800 units—to 49 subareas of the Region on the basis of various indicators concerning the overall suitability of each area as a location for such housing. In order to identify the potential impact of the land use plan alternatives on the housing allocation strategy, the formula of the strategy was reapplied assuming alternative design year conditions with respect to those indicators which would be expected to change significantly under the alternative land use plans—namely, indicators relating to transit service, employment, and land availability. In most cases, the difference between the recommended housing plan allocation and the allocation based on either of the year 2000 alternative regional land use plans is relatively small. The largest differences would occur for the City of Milwaukee, where the recommended allocation would be reduced by over 460 units under controlled centralization plan conditions and reduced by over 690 units under controlled decentralization plan conditions.

Source: SEWRPC.

Table 267

ESTIMATED PUBLIC SERVICE COSTS ASSOCIATED WITH THE CONTROLLED CENTRALIZATION LAND USE PLAN

County	Housing Unit Increment 1970-2000		Estimated Public Service Costs[a] (in millions of dollars)					
			Served with Public Sewer and Water		Not Served with Public Sewer and Water		Total	
	Served with Public Sewer and Water	Not Served with Public Sewer and Water	Capital[b]	Annual Operating[c]	Capital[d]	Annual Operating[e]	Capital	Annual Operating
Kenosha	18,700	300	120.4	24.2	1.8	0.4	122.2	24.6
Milwaukee . . .	42,700	--	275.0	55.3	--	--	275.0	55.3
Ozaukee	16,400	600	105.6	21.2	3.6	0.8	109.2	22.0
Racine.	14,700	500	94.7	19.0	3.0	0.7	97.7	19.7
Walworth. . . .	11,300	800	72.8	14.6	4.8	1.1	77.6	15.7
Washington . .	22,700	1,300	146.2	29.4	7.9	1.7	154.1	31.1
Waukesha. . . .	52,100	2,000	335.5	67.5	12.1	2.6	347.6	70.1
Region	178,600	5,500	1,150.2	231.2	33.2	7.3	1,183.4	238.5

[a] *Excludes capital development and annual operating and maintenance costs for transportation facilities.*

[b] *Based on a capital cost of $6.440 million for each 1,000 dwelling units added.*

[c] *Based on an annual operating and maintenance cost of $1.295 million for each 1,000 dwelling units added.*

[d] *Based on a capital cost of $6.041 million for each 1,000 dwelling units added.*

[e] *Based on an annual operating and maintenance cost of $1.324 million for each 1,000 dwelling units added.*

Source: SEWRPC.

mended regional transportation system plan as set forth in Chapter VIII of this volume. In addition, a comparison was made between the final recommended year 2000 regional transportation system plan and the series of 1990 county jurisdictional highway system plans. This comparison is set forth in Chapter VIII.

Another transportation related consideration brought out during advisory committee deliberations on the alternative regional transportation system plans was the utilization of a traffic control technique that would meter freeway access at critical locations in order to reduce traffic congestion and enable transit vehicles to travel on freeway segments at speeds equal or nearly equal to those hypothesized over the exclusive transitways. In this way, some committee members maintained, it would be possible to eliminate the capital investment required for exclusive transitways and substitute for it a relatively inexpensive system of freeway metering. This matter was evaluated during the synthesis of the recommended plan, and the results of that evaluation are also reported in Chapter VIII of this volume.

PUBLIC REACTION TO ALTERNATIVE PLANS

Regional Planning Conference

The alternative year 2000 land use and transportation plans for the Region were first presented for public reaction at a day-long regional planning conference held on April 14, 1976, at the Red Carpet Inn in Milwaukee. The conference brought together nearly 500 citizens, public officials, representatives of business, industry, and civic organizations, and professional people and technicians, including many from the planning field. The record of the conference was published by the Commission, including verbatim transcripts of a series of individual county workshops held during the afternoon conference session.[14] All conferees were provided with handout materials during the workshop sessions in order to provide a basis for a detailed examination of the alternative regional land use and transportation plans.

Public reaction to the alternative plans at the five workshop sessions was varied. In the Kenosha-Racine County workshop, most of those present expressed concern over not including certain previously recommended freeway elements in one or more of the alternative transportation plans considered. In particular, local public officials present at the workshop from the Kenosha and Racine area exhibited strong support for the inclusion of the Lake and Loop Freeways in the final recommended

[14] *See Proceedings of the Ninth Regional Planning Conference, SEWRPC, 1976.*

Table 268

ESTIMATED PUBLIC SERVICE COSTS ASSOCIATED WITH THE CONTROLLED DECENTRALIZATION LAND USE PLAN

County	Housing Unit Increment 1970-2000		Estimated Public Service Costs[a] (in millions of dollars)					
			Served with Public Sewer and Water		Not Served with Public Sewer and Water		Total	
	Served with Public Sewer and Water	Not Served with Public Sewer and Water	Capital[b]	Annual Operating[c]	Capital[d]	Annual Operating[e]	Capital	Annual Operating
Kenosha	26,800	1,500	172.6	34.7	9.1	2.0	181.7	36.7
Milwaukee . . .	23,200	--	149.4	30.0	--	--	149.4	30.0
Ozaukee	18,900	8,100	121.7	24.5	48.9	10.7	170.6	35.2
Racine.	14,600	2,700	94.0	18.9	16.3	3.6	110.3	22.5
Walworth. . . .	10,700	3,700	68.9	13.9	22.4	4.9	91.3	18.8
Washington . .	21,400	12,200	137.8	27.7	73.7	16.2	211.5	43.9
Waukesha. . . .	53,600	12,700	345.2	69.4	76.7	16.8	421.9	86.2
Region	169,200	40,900	1,089.6	219.1	247.1	54.2	1,336.7	273.3

[a] *Excludes capital development and annual operating and maintenance costs for transportation facilities.*

[b] *Based on a capital cost of $6.440 million for each 1,000 dwelling units added.*

[c] *Based on an annual operating and maintenance cost of $1.295 million for each 1,000 dwelling units added.*

[d] *Based on a capital cost of $6.041 million for each 1,000 dwelling units added.*

[e] *Based on an annual operating and maintenance cost of $1.324 million for each 1,000 dwelling units added.*

Source: SEWRPC.

regional transportation plan. In addition, those present at the workshop evidenced general support for the development concepts contained in the controlled centralization land use plan.

In the Milwaukee County workshop session, those present indicated great concern over the potential adverse impact on the social and economic health of Milwaukee County of development in accordance with the controlled decentralization land use plan. In particular, concern was expressed over the failure of that alternative to fully utilize existing and committed capital facilities in the county, particularly roads, sanitary sewers, and water supply facilities. Reaction to the alternative transportation system plans in the Milwaukee County workshop was mixed, with some officials and citizens expressing concern over the urban dislocation involved in implementing the transit supported highway system plan and with other officials and citizens indicating concern over the impact on the local property tax of the additional transit subsidies required under the highway supported transit system plan.

At the Ozaukee-Washington County workshop, most of the discussion centered over how best to bring about the urban development pattern embodied in the controlled centralization plan. Several officials and citizens present indicated concern over the continued viability of farming in Ozaukee County, particularly on small parcels, and the lack of the timely provision of needed centralized sanitary sewerage facilities. In general, however, those present strongly supported the controlled centralization land use plan.

In the Walworth County workshop, most of the discussion centered around the new Walworth County Zoning Ordinance and its relationship to the controlled centralization land use plan, with those commenting indicating strong support for that plan. In addition, several individuals expressed concern over the Chicago-oriented commuter problem, a problem of interregional and interstate significance.

In the Waukesha County workshop, strong support was expressed for the controlled centralization land use plan. The discussion concerning the alternative transportation system plans brought out both opposition to, and support for, the transit supported highway system plan, particularly with respect to the proposed Belt Freeway. Several local officials present indicated that the major problem with the Belt Freeway involved the lack of timely implementation in terms of state acquisition of the reserved right-of-way.

Informational Meetings

Following the regional planning conference, the Commission scheduled a series of nine informational meetings at locations throughout the Region in an attempt to gain further citizen and public official participation in the plan reevaluation process and to provide direction to the Commission in the preparation of the new regional land use and transportation plans. The dates and times of these meetings, which were attended by about 500 interested and concerned officials and citizens, are set forth in Table 269. As indicated in that table, three informational meetings were held specifically to obtain the reaction of elected public officials to the alternative plans with respect to three freeway corridors—the Belt Freeway, the Stadium Freeway-North, and the Lake Freeway. In addition, five general public informational meetings were held throughout the Region and one special informational meeting was held for elected representatives and representatives of agencies serving the nonwhite population of the Region, as well as interested nonwhite citizens. Verbatim minutes of all of these meetings were kept and published by the Commission.[15]

At the informational meeting for public officials concerning the Belt Freeway, local officials were divided as to whether or not the new regional transportation system plan should continue to include this important freeway facility. The City of Brookfield filed a statement indicating strong opposition to continuing to plan for the Belt Freeway, at least with respect to the proposed alignment of the Freeway through that City. The Cities of New Berlin and Franklin indicated that they had been largely successful to date in reserving needed right-of-way for the Freeway and that opinion was divided within their communities as to whether or not development of the Freeway should proceed, but that their communities would support continued development of the facility if the State Highway Commission of Wisconsin were to proceed in a timely manner with land acquisition of the reserved right-of-way.

At the informational meeting for public officials on the Stadium Freeway-North, mixed community reaction was received to the need to continue to plan for that Freeway. It was noted that the failure of the State Highway Commission to support the routing of IH 43 from Saukville to Milwaukee over the proposed Stadium Freeway-North had in effect eliminated the possibility of obtaining interstate level federal and state funding for the project, thus adversely affecting the practicality of constructing this facility in the near future. Nevertheless, strong support for the Stadium Freeway-North was voiced by officials represented not only by several of the communities through which the Stadium Freeway-North would pass and directly serve—the Cities of Mequon and Cedarburg and the Villages of Grafton and Thiensville—but also by officials representing communities currently served by the existing STH 141-IH 43 Freeway—the City of Glendale and the Villages of River Hills, Fox Point, and Whitefish Bay. The officials from the latter group of communities strongly supported the construction of the Stadium Freeway-North and opposed any plans that would expand the capacity of the existing STH 141-IH 43 Freeway facility and thus add to the amount of travel and traffic congestion and attendant noise and air pollution in that corridor. On the other hand, strong opposition to the proposed Stadium Freeway-North was evidenced by officials representing the Mayor of the City of Milwaukee and the Town of Saukville. It was also noted during the meeting that while the right-of-way for the Stadium Freeway-North extension through the Northridge planned development project in the City of Milwaukee had to date been reserved, it was unlikely that such reservation could continue much longer given opposition to the proposed freeway on the part of the Mayor's office in the City of Milwaukee and a desire on the part of the developer to plat at least a portion of the right-of-way for single-family home development.

At the informational meeting for public officials concerning the Lake Freeway, a similar pattern of opposition and support emerged. Milwaukee County officials indicated that the County maintained a strong commitment for construction of the Lake Freeway-South from the Harbor Bridge to E. Layton Avenue. Strong support for the Lake Freeway was also evidenced by officials representing Kenosha and Racine Counties, the City of Racine, and the Towns of Pleasant Prairie, Mt. Pleasant, and Somers. Representatives of the Mayor's office of the City of Milwaukee supported the completion of the Milwaukee downtown freeway loop, including the Lake Freeway-North through Juneau Park and the Park Freeway-East, but indicated strong opposition to construction of the Lake Freeway-South from E. Lincoln Avenue. Opposition to construction of the Lake Freeway was also voiced by officials of the Cities of St. Francis and Cudahy, largely on the basis of the lack of timely implementation of the freeway proposal.

The record of the five general public informational meetings held throughout the counties in the Region indicated considerable support for, as well as opposition to, continued freeway development, while nearly overwhelmingly favoring selection of the controlled centralization alternative land use plan as the new recommended regional land use plan. As expected, much of the opposition to freeway construction was encountered in the Waukesha and Milwaukee County meetings, with continued support for freeway construction generally expressed in the meetings held in the other counties. In the outlying counties of the Region, many citizens and officials favored continuing transportation system development in accord with the series of adopted county jurisdictional highway system plans. As noted above, the majority of comments favored the controlled centralization plan, with those commenting perceiving a need on the part of the county and town governments in the Region to more vigorously use existing land use controls to carry out the plan.

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[15] *See Minutes of Informational Meetings, Alternative Regional Land Use-Transportation Plans for Southeastern Wisconsin—2000, June 8, 1976 to July 26, 1976.*

Table 269

INFORMATIONAL MEETINGS HELD CONCERNING ALTERNATIVE YEAR 2000 REGIONAL LAND USE AND TRANSPORTATION PLANS FOR SOUTHEASTERN WISCONSIN: APRIL 14, 1976 THROUGH JULY 26, 1976

Type of Meeting	Place of Meeting	Date and Time of Meeting
Regional Planning Conference	Red Carpet Inn, Milwaukee	April 14, 1976 9:00 a.m.-3:30 p.m.
Informational Meeting for Public Officials—Belt Freeway Corridor	Franklin City Hall, Franklin	June 8, 1976 2:00 p.m.-3:20 p.m.
Informational Meeting for Public Officials—Stadium Freeway Corridor	Mequon City Hall, Mequon	June 9, 1976 2:00 p.m.-4:00 p.m.
Informational Meeting for Public Officials—Lake Freeway Corridor	Oak Creek City Hall, Oak Creek	June 15, 1976 2:00 p.m.-3:30 p.m.
Public Informational Meeting—Milwaukee County	Wisconsin State Office Building, Milwaukee	June 21, 1976 7:30 p.m.-9:40 p.m.
Public Informational Meeting—Walworth County	Walworth County Courthouse, Elkhorn	June 22, 1976 7:30 p.m.-9:30 p.m.
Public Informational Meeting—Ozaukee and Washington Counties	Washington County Courthouse, West Bend	June 23, 1976 7:30 p.m.-9:45 p.m.
Public Informational Meeting—Kenosha and Racine Counties	Mt. Pleasant Town Hall, Mt. Pleasant	June 24, 1976 7:30 p.m.-10:00 p.m.
Public Informational Meeting—Waukesha County	Waukesha County Office Building, Waukesha	June 25, 1976 7:30 p.m.-9:35 p.m.
Informational Meeting for Elected Representatives and Representatives from Agencies Serving the Nonwhite Population	Martin Luther King Community Center, Milwaukee	July 26, 1976 3:30 p.m.-6:15 p.m.

Source: SEWRPC.

More specifically, at the public informational meeting held in Milwaukee County, considerable opposition was expressed with respect to proposed freeway development. State Representative John O. Norquist of the 8th District, indicated strong opposition to continuing to plan for freeway development in Milwaukee County, recommending instead that emphasis be placed on the transportation of people by mass transit and the transportation of goods by rail. Representative Norquist also strongly favored the controlled centralization land use plan. Some citizens at the meeting questioned the practicality of the mass transit proposals in either plan, expressing concern over the impact of such proposals on the local property tax. Support for continued freeway construction was evidenced by a representative of the Wisconsin Motor Carriers Association.

At the Walworth County Public Informational meeting, much of the discussion evidenced considerable support for the controlled centralization land use plan. In addition, several of those present asked that the need for the continuation of the STH 12 Freeway be again reconsidered, indicating that they favored improving existing STH 12. State Representative Timothy F. Cullen of the 15th District indicated support for the controlled centralization land use plan as well as support for appropriate legislation that would reduce property taxes on land zoned for exclusive agricultural use. In addition, Representative Cullen indicated support for the proposed STH 120 bypass of Lake Geneva and the proposed rerouting of STH 67 through Elkhorn. He also asked that an examination be made of the need to provide a STH 50 bypass of Lake Geneva. Both support for, and opposition to, the long proposed acquisition of the Sugar Creek major outdoor recreation area was evidenced at the meeting.

At the meeting held for Ozaukee and Washington Counties, considerable support was voiced for the controlled centralization land use plan. Concern was expressed by several speakers over the continued acceptance of the septic tank as a permanent solution to sanitary sewage disposal and indicating support for large lot residential and agricultural zoning. Both opposition to and support for the Stadium Freeway-North extension as shown on the adopted 1990 plan was voiced and some support was evidenced for the construction of an East-West Freeway route in the STH 167 corridor in Mequon, which freeway would be an extension of the proposed Belt Freeway as identified in the 1990 plan.

At the meeting held for Racine and Kenosha Counties, much of the discussion centered around the highway development proposals initially presented in the Racine and Kenosha County jurisdictional highway system plans. Considerable support was voiced for the construc-

tion of the Lake and Loop Freeways by public officials present at the meeting, and considerable opposition to the freeways was voiced by private citizens. Both opposition to, and support for, the proposed STH 83 bypass at Rochester and Burlington were in evidence at the meeting. In general, those present seemed to overwhelmingly favor the controlled centralization land use plan.

At the Waukesha County public informational meeting, some opposition was evident with respect to freeway construction, particularly the Belt Freeway, with some of those in opposition favoring an alignment of that freeway in a corridor farther west. Some support was evidenced for the establishment of mass transit service in the communities of eastern Waukesha County, while those present overwhelmingly favored the controlled centralization land use plan.

At the informational meeting held specifically for elected officials and representatives of agencies serving the nonwhite population of the Region, and nonwhite citizens—a meeting at which a particularly thoughtful reaction to the plans was received—the record indicated strong support for the controlled centralization and highway supported transit system plans. Nonwhite officials and citizens were particularly concerned about improving transit service for those who cannot afford private automobiles, and particularly about ensuring that such individuals be provided with adequate mass transit service to jobs in outlying areas and to shopping centers. Many of the nonwhite officials indicated concern about the continued viability of inner-city neighborhoods and supporting shopping and personal service areas under the controlled decentralization land use plan.

Advisory Committee Action

While the aforementioned series of informational meetings were going on, the Technical Coordinating and Advisory Committee completed its technical evaluation of the alternative regional land use and transportation plans and made its recommendations to the Commission. At a meeting on July 19, 1976, and after careful deliberation in a total of five meetings of the full Committee, and three meetings of a special subcommittee, the Technical Coordinating and Advisory Committee unanimously recommended that the Commission proceed with the refinement and detailing of the controlled centralization land use plan as the recommended new land use plan for the Region. The Technical Committee unanimously recommended rejection of the "No Build" transportation plan alternative. Finally, the Technical Committee by a vote of 20 to 6 recommended selection of the transit supported highway system plan as the plan to be refined and detailed in order to arrive at a final recommended regional transportation system plan. In making these recommendations, the Technical Coordinating and Advisory Committee was guided largely by application of the rank-based expected value method of plan evaluation discussed earlier in this chapter.

The Citizens Advisory Committee, after lengthy deliberation in a total of three meetings of the full Committee and four meetings of a special subcommittee, at a meeting on June 23, 1976, also recommended, by a vote of 15 ayes, 0 nayes, and 2 abstentions, that the Commission proceed with the refinement and detailing of the controlled centralization land use plan as the recommended new land use plan for the Region. In addition, the Citizens Advisory Committee unanimously recommended that the Commission reject the "No Build" transportation plan alternative. When it came to make a recommendation to the Commission as to which of the alternative transportation plans should be considered for further refinement and detailing, the Committee was unable to arrive at a decision, with eight Committee members favoring refinement of the transit supported highway system plan, eight favoring refinement of the highway supported transit system plan, and one abstaining.

Commission Action

On July 28, 1976, the full Commission met to receive the foregoing advisory committee recommendations, as well as to consider the general public reaction to the alternative regional land use and transportation plans. After lengthy and careful deliberation, the Commission unanimously directed the staff to refine and detail the controlled centralization alternative land use plan as the recommended new regional land use plan. In addition, the Commission acted to create a special Task Force consisting of representatives of those state and major local agencies concerned with transportation system development and two members from the Citizens Advisory Committee, and charged that Task Force with the responsibility of assisting the Commission staff in preparing a new recommended regional transportation plan that would combine the best elements of the transit supported highway and highway supported transit alternative plans. Subsequent to this meeting, the Task Force was created and its membership is set forth in Appendix C.

SUMMARY

This chapter has presented the results of a comparison and evaluation of the two alternative land use and six alternative transportation plans designed to meet anticipated growth and change within the Region to the plan design year 2000. Important data pertaining to the plans are presented in summary form in Tables 227, 258, and 259. The most important findings of this comparison and evaluation are summarized below:

1. Two alternative regional development plans were prepared and evaluated for the year 2000: a controlled centralization plan and a controlled decentralization plan. Each represents an attempt to meet the regional development objectives by controlling existing trend development, with the two plans differing primarily as to urban population densities, diffusion of population and employment, and the extent to which new urban development is provided with centralized sewer and water supply services and contained in planned neighborhood development units.

2. The controlled centralization plan would require the conversion of about 100 square miles of land from rural to urban use by the year 2000, whereas the controlled decentralization plan would require the conversion of about 237 square miles of land from rural to urban use. New urban development under the controlled centralization plan would be encouraged to occur almost entirely at medium urban densities, whereas under the controlled decentralization plan a substantial amount of new urban development would be permitted to occur at the suburban density in a highly diffused fashion and without centralized sanitary sewer and water supply services. Under the controlled centralization plan about 62 percent of all new urban residential land would be located within 20 miles of the central business district of Milwaukee, while under the controlled decentralization plan about 27 percent of new urban residential land would be so located.

3. The controlled decentralization plan would require the conversion to urban use of about 35 square miles of prime agricultural land as compared to the conversion of about nine square miles of such land under the controlled centralization plan. Both plans would seek to preserve all of the approximately 501 square miles of delineated primary environmental corridor area within the Region in essentially natural, open use.

4. Under the controlled centralization plan, about 92 percent of the developed urban land and about 94 percent of the resident population of the Region would be served by public sanitary sewer and water supply services in the year 2000, compared to about 63 percent and 89 percent, respectively, under the controlled decentralization plan.

5. The total future travel demand generated by the land use patterns represented by the two alternative land use patterns would not be significantly different. A total of about 4.46 million person trips were generated within the Region on an average weekday in 1972. By the year 2000, this total could be expected to increase from 1.22 to 1.36 million person trips under the various land use and transportation system combinations considered.

6. Significant differences were found between the alternative land use and transportation system combinations with respect to transit utilization. A total of about 184,000 transit trips were generated within the Region on an average weekday in 1972, representing about 4 percent of all internal person trips. Under the transit-supported highway system plan, average weekday transit trip generation could be expected to increase by about 167,000 trips, or to 6 percent of all internal person trips under the controlled centralization plan; and by about 132,000 trips, or to 6 percent of all internal person trips under the controlled decentralization plan. Under the highway-supported transit system plan, the average weekday transit trip generation could be expected to increase by about 509,000 trips, or to 12 percent of all internal person trips under the controlled centralization plan; and about 391,000 trips or to 10 percent of all internal person trips under the controlled decentralization plan. The highway-supported transit system plan assumes that the basic transit fare will be reduced to $0.25 and that the minimum all day automobile parking costs in downtown Milwaukee will be increased to at least equal the cost of the round trip transit fare, or $0.50. Under the transit-supported highway system plan, it was assumed that the base transit fare would remain at its current level of $0.50 with no changes in relative parking costs for all day parking in downtown Milwaukee.

7. Total arterial vehicle miles of travel within the Region, which stood at about 20.1 million in 1972, could be expected to increase by about 10.2 million under the transit-supported highway system plan prepared to serve the controlled centralization plan; and by about 10.5 million under the transit-supported highway system plan prepared to serve the controlled decentralization plan. The increment in arterial vehicle miles of travel would be somewhat less under both highway-supported transit system plans, increasing by about 7.9 million when that plan is designed to serve the controlled centralization plan and by about 8.5 million when that plan is designed to serve the controlled decentralization plan.

8. Automobile availability which stood at about 705,000 in 1972, could be expected to increase the most under the controlled decentralization land use and "no build" transportation plan combination and the least under the controlled centralization land use and highway-supported transit system plan combination. Automobile availability may be expected to increase by about 346,000 under the former and 248,000 under the latter.

9. Additions to the regional freeway system would total about 116 miles under the highway-supported transit system plan, with virtually no new freeway development in the Milwaukee urbanized area, and by about 237 miles under the transit-supported highway system plan, including significant freeway development in the Milwaukee urbanized area.

10. Significant improvements to the mass transit systems of the Region are proposed under both the highway-supported transit system plan and the transit-supported highway system plan. In each case a significant mileage of exclusive transitway are included in the plans, as well

as significant mileage of exclusive transit lanes on standard arterial streets. The basic difference between the transit systems under the alternative transportation system plans relates to the assumed basic transit fare and changes in the downtown Milwaukee all day parking fee structure.

11. The average annual public cost of implementing the alternative transportation system plans ranges from a low of about $121 million for the "no build" transportation system plan and the controlled centralization land use plan to a high of $2.39 million for the transit-supported highway system plan as designed to serve the controlled decentralization land use plan. The estimated arterial street and highway portion of these costs is well within the financial ability of the Region as indicated by public revenue forecasts for highway construction purposes. The average annual subsidy required to operate the proposed transit systems ranges from a low of $5.5 million for the "no build" transportation system plan under both alternative land use plans to a high of about $50.7 million for the highway-supported transit system plan designed to serve the controlled centralization land use plan.

12. The controlled centralization land use plan satisfies more of the land use development objectives and supporting standards than the controlled decentralization land use plan. Importantly, the controlled centralization plan better relates new urban development to supporting transportation and public utility systems and better meets the standards relating to the preservation of prime and other agricultural lands. Plan evaluation, utilizing the rank-based expected value method, further indicates that the controlled centralization plan best meets the stated regional land use development objectives.

13. Application of the rank-based expected value method of plan evaluation indicates that the transit-supported highway system plan best meets the stated regional development objectives.

14. Analyses conducted under the companion regional air quality maintenance planning program indicate that differences in ambient air quality relating to particulate matter, carbon monoxide, hydrocarbons, nitrogen oxide, and sulfur oxides are not significantly different for the various alternative combination of regional land use and transportation plans considered. Accordingly, regional air quality considerations do not provide a basis for the preferential selection of one alternative plan over another. These analyses further indicate that while the air quality may be expected to remain constant or to improve over existing levels, no matter what plan combination may be selected as the final recommended regional land use-transportation plan, air quality standards will not be met in localized areas of the Region, particularly in Milwaukee County, and implementation strategies will be necessary for the control of the particulate matter, sulfur dioxide, and hydrocarbon emissions. The emission control strategies will, however, have to be related as much to point and area as to line (transportation) sources.

15. After holding a regional planning conference and nine informational meetings throughout the Region and after receiving recommendations from the Technical and Citizen Advisory Committees, the Commission acted on July 28, 1976, to direct the staff to refine and detail the controlled centralization alternative land use plan as the recommended new regional land use plan and to create a special Task Force to assist in nominating a new recommended regional transportation plan that would combine the best elements of transit supported highway and highway supported transit alternative plans.

Chapter VII

THE RECOMMENDED LAND USE PLAN

INTRODUCTION

Previous chapters of this report have described, compared, and evaluated two alternative land use plans for the Southeastern Wisconsin Region for the year 2000: a controlled centralization plan and a controlled decentralization plan. In the controlled centralization plan alternative, the development concept is one of centralization with virtually all new urban development occurring at medium density, in planned neighborhood units, and in areas of the Region which can be readily served by such important urban facilities and services as centralized public sanitary sewer, public water supply, and mass transit. In contrast, the controlled decentralization plan alternative emphasizes lower density and more diffused residential development and the use of onsite soil absorption sewage disposal (septic tank) systems and private water supply wells. Based upon a careful evaluation of these two land use plan alternatives against the adopted regional land use development objectives and standards, the recommendations of the Technical and Citizen Advisory Committees concerned, and a review of the results of a series of public informational meetings and public hearings concerning the land use plan alternatives held throughout the Region in July of 1976, the Commission directed the staff to refine and detail the controlled centralization plan alternative for presentation as the recommended new land use plan for southeastern Wisconsin. The controlled centralization plan, refined to incorporate the specific suggestions of interested citizen leaders and local planners and engineers and to reflect detailed community development proposals, is set forth in this chapter as the recommended new year 2000 land use element of the comprehensive plan for the physical development of the Region.

The basic concepts underlying the recommended land use plan for the year 2000 are the same as those underlying the regional land use plan for 1990 adopted by the Commission in 1966. Like the adopted year 1990 regional land use plan, the recommended land use plan for the year 2000 advocates a return to historic development trends within the Region that were most evident prior to the late 1950's, with urban development proposed to continue to occur largely in concentric rings along the full periphery of, and outward from, existing urban centers. While the plan places heavy emphasis on the continued effect of the urban land market in determining the location, intensity, and character of future urban development, the plan proposes to regulate to a greater degree than in the past the effect of this market on development in order to ensure that new urban development occurs at densities consistent with the provision of public centralized sanitary sewer, water supply, and mass transit facilities and services and in locations where such facilities can be readily and economically extended or obtained, particularly including the older central cities. In so doing, the plan seeks to provide a more orderly and economic development pattern and an abatement of areawide developmental and environmental problems within the Region, thereby channeling the results of market forces into better conformance with the established regional development objectives.

Similar to the adopted year 1990 regional land use plan, historic growth trends within the Region under the recommended plan for the year 2000 would continue to be altered by encouraging intensive urban development—consisting primarily of residential, commercial, recreational, industrial, and institutional land uses—to occur in those areas of the Region having soils suitable for such development and which may be readily provided with sanitary sewer systems, public water supply, mass transit, and other essential urban services. New urban development would occur in planned neighborhood development units, primarily at medium population density levels—that is, with new single-family residential development averaging about four dwelling units per net residential acre and with new multiple-family residential development averaging about 10 dwelling units per net residential acre. As in the adopted year 1990 regional land use plan, the most basic regional development objectives would be achieved by protecting from further urban development the floodlands of the perennial streams, by protecting from development the best remaining woodlands and wetlands, by protecting the most productive agricultural lands in the Region, and by developing an integrated system of park and open space areas centered on the primary environmental corridors. Under the recommended land use plan for the year 2000, the allocation of future land use within each county of the Region is such as to approximate the forecast county population levels set forth in Chapter III and, to the extent possible, the proposals contained in local community development plans and zoning ordinances.

DESIGN METHODOLOGY

Following the methodology utilized in the preparation of the adopted 1990 regional land use plan, the following three general guidelines were used in the design of the recommended regional land use plan for the year 2000:

1. New urban development should emphasize medium densities and should be located in those areas of the Region readily provided with essential urban services, particularly centralized sanitary sewer systems and water supply and mass transit services; and new residential development should occur largely in planned neighborhood units.

2. No new urban development should be allocated to the delineated primary environmental corridors in order to preserve the best remaining elements of the natural resource base of southeastern Wisconsin.

3. To the maximum extent possible, no new urban development should be allocated to the delineated prime agricultural lands, thereby preserving highly productive lands for the continuing production of food and fibre.

The specific procedures utilized in preparing the recommended regional land use plan for the year 2000 were as follows:

1. A determination was made of the amount of "developable" land located within each U. S. Public Land Survey quarter section. Developable land was defined as land which, while not presently developed for urban use, was suitable and could be assumed available for such use. The developable land area was determined for each quarter section by subtracting from the quarter section total the area within the quarter section included in primary environmental corridors, the area covered by soils having "severe" and "very severe" limitations for urban development even with public centralized sanitary sewers, and the area covered by existing urban development as of 1975.

2. An identification was made of those quarter sections served by public sanitary sewerage facilities as of 1975 and those planned to be served by such facilities in the adopted regional sanitary sewerage system plan.

3. An assignment of a proposed potential urban or rural density was made to each quarter section based upon consideration of existing development densities in the quarter section concerned and in adjacent quarter sections, trends in densities in adjacent quarter sections, the forecast population increase in the planning analysis areas (see Map 2), community plans and zoning provisions, and planning judgment. The specific density categories utilized in the plan preparation are identified and defined in Table 54 (see also Appendix Tables G-1 and G-2). These categories include urban high-density, with a net lot area per dwelling unit ranging from 0.06 to 0.14 acre; urban medium-density, with a net lot area per dwelling unit ranging from 0.15 to 0.44 acre; urban low-density, with a net lot area per dwelling unit ranging from 0.45 to 1.44 acres; suburban residential density, with a net lot area per dwelling unit ranging from 1.45 to 5.00 acres; and rural density, with a net lot area per dwelling unit exceeding 5.00 acres.

   The standards set forth in Chapter II of this volume require that the urban high-, medium-, and low-density categories of residential development be provided with a full array of urban services, including centralized sanitary sewer and water supply services and walk-in elementary school service. The standards further require that the suburban residential density category be provided with partial urban services, including solid waste collection and police, fire, and rescue services, but not including walk-in elementary school or centralized sanitary sewer and water supply services. Thus, within the context of this report, the term "suburban" is utilized in its literal sense; that is, "sub-urban," indicating that a particular area of urban development is being provided with less than the full range of available urban services. This meaning of the term suburban should not be confused with the more popular meaning used to identify civil divisions adjacent to a large central city. Taken together, the urban high-, medium-, and low-density and the suburban residential density categories constitute the full range of urban development contemplated in the recommended land use plan, with any development exceeding a net lot area of 5 acres per dwelling unit deemed by definition to constitute either rural estate or farm residential development.

4. A determination was made of the location of all proposed community and major regional land uses by quarter section, including community and major multipurpose commercial centers; community and major industrial centers; major institutional centers, including county, state, and federal administrative offices, major medical centers, universities, technical/vocational schools, and cultural/entertainment centers and libraries as recommended in the regional library facilities and services plan; major state, regional, and county parks and special purpose recreation sites; and major transportation and utility centers including airports as recommended in the adopted regional airport system plan bus, rail, and sea passenger terminals, sewage treatment plants as recommended in the adopted regional sanitary sewerage system plan, and major electric power generation plants. Locations for these proposed community and major regional land uses were formulated within the context of the land use pattern existing in the Region in 1975 and the framework of existing community plans and zoning provisions.

5. A determination was made of those quarter sections to which new urban development should be assigned, following the three general guidelines set forth above.

6. New residential land was allocated as follows:

   a. New residential development was allocated, first, to land identified in the 1975 land use inventory as "under development"; that is, land platted and committed to residential use

but not yet used for such development. In this step, lands were designated for development at high-, medium-, or low-, or suburban-residential densities, depending on the development pattern to which the land was committed.

b. When the existing supply of residential land under development was exhausted, new residential development was allocated, generally at medium densities, to available developable land in quarter sections covered by soils suitable for such use and within delineated sanitary sewer service areas. It should be noted that no new suburban density residential development, as defined earlier, was allocated in this step.

c. About 10 percent of the forecast increase in the population of the Region through the plan design year 2000 was accommodated in rural density residential development, as defined earlier, in response to the apparent demand for very low-density country-estate type development.

7. All new high-, medium-, and low-density residential development was assumed to occur in planned neighborhood units. Accordingly, a distribution of urban land uses which support residential uses at the neighborhood level was made to the developable land areas in those quarter sections to which new high-, medium-, or low-density residential development was assigned. This distribution of urban land uses was made in terms of the following land use categories: neighborhood commercial; neighborhood institutional; neighborhood park; and neighborhood transportation (streets and highways). The distribution of urban land was based upon the land development percentages embodied in the neighborhood development standards for each residential density category.

8. A calculation was made of the incremental and total housing units and population by quarter section and planning analysis area. Assumptions concerning the average household size were varied by county based on trend analyses (see Table 154).

9. An adjustment was made of the planned land use distribution, including population and housing units, utilizing the year 2000 regional and county population forecasts as set forth in Chapter III of this volume for control totals.

10. A recommended regional land use plan computer tape file was prepared for use in the assignment of forecast employment, for the development of alternative transportation plans, and for area source air pollution analyses. The file includes for each quarter section both existing and future land use by major category and existing and future population, housing units, and employment.

PLAN DESCRIPTION

Commission forecasts indicate that the population of the Southeastern Wisconsin Region may be expected to reach a level of about 2.22 million persons by the year 2000, an increase of approximately 460,000 persons over the 1970 population level, while employment may be expected to reach about 1.02 million jobs by the year 2000, an increase of 267,000 jobs over the 1972 level. The recommended land use plan proposes to accommodate this growth in population and employment through the conversion of approximately 113 square miles of land from rural to urban use by the year 2000. The future land use pattern proposed by the plan is shown on Map 53 and on a map included in a packet attached to the back cover of this volume, and is summarized for the Region overall in Table 270 and for the individual counties and planning analysis areas in the Region in Appendix Tables G-19 through G-29.

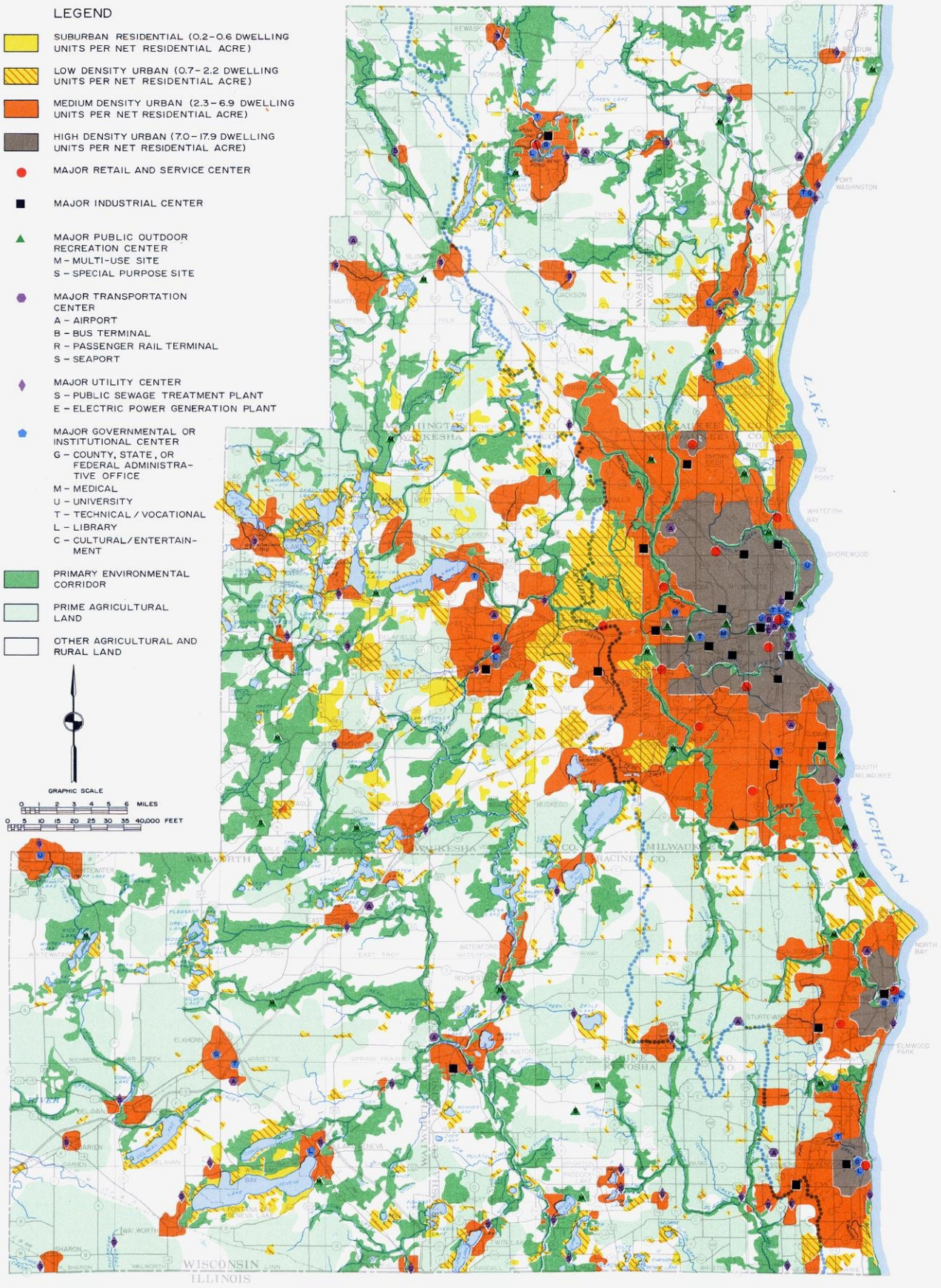
Residential Development

The recommended land use plan proposes to meet the housing needs of the growing regional population through the maintenance of existing urban areas and as needed an outward expansion of existing urban areas. The future intensity and distribution of residential development would be established largely through the operation of the urban land market, guided in the public interest, however, by the required adaptation to certain physiographic and cultural features of the Region, particularly the primary environmental corridors and the sanitary sewer service areas identified in the adopted regional sanitary sewerage system plan. The recommended land use plan would seek to discourage scattered, "leap-frog" urban development in outlying areas of the Region, both through maintenance of rural development densities in these areas—that is, average lot sizes of at least five acres for single-family housing development—and through encouragement of higher-density development in those areas of the Region that can be most readily served by essential urban services.

The recommended regional land use plan proposes to add about 60,900 acres to the existing stock of residential land within the Region in order to meet the additional housing needs associated with the forecast increase in the regional population by the plan design year. As indicated in Table 271, the recommended plan proposes an additional 38,600 acres of urban residential land—that is, residential land to be developed at a high-, medium-, and low-, or suburban-density—and an additional 22,300 acres of rural residential land, or very low-density residential development with lot sizes exceeding five acres. Under the recommended land use plan, most of the additional housing required in the Region by the year 2000 would be developed in urban residential areas, predominantly at medium density, with a typical single-family lot size of one quarter acre and a typical multiple-family development averaging about 10 dwelling units per net acre. While rural residential development accounts for a substantial proportion, 37 percent, of the total proposed increase in residential land, such development would

Map 53

RECOMMENDED LAND USE PLAN FOR THE, SOUTHEASTERN WISCONSIN REGION: 2000



The recommended regional land use plan envisions converting about 113 square miles of land from rural to urban use over the period 1970 to 2000 to accommodate the forecast 463,000 person increase in the regional population expected over this time period. The degree of centralization of the recommended plan is indicated by the fact that over 60 percent of all new urban residential land and about 49 percent of the incremental resident population would be located within 20 miles of the central business district of the City of Milwaukee. Even with this emphasis on centralization of land use development the average population density of the developed urban area of the Region would decline from about 4,350 persons per square mile in 1970 to about 3,500 persons per square mile in the year 2000.

Source: SEWRPC.

Table 270

EXISTING AND PROPOSED LAND USE IN THE REGION: 1970 AND 2000 RECOMMENDED REGIONAL LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	24,389	7.4	371	1.5	24,760	6.2
Urban Medium Density	37,092	11.3	41,046	110.7	78,138	19.5
Urban Low Density	72,701	22.2	- 7,689	- 10.6	65,012	16.2
Suburban Density	22,079	6.7	4,862	22.0	26,941	6.7
Subtotal	156,261	47.6	38,590	24.7	194,851	48.6
Commercial	6,517	2.0	698	10.7	7,215	1.8
Industrial	10,038	3.1	6,672	66.5	16,710	4.2
Governmental and Institutional	16,628	5.1	951	5.7	17,579	4.4
Transportation, Communication,and Utilities[a]	109,430	33.4	21,441	19.6	130,871	32.7
Recreation	28,982[b]	8.8	4,166[c]	14.4	33,148	8.3
Urban Land Use Subtotal	327,856	100.0	72,518	22.1	400,374	100.0
Rural Land Use						
Residential	--[d]	--	22,306	--	22,306	1.7
Agriculture	1,040,119	74.7	- 79,779	- 7.7	960,340	72.7
Other Open Lands[e]	353,125	25.3	- 15,045	- 4.3	338,080	25.6
Rural Land Use Subtotal	1,393,244	100.0	- 72,518	- 5.2	1,320,726	100.0
Total	1,721,100	--	--	--	1,721,100	--

[a] *Includes off-street parking uses.*

[b] *Includes net site area of public and nonpublic recreation sites.*

[c] *Includes only that net site area recommended for public recreation use.*

[d] *Includes in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

accommodate only a small proportion, approximately 10 percent, of the incremental population because of the large lot size involved.

Among the seven counties in the Region, Waukesha County would experience the largest increase in urban residential land—13,700 acres—under the recommended land use plan (see Table 271). Milwaukee County would also experience a relatively large increase in urban residential land, approximately 7,900 acres. In fact, more than one half of the total increase in the urban residential land in the Region would occur in Waukesha and Milwaukee Counties. At the other extreme, the smallest increase in urban residential land among the seven counties would occur in Walworth County, where an increase of approximately 2,000 acres is planned.

As further indicated in Table 271, among the seven counties, Waukesha County would also experience the largest increase in rural residential land—approximately 8,300 acres, while Washington County, with a proposed increase of 7,300 acres, is second. In comparison, the amount of rural residential development proposed in each of the five counties is small—less than 2,200 acres— with no rural residential land proposed in Milwaukee whatsoever.

The change in distribution of occupied housing units, or households, resulting from implementation of the residential development proposals of the recommended land use plan is summarized in Table 272. Waukesha County would experience an increase of about 56,000 households under the regional land use plan, with its

Table 271

EXISTING AND PROPOSED RESIDENTIAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 RECOMMENDED LAND USE PLAN

County	Residential Land Use in Acres											
	Urban High Density				Urban Medium Density				Urban Low Density			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	1,375	123	1,498	8.9	3,499	4,652	8,151	133.0	7,100	- 1,356	5,744	- 19.1
Milwaukee	20,178	357	20,535	1.8	13,663	10,447	24,110	76.5	9,291	- 2,705	6,586	- 29.1
Ozaukee	54	- 45	9	- 83.3	2,297	3,392	5,689	147.7	6,237	1,452	7,689	23.3
Racine	2,031	2	2,033	0.1	4,255	4,197	8,452	98.6	8,970	- 1,333	7,637	- 14.9
Walworth	29	- 20	9	- 69.0	3,083	2,225	5,308	72.2	7,224	- 557	6,667	- 7.7
Washington	99	--	99	--	2,999	4,495	7,494	149.9	6,983	- 1,067	5,916	- 15.3
Waukesha	623	- 46	577	- 7.4	7,296	11,638	18,934	159.5	26,896	- 2,123	24,773	- 7.9
Total	24,389	371	24,760	1.5	37,092	41,046	78,138	110.7	72,701	- 7,689	65,012	- 10.6

County	Residential Land Use in Acres											
	Suburban				Total Urban				Rural			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	1,502	- 88	1,414	- 5.9	13,476	3,331	16,807	24.7	--	1,484	1,484	--
Milwaukee	2,499	- 185	2,314	- 7.4	45,631	7,914	53,545	17.3	--	--	--	--
Ozaukee	3,733	- 390	3,343	- 10.4	12,321	4,409	16,730	35.8	--	1,243	1,243	--
Racine	1,369	- 167	1,202	- 12.2	16,625	2,699	19,324	16.2	--	1,797	1,797	--
Walworth	3,073	378	3,451	12.3	13,409	2,026	15,435	15.1	--	2,115	2,115	--
Washington	1,443	1,062	2,505	73.6	11,524	4,490	16,014	39.0	--	7,318	7,318	--
Waukesha	8,460	4,252	12,712	50.3	43,275	13,721	56,996	31.7	--	8,349	8,349	--
Total	22,079	4,862	26,941	22.0	156,261	38,590	194,851	24.7	--	22,306	22,306	--

Source: SEWRPC.

Table 272

EXISTING AND PROPOSED OCCUPIED HOUSING UNITS IN THE REGION BY COUNTY
1970 AND 2000 RECOMMENDED LAND USE PLAN

County	Occupied Housing Units					
	1970		Planned Increment 1970-2000		2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha	35,500	6.6	20,900	58.9	56,400	7.6
Milwaukee	338,600	63.1	54,100	16.0	392,700	53.1
Ozaukee	14,800	2.8	17,700	119.6	32,500	4.4
Racine	49,800	9.3	18,000	36.1	67,800	9.2
Walworth	18,500	3.5	11,400	61.6	29,900	4.0
Washington	17,400	3.2	24,800	142.5	42,200	5.7
Waukesha	61,900	11.5	56,000	90.5	117,900	16.0
Region	536,500	100.0	202,900	37.8	739,400	100.0

Source: SEWRPC.

share of the regional total households increasing from 11.5 percent to 16.0 percent. While Milwaukee County would also experience a large absolute increase of 54,100 households between 1970 and the year 2000, its share of the regional total would decline from 63.1 percent to 53.1 percent. On a relative basis, among the seven counties the number of households would increase at the fastest rate, 143 percent, in Washington County. Despite this rapid growth rate, however, Washington County would still only account for 5.7 percent of all households in the Region in the plan design year.

Commercial Development

The recommended land use plan proposes the development of approximately 700 acres of new commercial land within the Region over the plan design period, increasing the total stock of commercial land in the Region to over 7,200 acres by the year 2000. This increase would meet the area requirements of the anticipated increases in retail and service employment and the demands of a growing population within the Region and would be distributed so as to make the operation of business and the provision of goods and services to the people of the Region both efficient and convenient. This is proposed to be accomplished through the development of planned, integrated commercial centers properly located with respect to the existing and proposed transportation system and residential areas; through the discouragement of strip commercial development along major streets and highways; through the encouragement of the provision of adequate off-street parking and loading facilities; and through the efficient provision of adequate utility services.

There were 12 major commercial centers in the Region in 1970. These 12 centers comprise a total of 390 acres of commercial land uses—excluding related off-street parking—and provide employment for over 99,000 persons, which accounts for about 33 percent of the total retail and service employment in the Region (see Tables 273 and 274). The recommended land use plan proposes to retain 11 of these 12 existing retail and service centers as major commercial areas through the year 2000 and, furthermore, proposes the expansion of certain of these centers. It is anticipated that, by the year 2000, the 11 existing major commercial centers which are retained under the recommended plan would provide employment for an additional 8,000 persons.

In addition to providing land area for the expansion and improvement of 11 existing major commercial centers, the plan proposes to add five new major commercial centers (see Map 54). These new centers would provide employment for over 20,000 persons and would be located in the Cities of Milwaukee, Oak Creek, Racine, Waukesha, and West Bend. The Oak Creek and Racine centers, it should be noted, would be entirely new commercial areas. The major commercial centers in the Cities of Waukesha and West Bend would result from growth in commercial activities in the central business districts of those cities. The additional major commercial center in the City of Milwaukee is the Northridge Shopping Center which was essentially completed by 1972. Each of these new centers would serve a market area containing 100,000 persons or more, have a net site area of at least 20 acres, and would contain a full range of commercial and service enterprises necessary to serve the surrounding trade area.

Because of the lower design population level used in the preparation of the year 2000 land use plan, the number of major commercial centers in the Region proposed under that plan is considerably less than the number of such centers included in the adopted year 1990 land use plan. In this regard, the recommended land use plan for the year 2000 includes a total of 16 major commercial centers, in comparison to 23 such centers under the adopted year 1990 land use plan. All major commercial centers included in the year 2000 plan were included in the initial 1990 land use plan, although the previously proposed major commercial center in Franklin was developed at an alternate site in the Village of Greendale and City of Greenfield. On the other hand, seven major commercial areas included in the adopted 1990 land use plan were not incorporated into the recommended land use plan for the year 2000, including the following centers: Kenosha-West, Twenty-first and North in the City of Milwaukee, Burlington, Germantown, Oconomowoc, Menomonee Falls, and New Berlin.

In addition to the major existing and proposed commercial centers, the recommended year 2000 land use plan provides for more than 400 additional acres of commercial and service land for neighborhood and community commercial development (see Table 275). This new neighborhood and community commercial area, together with the area in such existing uses, would employ nearly 308,000 persons by the year 2000, an increase of 49 percent over the estimated 1972 level.

Industrial Development

The recommended plan proposes to add by the year 2000 more than 6,600 acres of industrial land in the Region, increasing the total stock of such land in the Region to more than 16,700 acres by the plan design year. This increase would meet the land requirements of the anticipated increases in manufacturing and wholesaling employment within the Region and would be distributed so as to protect and enhance the continued efficient operation of these most important components of the economic base of the Region. This is proposed to be accomplished through the development of planned industrial centers properly located with respect to the existing and proposed transportation system; through the protection and enhancement of existing industrial areas; and through the efficient provision of adequate utility services. The plan provides adequate sites for industrial development which meet the full array of criteria for such development, including ready accessibility to high-speed, all-weather arterial highway facilities; soils which are suitable for industrial development; adequate power and water supply; sanitary sewer service and storm water drainage; reasonable access to airport and railway facilities; and ready access to labor supply.

Table 273

SELECTED CHARACTERISTICS OF PLANNED MAJOR RETAIL AND SERVICE CENTERS IN THE REGION: 2000 RECOMMENDED LAND USE PLAN

Major Retail[a] and Service Center	Land Use Area in Acres						Employment		
	Gross[b]			Net[c]					
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1972	Planned Increment	Total 2000
Existing									
Kenosha CBD[d]	45	--	45	29	--	29	2,400	--	2,400
Bay Shore	79	--	79	28	--	28	5,600	100	5,700
Capitol Court	79	--	79	28	--	28	3,000	100	3,100
Mayfair	109	10	119	21	17	38	3,600	1,900	5,500
Milwaukee CBD	208	--	208	97	--	97	65,900	200	66,100
Mitchell Street	50	--	50	20	--	20	4,400	300	4,700
Southgate	91	--	91	28	--	28	2,400	100	2,500
Southridge	55	54	109	25	18	43	2,700	1,800	4,500
West Allis-West	58	15	73	21	5	26	1,500	600	2,100
Elmwood Plaza[e]	52	-52	--	18	-18	--	1,700	-1,700	--
Racine CBD	62	--	62	31	--	31	4,100	400	4,500
Brookfield Square	101	114	215	44	38	82	1,900	4,200	6,100
Subtotal	989	141	1,130	390	60	450	99,200	8,000	107,200
Proposed									
Northridge	--	135	135	--	45	45	--	4,500	4,500
Oak Creek	--	90	90	--	30	30	--	3,000	3,000
Racine-West	--	102	102	--	34	34	--	3,500	3,500
West Bend CBD	--	68	68	--	43	43	--	6,200	6,200
Waukesha CBD	--	69	69	--	42	42	--	3,100	3,100
Subtotal	--	464	464	--	194	194	--	20,300	20,300
Total	989	605	1,594	390	254	644	99,200	28,300	127,500

[a] *See Map 54.*

[b] *Includes land actually used for retail and service purposes together with associated off-street parking and road facilities, loading areas, and landscape areas.*

[c] *Includes only that land actually used for retail and service purposes.*

[d] *Central business district.*

[e] *This center would be replaced by a proposed new center at the intersection of STH 11 and STH 31. Elmwood Plaza would remain as a community level retail and service center.*

Source: SEWRPC.

As shown on Map 55, there were 17 major industrial centers within the Region in 1970. These 17 centers encompassed a total area of about 4,000 acres of manufacturing and warehousing land uses, excluding off-street parking, and provide employment for about 179,000 persons, or about 60 percent of the total regional employment in the manufacturing and wholesaling industries (see Tables 276 and 277). The recommended land use plan proposes to retain these 17 areas as major industrial areas through the year 2000 and, furthermore, proposes the expansion of certain of these existing centers. Under the recommended plan, it is anticipated that by the year 2000 the 17 major industrial areas will provide employment for about 198,000 persons, an increase of about 10 percent over the estimated 1972 employment.

As further shown on Map 55, in addition to providing for the expansion and improvement of the existing major industrial areas within the Region, the plan also proposes to add five new major industrial centers. These centers

Table 274

EXISTING AND PROPOSED COMMERCIAL EMPLOYMENT DISTRIBUTION BY TYPE OF COMMERCIAL AREA: 1972 AND 2000 RECOMMENDED LAND USE PLAN

Type of Commercial Area	Commercial Employment[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Major Retail and Service						
Existing[b]	99,200	32.5	8,000	8.1	107,200	24.6
Proposed	--	--	20,300	--	20,300	4.7
Subtotal	99,200	32.5	28,300	28.5	127,500	29.3
Neighborhood and Other	205,900	67.5	101,600	49.3	307,500	70.7
Total	305,100	100.0	129,900	42.6	435,000	100.0

[a] *Includes retail and service industries; excludes government and transportation and communication industries.*

[b] *Employment at one existing major center—Elmwood Plaza in Racine—is included in the 1972 existing major retail and service total but is not included in the 2000 major retail and service total because it would be replaced by a new center at the intersection of STH 11 and STH 31. Employment at the Elmwood Plaza Center in 2000 is included in the neighborhood and other category.*

Source: SEWRPC.

Table 275

EXISTING AND PROPOSED COMMERCIAL LAND USE IN THE REGION BY COUNTY 1970 AND 2000 RECOMMENDED LAND USE PLAN

County	Commercial Land Use in Acres											
	Major[a]				Neighborhood and Other				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	29	--	29	--	475	34	509	7.2	504	34	538	6.7
Milwaukee	268	115	383	42.9	2,607	81	2,688	3.1	2,875	196	3,071	6.8
Ozaukee	--	--	--	--	331	43	374	13.0	331	43	374	13.0
Racine	49	16	65	32.7	525	67	592	12.8	574	83	657	14.5
Walworth	--	--	--	--	593	64	657	10.8	593	64	657	10.8
Washington	--	43	43	--[b]	299	-2[c]	297	-0.7	299	41	340	13.7
Waukesha	44	80	124	181.8	1,297	157	1,454	12.1	1,341	237	1,578	17.7
Total	390	254	644	65.1	6,127	444	6,571	7.2	6,517	698	7,215	10.7

[a] *Elmwood Plaza in Racine is included in 1970 but excluded in 2000 because it is to be replaced by a new center at the intersection of STH 11 and STH 31.*

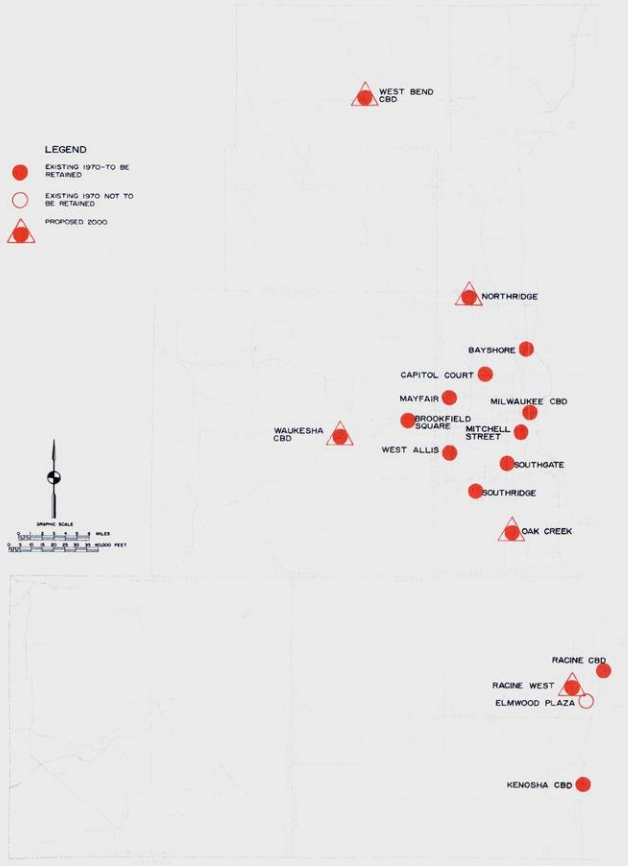
[b] *The percent change is infinity.*

[c] *The loss in neighborhood and other commercial land use in Washington County is due to the conversion of the West Bend CBD (43 acres) from other to major by 2000.*

Source: SEWRPC.

Map 54

MAJOR RETAIL AND SERVICE CENTERS IN THE REGION
2000 RECOMMENDED LAND USE PLAN

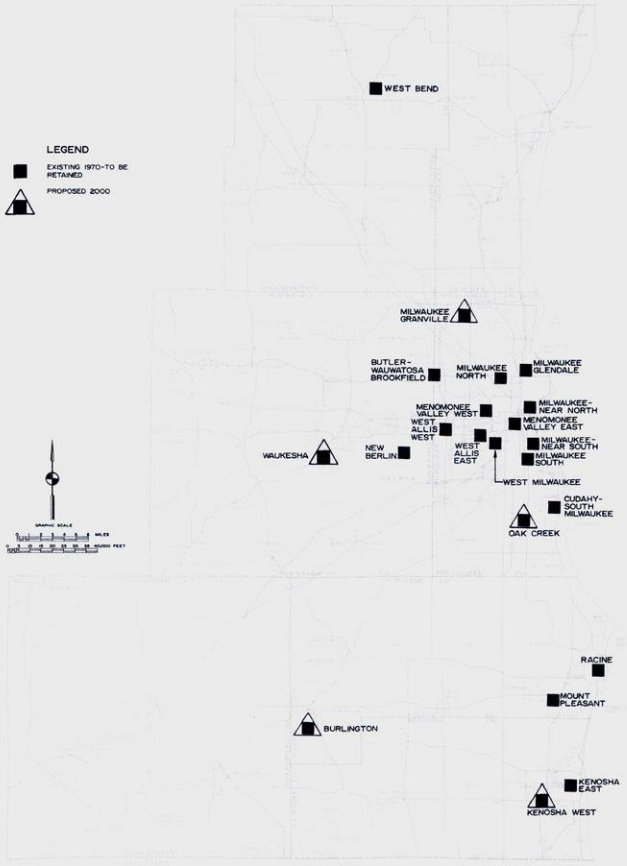


The recommended land use plan envisions that 16 major retail and service centers will be provided to serve the needs of the Region through the year 2000. Twelve of these centers existed in 1970, eleven of which are to be retained. Five are proposed new centers. The proposed new centers have a minimum gross site area of 70 acres each and are to be located in or near the Cities of Milwaukee, Oak Creek, Racine, West Bend, and Waukesha.

Source: SEWRPC.

Map 55

MAJOR INDUSTRIAL CENTERS IN THE REGION
2000 RECOMMENDED LAND USE PLAN



The recommended land use plan envisions that 22 major industrial centers will be provided to serve the needs of the Region through the year 2000. Seventeen of these centers existed in 1970 and are to be retained and enlarged while five are proposed new centers. The five proposed new centers, each having a minimum gross site area of 320 acres are Kenosha-West, Milwaukee, Granville, Oak Creek, Burlington, and Waukesha.

Source: SEWRPC.

would be located in and/or near the Cities of Kenosha, Milwaukee, Oak Creek, Burlington, and Waukesha. These centers would provide employment for more than 41,000 persons by the plan design year. Each of these new industrial areas has been provided for in local plans as well as in the recommended regional land use plan and would comprise an area of at least 250 acres of net industrial land designed and developed according to an integrated plan for use by a community of industries.

The recommended year 2000 regional land use plan includes all major industrial centers included in the adopted 1990 land use plan. The 1990 land use plan, it should be noted, proposed the development of six additional major industrial areas in the Region. One of these new industrial areas, proposed under the adopted 1990 plan to be located in the Town of Mt. Pleasant in Racine County, has been developed and is known as Waxdale. It should also be noted that two industrial areas located in the Cities of Cudahy and South Milwaukee, which were identified as separate major industrial sites under the adopted 1990 plan, are considered to comprise a single major industrial area under the recommended year 2000 plan, primarily because of their proximity to one another.

In addition to the major existing and proposed industrial areas shown on the plan, the plan provides for more than 2,700 acres of new industrial land for smaller industrial areas within local communities (see Table 278). The new

Table 276

SELECTED CHARACTERISTICS OF PLANNED MAJOR INDUSTRIAL CENTERS IN THE REGION: 2000 RECOMMENDED LAND USE PLAN

Major Industrial Center[a]	Land Use in Acres						Employment		
	Gross[b]			Net[c]					
	Existing 1970	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000	Existing 1972	Planned Increment	Total 2000
Existing									
Kenosha-East	234	--	234	214	--	214	11,600	--	11,600
Cudahy-South Milwaukee	294	83	377	256	70	326	7,300	1,100	8,400
Milwaukee-Glendale	446	--	446	358	--	358	17,800	400	18,200
Milwaukee-Menomonee Valley East	447	--	447	398	--	396	18,600	400	19,000
Milwaukee-Menomonee Valley West	134	--	134	120	--	120	5,300	100	5,400
Milwaukee-Near North	155	--	155	123	--	123	15,000	300	15,300
Milwaukee-Near South	307	--	307	280	--	280	12,600	300	12,000
Milwaukee-North	391	--	391	342	--	342	20,800	400	21,200
Milwaukee-South	111	--	111	89	--	89	4,100	100	4,200
West Allis-East	252	--	252	220	--	220	9,300	200	9,500
West Allis-West	160	--	160	129	--	129	3,600	100	3,700
West Milwaukee	472	--	472	408	--	408	15,400	300	15,700
Mt. Pleasant	176	531	707	162	413	575	3,500	5,900	9,400
Racine	340	--	340	273	--	273	12,500	300	12,800
West Bend	110	297	407	83	231	314	3,800	3,300	7,100
Butler-Wauwatosa-Brookfield	474	--	474	375	--	375	14,600	300	14,900
New Berlin	198	455	653	174	350	524	3,500	5,000	8,500
Subtotal	4,701	1,366	6,067	4,004	1,064	5,068	179,300	18,500	197,800
Proposed									
Kenosha-West	--	393	393	--	313	313	--	4,500	4,500
Milwaukee-Granville	--	1,407	1,407	--	1,117	1,117	--	15,500	15,500
Oak Creek	--	874	874	--	678	678	--	8,800	8,800
Burlington	--	402	402	--	325	325	--	4,700	4,700
Waukesha	--	582	582	--	460	460	--	8,000	8,000
Subtotal	--	3,658	3,658	--	2,893	2,893	--	41,500	41,500
Total	4,701	5,024	9,725	4,004	3,957	7,961	179,300	60,000	239,300

[a] *See Map 55.*

[b] *Includes land actually used for industrial purposes together with associated off-street parking and road facilities, loading areas, and landscaped areas.*

[c] *Includes only that land actually used for industrial purposes.*

Source: SEWRPC.

industrial area, together with the area devoted to existing local industrial areas, would employ more than 159,000 persons by the year 2000, an increase of 32 percent over the estimated 1972 employment level.

Governmental and Institutional Land Use

As indicated in Table 279, the recommended land use plan proposes to add by the year 2000 about 950 acres of new governmental and institutional land to the existing stock of such land within the Region, resulting in a total of about 17,600 acres of governmental and institutional land by the plan design year. Most of the additional governmental and institutional lands proposed under the recommended plan would be of neighborhood and community, rather than major regional, significance. Specifically, of the planned increment of 951 acres of

Table 277

EXISTING AND PROPOSED INDUSTRIAL EMPLOYMENT DISTRIBUTION BY TYPE OF INDUSTRIAL AREA: 1972 AND 2000 RECOMMENDED LAND USE PLAN

Type of Industrial Area	Industrial Employment[a]					
	Existing 1972		Planned Increment		Total 2000	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Major Industrial						
Existing	179,300	59.7	18,500	10.3	197,800	49.6
Proposed	--	--	41,500	--	41,500	10.4
Subtotal	179,300	59.7	60,000	33.5	239,300	60.0
Local and Other	120,800	40.3	38,500	31.9	159,300	40.0
Total	300,100	100.0	98,500	32.8	398,600	100.0

[a] *Includes manufacturing and wholesaling industries.*

Source: SEWRPC.

Table 278

EXISTING AND PROPOSED INDUSTRIAL LAND USE IN THE REGION BY COUNTY 1970 AND 2000 RECOMMENDED LAND USE PLAN

County	Industrial Land Use in Acres											
	Major				Local and Other				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	214	313	527	146.3	597	37	634	6.2	811	350	1,161	43.2
Milwaukee	2,944	1,865	4,809	63.3	1,955	130	2,085	6.6	4,899	1,995	6,894	40.7
Ozaukee	--	--	--	--	443	483	926	109.0	443	483	926	109.0
Racine	435	738	1,173	169.7	664	60	724	9.0	1,099	798	1,897	72.6
Walworth	--	--	--	--	827	448	1,275	5.4	827	448	1,275	54.2
Washington	83	231	314	278.3	351	154	505	43.9	434	385	819	88.7
Waukesha	328	810	1,138	247.0	1,197	1,403	2,600	117.2	1,525	2,213	3,738	145.1
Total	4,004	3,957	7,961	98.8	6,034	2,715	8,749	45.0	10,038	6,672	16,710	66.5

Source: SEWRPC.

governmental and institutional land, 897 acres would be developed for such neighborhood and community uses as new schools, hospitals, and churches; for public facilities including police and fire stations; and for city, village, and town halls.

Major governmental centers, including county seats, state and federal office buildings, and medical complexes, along with major institutional centers, including universities, technical schools, libraries, and cultural centers, are shown on Map 56. As indicated in Table 279, the recommended land use plan calls for a total of 888 acres of lands devoted to such major governmental and institutional uses in the year 2000, an increase of only 54 acres over the 1970 level. The small planned increment in major governmental and institutional lands, it should be noted, is intended to accommodate the development of the Waukesha County Technical Institute in the Village of Pewaukee since 1970 as well as the expansion of the Milwaukee Area Technical Colleges through branches in the City of Oak Creek and the City of Mequon.

Transportation, Communication, and Utility Developed Land Use

As indicated in Table 280, the recommended land use plan proposes to add approximately 21,400 acres of new transportation, communication, and utility land to the existing stock of such land within the Region. A total of

Table 279

EXISTING AND PROPOSED GOVERNMENTAL AND INSTITUTIONAL LAND USE IN THE REGION BY COUNTY: 1970 AND 2000 RECOMMENDED LAND USE PLAN

County	Governmental and Institutional Land Use in Acres											
	Major[a]				Neighborhood and Other				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	163	--	163	--	1,163	89	1,252	7.7	1,326	89	1,415	6.7
Milwaukee . . .	570	15	585	2.6	6,932	196	7,128	2.8	7,502	211	7,713	2.8
Ozaukee	3	15	18	500.0	936	98	1,034	10.5	939	113	1,052	12.0
Racine	7	--	7	--	1,737	72	1,809	4.1	1,744	72	1,816	4.1
Walworth. . . .	76	--	76	--	1,116	48	1,164	4.3	1,192	48	1,240	4.0
Washington . .	8	--	8	--	908	122	1,030	13.4	916	122	1,038	13.3
Waukesha . . .	7	24	31	342.9	3,002	272	3,274	9.1	3,009	296	3,305	9.8
Total	834	54	888	6.5	15,794	897	16,691	5.7	16,628	951	17,579	5.7

[a] *Includes the following governmental centers: county seats, state and federal office buildings, medical complexes; and the following institutional centers: universities, technical and vocational schools, libraries, and cultural/entertainment centers.*

Source: SEWRPC.

Table 280

EXISTING AND PROPOSED TRANSPORTATION, COMMUNICATION, AND UTILITY LAND USE IN THE REGION BY COUNTY: 1970 AND 2000 RECOMMENDED LAND USE PLAN

County	Transportation, Communication, and Utility Land Use in Acres[a]											
	Major[b]				Other				Total			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	208	1,146	1,354	551.0	8,724	1,434	10,158	16.4	8,932	2,580	11,512	28.9
Milwaukee . . .	2,179	220	2,399	10.1	33,262	3,396	36,658	10.2	35,441	3,616	39,057	10.2
Ozaukee	57	276	333	484.2	7,998	1,646	9,644	20.6	8,055	1,922	9,977	23.9
Racine	414	201	615	48.6	12,028	1,479	13,507	12.3	12,442	1,680	14,122	13.5
Walworth. . . .	52	725	777	1,394.2	11,968	1,096	13,064	9.2	12,020	1,821	13,841	15.1
Washington . .	249	426	675	171.1	11,040	2,814	13,854	25.5	11,289	3,240	14,529	28.7
Waukesha . . .	370	160	530	43.2	20,881	6,422	27,303	30.8	21,251	6,582	27,833	31.0
Total	3,529	3,154	6,683	89.4	105,901	18,287	124,188	17.3	109,430	21,441	130,871	19.6

[a] *Includes communication and utility uses; harbor, railroad, and airport uses; truck terminals; and off-street parking associated with other land use development; as well as streets and highways.*

[b] *Includes the following transportation centers: airports, seaports, bus terminals, and rail passenger terminals; and the following utility centers: public sewage treatment plants and electric power generation plants.*

Source: SEWRPC.

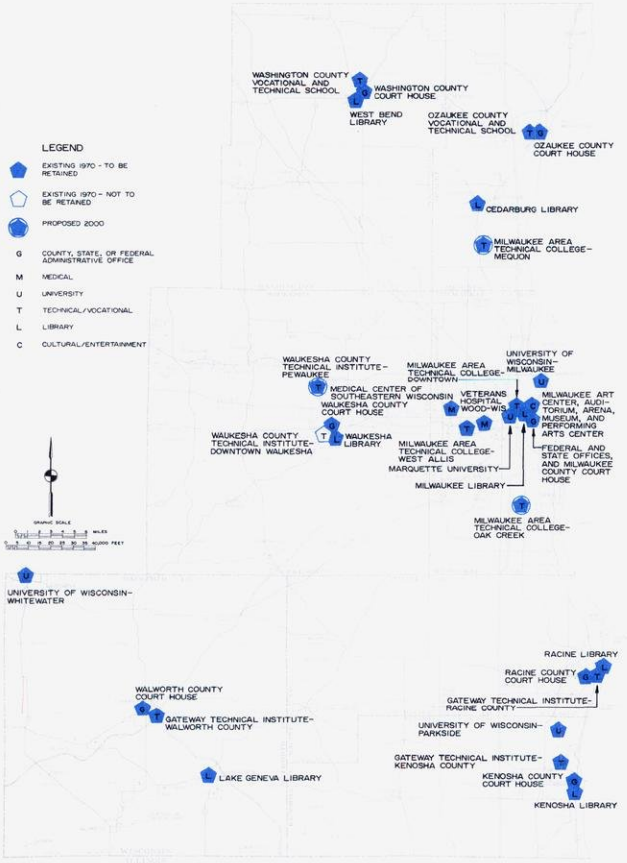
about 130,900 acres of land in the Region would be devoted to transportation, communication, and utility uses by the year 2000, an increase of about 20 percent over the 1970 level.

Major transportation centers, including major bus and rail terminals and major airports, along with major utility plants including public sewage treatment plants and major electric power generation plants, are shown on Map 57. Under the recommended land use plan, lands devoted to such major transportation and public utility uses would increase from about 3,500 acres in 1970 to almost 6,700 acres by the year 2000, primarily to accommodate airport expansion recommended as part of the regional airport system plan and the construction or expansion of sewage treatment plants recommended under the regional sanitary sewerage plan.

In addition to the foregoing major transportation and utility land uses, the recommended land use plan calls for the provision of about 18,300 additional acres of lands devoted to other transportation, communication,

Map 56

MAJOR GOVERNMENTAL AND INSTITUTIONAL CENTERS IN THE REGION: 2000 RECOMMENDED LAND USE PLAN

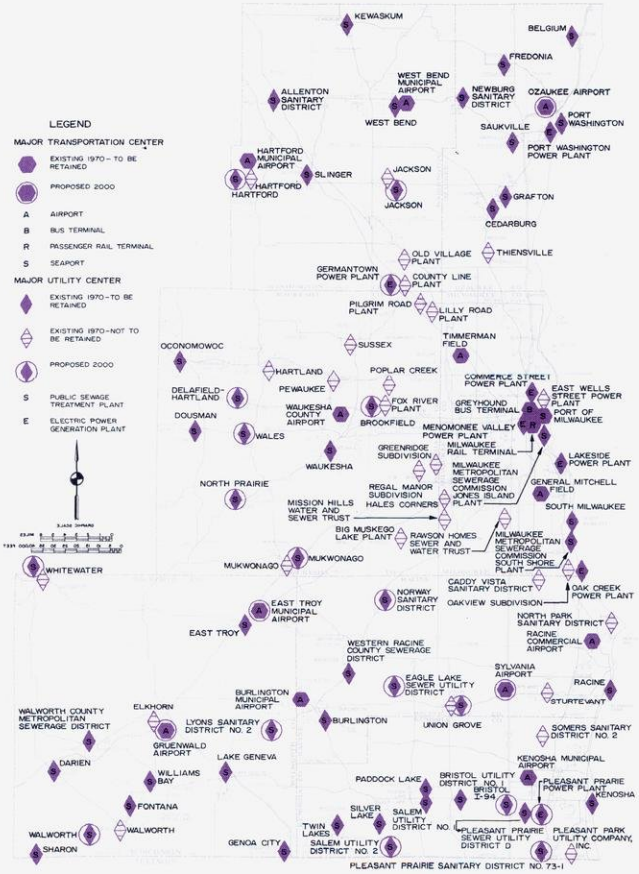


Major governmental and institutional centers including county seats, major state and federal office buildings, major medical complexes, universities, technical and vocational schools, major libraries, and cultural and entertainment centers are expected to require a total of about 890 acres of land by the year 2000. This represents an increase of about 55 acres over the 1970 level of 835 acres. This increase is primarily to accommodate the development of Waukesha County Technical Institute in the Village of Pewaukee and the Milwaukee Area Technical Colleges in the Cities of Mequon and Oak Creek.

Source: SEWRPC.

Map 57

MAJOR TRANSPORTATION AND UTILITY CENTERS IN THE REGION: 2000 RECOMMENDED LAND USE PLAN



Major transportation and utility centers, including major bus, sea, and rail terminals, airports, public sewage treatment plants and major electric power generation plants, are expected to require a total of about 6,700 acres of land by the year 2000. This represents an increase of nearly 3,200 acres over the 1970 level of 3,500 acres. This increase is primarily to accommodate airport expansion and the construction or expansion of sewage treatment and electric power generation plants.

Source: SEWRPC.

and utility uses in the Region by the year 2000. Most of this additional land would be required for rights-of-way for new and improved arterial, collector, and minor streets needed to serve new land use development or to provide adequate transportation service to existing urban development.

Open Space—Recreational Land Use

Under the recommended land use plan, about 3,300 acres of land would be added to the existing stock of gross recreational land use (see Table 281). This represents an increase of about 6 percent over the 1973 acreage.

It should be noted that this additional recreational land represents only the recommended increase in land devoted to public recreational use.

Included in these 3,300 acres are two new major public parks—Sugar Creek in the Town of Lafayette, Walworth County, and Paradise Valley in the Town of West Bend, Washington County—as well as additional acquisition at one existing, undeveloped major park site—Monches in the Town of Merton, Waukesha County. With the addition of these major parks and the development of certain existing publicly owned undeveloped or partially developed

Table 281

EXISTING AND PROPOSED RECREATIONAL LAND USE IN THE REGION BY COUNTY
1970, 1973, AND 2000 RECOMMENDED LAND USE PLAN

County	Recreational Land Use in Acres							
	Gross[a]				Net[b]			
	Existing 1973	Planned Increment[c]	Total 2000	Percent Change 1973-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	5,486	67	5,553	1.2	2,670	259	2,929	9.7
Milwaukee . . .	16,475	198	16,673	1.2	9,911	521	10,432	5.3
Ozaukee	3,264	86	3,350	2.6	1,657	682	2,339	41.2
Racine.	4,440	52	4,492	1.2	2,586	347	2,933	13.4
Walworth. . . .	9,978	1,335	11,313	13.4	4,275	779	5,054	18.2
Washington . .	6,017	669	6,686	11.1	1,664	696	2,360	41.8
Waukesha. . . .	9,945	856	10,801	8.6	6,219	882	7,101	14.2
Total	55,605	3,263	58,868	5.9	28,982	4,166	33,148	14.4

[a] *Includes entire site area of public and nonpublic recreational uses.*

[b] *Includes only that land intensively used for recreational purposes.*

[c] *Includes only that increment which is for public recreational use.*

Source: SEWRPC.

park sites, there would be a total of 29 major parks in southeastern Wisconsin by the plan design year (see Table 282 and Map 58). Plan proposals of the recommended year 2000 land use plan concerning major parks in the Region, it should be noted, are the same as the major park recommendations of the adopted 1990 land use plan. The rather small increment in major park acreage in the Region is due to the significant progress made since the adoption of the initial regional land use plan toward the acquisition of the 12 proposed major park sites recommended in that plan.

In addition to the proposed increase in the major park acreage, the recommended land use plan would expand by 983 acres the gross area devoted to other public outdoor recreation uses including major special use outdoor recreation sites and neighborhood parks (see Table 283). More specifically, the recommended land use plan includes an additional 480 acres of major special use outdoor recreation sites to reflect the development of Old World Wisconsin in the Town of Eagle, Waukesha County, and the Milwaukee Summerfest grounds in the City of Milwaukee. The recommended plan also proposes the development of 503 additional acres of neighborhood parks by the year 2000.

As shown in Table 283, there were in 1973 about 16.3 acres of public park and outdoor recreation land per 1,000 population in the Region. The proposed increment of about 3,300 acres of public park land would be needed to serve the expanded regional population, and would result in a slight decrease in the number of acres of public park land per thousand population by the year 2000 to 14.6. The amount of public park land provided under the recommended land use plan, it should be noted, would still be such as to exceed the agreed-upon standard for this use—14.0 acres per thousand persons.

Open Space—Environmental Corridors

The most important elements of the natural resource base of the Region, including the best remaining woodlands, wetlands, wildlife habitat, surface water and associated natural shorelands and floodlands, and historic, scenic, and scientific sites, have been found to occur within the Region combined in linear patterns. These linear patterns of prime natural resource concentrations have been termed primary environmental corridors and are described in more detail in Volume I of this report. The preservation and protection of these environmental corridors in accordance with regional development objectives are considered essential to the maintenance of a wholesome environment within the Region and preservation of the unique cultural and natural heritage of the Region, as well as of its natural beauty.

The linear patterns which the environmental corridors form in the Region are shown on Map 53, and the area of these corridors lying within each county in the Region is set forth in Table 284. The gross primary environmental corridor area, defined as including all land uses, both urban and rural, and all surface water area within the corridor configuration delineated on Map 53, totaled 347,000 acres, or about 20 percent of the total area of the Region. Waukesha County contains more than 94,000

Table 282

SELECTED CHARACTERISTICS OF PLANNED MAJOR PUBLIC OUTDOOR RECREATION CENTERS IN THE REGION: 2000 RECOMMENDED LAND USE PLAN

Major Public Outdoor Recreation Center[a]	Land Use Area in Acres					
	Gross[b]			Net[c]		
	Existing 1973	Planned Increment	Total 2000	Existing 1970	Planned Increment	Total 2000
Multi-Use Sites						
Existing						
Petrifying Springs	350	--	350	253	--	253
Brighton Dale	360	--	360	329	--	329
Brown Deer	370	--	370	347	--	347
Greenfield	290	--	290	284	--	284
Lake Michigan-North	370	--	370	268	74	342
Lake Michigan-South	680	--	680	673	--	673
Lincoln	320	--	320	230	--	230
Whitnall	640	--	640	591	--	591
Dretzka	330	--	330	306	--	306
Oakwood	280	--	280	247	--	247
Hawthorne Hills	280	--	280	278	--	278
Johnson	360	--	360	308	--	308
Big Foot Beach	260	--	260	142	100	242
Whitewater Lake	250	--	250	173	--	173
Menomonee	390	--	390	299	56	355
Minooka	300	--	300	50	133	183
Mukwonago	220	--	220	171	28	199
Nagawaukee	420	--	420	406	--	406
Ottawa Lake	220	--	220	75	--	75
Subtotal	6,690	--	6,690	5,430	391	5,821
Proposed–Site Acquired But Not Developed						
Silver Lake	240	--	240	--	194	194
Bender	310	--	310	--	249	249
Meek-won	240	--	240	--	184	184
Harrington Beach	630	--	630	--	421	421
Cliffside	250	--	250	--	175	175
Ela	240	--	240	--	120	120
Monches	200	200	400	--	251	251
Pike Lake	670	--	670	--	347	347
Subtotal	2,780	200	2,980	--	1,941	1,941
Proposed–New Site						
Sugar Creek	--	1,300	1,300	--	668	668
Paradise Valley	--	580	580	--	319	319
Subtotal	--	1,880	1,880	--	987	987
Subtotal–Multi-Use Sites	9,470	2,080	11,550	5,430	3,319	8,749
Special Use Sites						
Existing						
State Fair Park	180	--	180	181	--	181
Milwaukee County Stadium	10	--	10	11	--	11
Milwaukee County Zoo	130	--	130	123	--	123
Mitchell Conservatory	50	--	50	50	--	50
Subtotal	370	--	370	365	--	365
Proposed						
Old World Wisconsin	--	450	450	--	208	208
Milwaukee Summerfest Grounds	--	30	30	--	34	34
Subtotal	--	480	480	--	242	242
Subtotal–Special Use Sites	370	480	850	365	242	607
Total	9,840	2,560	12,400	5,795	3,561	9,356

[a] *See Map 58.*

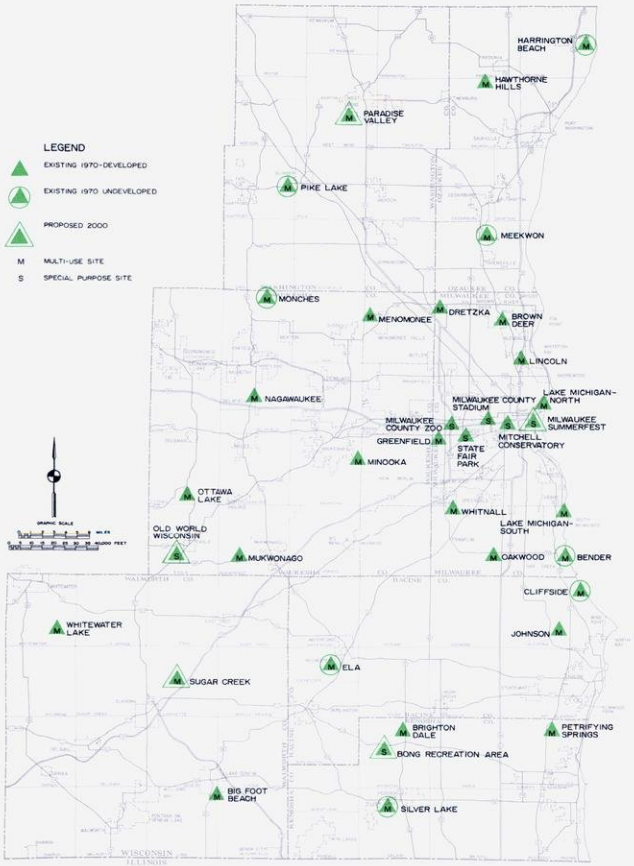
[b] *Includes entire site area.*

[c] *Includes only that land intensively used for recreation purposes.*

Source: SEWRPC.

Map 58

MAJOR PUBLIC OUTDOOR RECREATION CENTERS IN THE REGION: 2000 RECOMMENDED LAND USE PLAN



Under the recommended land use plan a total of 29 major outdoor recreation sites are proposed to serve the needs of the Region by 2000. Of these 29 sites, 19 were in public ownership and use in 1970 and are to be retained. Eight sites, including Silver Lake, Bender, Mee-kwon, Harrington Beach, Cliffside, Ela, Monches, and Pike Lake were in public ownership in 1970 but had not been developed, and two sites—Sugar Creek and Paradise Valley—are not yet in public ownership.

Source: SEWRPC.

acres, or about 27 percent of the corridor acreage, while Walworth County, with about 88,000 acres, contains nearly 26 percent. Highly urbanized Milwaukee County contains about 18,000 acres, or about 5 percent of the gross environmental corridor acreage within the Region.

The net primary environmental corridor area is defined as the gross corridor acreage less any incompatible urban use acreage located in the corridors. The net corridor acreage, therefore, includes water, wetlands, woodlands, agricultural lands, recreational lands, and other open lands within the gross environmental corridor configuration. The net primary environmental corridor area constitutes about 322,000 acres, or nearly 93 percent of the gross corridor area, while urban development within the gross corridor area constitutes nearly 25,000 acres, or the remaining 7 percent. About 41 percent of the net corridor area, or nearly 133,000 acres, is in water and wetland uses; about 32 percent, representing about 104,000 acres, is in agricultural and other open land uses; about 20 percent, or nearly 65,000 acres is in woodland use; and the remaining 6 percent, representing about 20,000 acres, is devoted to active recreational land uses (see Tables 285 and 286).

The recommended land use plan proposes to develop none of the net primary environmental corridor area except to accommodate compatible park and outdoor recreation land uses, since maintenance of environmental corridor lands in a natural state is considered vital to the protection of the natural resource base and to the maintenance of the overall quality of the regional environment. The recommended land use plan for the year 2000, thus, reaffirms the basic corridor preservation recommendations of the adopted 1990 land use plan. Of the total net corridor area of about 322,000 acres, more than 42,000 acres, or about 13 percent, are covered by surface water. The balance of 280,000 acres of net corridor lands, representing 16 percent of the total land area of the Region, remains as that corridor area requiring protection through appropriate public action—that is, through public acquisition or protection through appropriate land use controls, including, as appropriate, the use of rural estate residential zoning districts.

Open Space—Agricultural and Other Open Land Use

There were approximately 1,393,000 acres, or 2,177 square miles, of open land within the Region in 1970, including 1,040,000 acres of agricultural land and 353,000 acres of other open lands. These rural land uses serve at least two important functions in the Region. As a land use, they provide open areas that serve to lend form and shape to urban development; provide invaluable opportunities for passive recreation; and serve to preserve, protect, and enhance certain elements of the natural resource base. As an economic activity, these lands provide employment opportunities and an important source of income in the regional economy, and provide the urban areas of the Region with certain necessary agricultural, forest, and mineral products. In an urbanizing area such as the Southeastern Wisconsin Region, it is inevitable that the demands of a growing urban population will require some conversion of rural land to urban land use. Under the recommended land use plan, the expansion of urban activities into presently rural areas would result in the conversion of about 72,500 acres, or about 113 square miles of rural land, to urban land uses between 1970 and 2000. This would be equivalent to an average annual rate of conversion of about 2,400 acres, or about 3.8 square miles. In addition to conversion of rural land to urban land uses, about 22,300 additional acres, or 35 square miles, of rural land would be developed for rural estate use. Because of the very low density recommended, however, such rural estate development would maintain the basic natural state of the open land.

Table 283

EXISTING AND PROPOSED PUBLIC PARK AND OUTDOOR RECREATION LANDS IN THE REGION PER ONE THOUSAND POPULATION: 1973 AND 2000 RECOMMENDED LAND USE PLAN

Type of Public Park and Outdoor Recreation Land	Existing 1973		Planned Increment			Total 2000	
	Acres[a]	Acres Per One Thousand Population	Acres[a]	Acres Per One Thousand Population	Percent Change	Acres[a]	Acres Per One Thousand Population
Major Multi-Use Outdoor Recreation Center							
Existing[b]	9,470	--	200	--	--	9,670	--
Proposed	--	--	2,080	--	--	2,080	--
Subtotal	9,470	5.3	2,280	5.2	24.1	11,750	5.3
Neighborhood and Other[c]	19,625	11.0	983	2.3	5.0	20,608	9.3
Total	29,095	16.3	3,263	7.5	11.2	32,358	14.6

[a] *Represents gross recreation land; entire public site area.*

[b] *Includes proposed centers where site acquisition was at least partially completed in 1970 but where development had not yet begun.*

[c] *Includes major special use outdoor recreation centers.*

Source: SEWRPC.

Table 284

PRIMARY ENVIRONMENTAL CORRIDOR AREA IN THE REGION BY COUNTY 2000 RECOMMENDED LAND USE PLAN

County	Gross Corridor Area[a]		Urban Development Within Corridor[b]		Net Corridor Area[c]	
	Acres	Percent of Total	Acres	Percent of Gross Corridor	Acres	Percent of Gross Corridor
Kenosha	30,663	8.8	2,542	8.3	28,121	91.7
Milwaukee	18,111	5.2	3,928	21.7	14,183	78.3
Ozaukee	25,135	7.3	2,841	11.3	22,294	88.7
Racine	34,277	9.9	2,461	7.2	31,816	92.8
Walworth	88,527	25.5	4,543	5.1	83,984	94.9
Washington	56,285	16.2	2,685	4.8	53,600	95.2
Waukesha	94,110	27.1	5,882	6.3	88,228	93.7
Total	347,108	100.0	24,882	7.2	322,226	92.8

[a] *These figures differ slightly from those presented in Volume One of this report because of a subsequent refinement in the corridor delineation.*

[b] *Includes residential, commercial, industrial, governmental, institutional, and transportation uses.*

[c] *Includes water and wetlands, woodlands, recreational, agricultural lands, quarries, and other generally open or unused lands, except those contained within the major park lands.*

Source: SEWRPC.

As indicated in Table 287, much of the urban expansion and rural estate residential development proposed under the recommended land use plan—79,800 acres—would take place on lands now in agricultural use and would result in a decrease of about 8 percent in the existing stock of agricultural land within the Region. Among the seven counties, the greatest decline in agricultural land—27,900 acres—would occur in Waukesha County. In Milwaukee County, expanding urban development would require the conversion of about 8,400 acres, or about 30 percent of the remaining agricultural acreage, to urban use by 2000.

Table 285

PRIMARY ENVIRONMENTAL CORRIDOR AREA IN THE REGION 2000 RECOMMENDED LAND USE PLAN

	Acres	Percent of Gross Corridor	Percent of Net Corridor
Gross Corridor	347,108	100.0	--
Urban Development Within Corridor	24,882	7.2	--
Net Corridor	322,226	92.8	100.0
Water	42,529	--	13.2
Wetlands	90,684	--	28.2
Woodlands	64,920	--	20.1
Agriculture	92,761	--	28.8
Other Open Lands[a]	11,748	--	3.6
Recreational Lands	19,584	--	6.1

[a] *Includes quarries, landfill sites, and unused lands.*

Source: SEWRPC.

While substantial amounts of general agricultural lands would be converted to urban use under the recommended land use plan in order to accommodate the spatial requirements of expanding urban areas, the recommended plan seeks to minimize the development of prime agricultural lands. Prime agricultural lands, as the name implies, are areas particularly well suited for highly productive agricultural use. Prime agricultural lands in the Region were delineated in the initial regional land use plan on the basis of the results of detailed soil surveys and ratings by agri-business specialists. The recommended year 2000 land use plan proposes to convert to urban use only those prime agricultural lands which were already committed to urban development due to the proximity to existing and expanding concentrations of urban uses and the prior commitment of heavy capital investments and utility extensions. The recommended year 2000 land use plan, thus, reaffirms the basic recommendations of the adopted year 1990 land use plan concerning the preservation of the remaining prime agricultural lands in the Region.

Prime agricultural lands in southeastern Wisconsin are shown on Map 59. On a net basis—that is, including only agricultural land uses located within such areas—the prime agricultural land acreage in the Region totaled about 405,000 acres in 1970, or about 39 percent of the total land in agricultural use in the Region. As indicated in Table 287, the recommended land use plan proposes to convert only about 8,400 acres, or about 2 percent, of the remaining prime agricultural lands to urban use or to rural estate residential use.

In addition to agricultural lands, there were 353,100 acres of other open land uses in the Region in 1970 including woodlands, water, wetlands, quarries, and unused land. As indicated in Table 288, under the recom-

Table 286

LAND USE WITHIN THE NET PRIMARY ENVIRONMENTAL CORRIDOR AREA IN THE REGION BY COUNTY: 2000 RECOMMENDED LAND USE PLAN

County	Net Corridor Area		Recreational Lands		Water		Wetlands		Woodlands		Agriculture and Related		Other Open Lands[a]	
	Acres	Percent of Total	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor	Acres	Percent of Net Corridor
Kenosha	28,121	8.7	1,770	6.3	3,577	12.7	8,727	31.0	2,673	9.5	9,864	35.1	1,510	5.4
Milwaukee	14,183	4.4	6,638	46.8	918	6.5	1,461	10.3	1,193	8.4	2,209	15.6	1,764	12.4
Ozaukee	22,294	6.9	952	4.3	1,541	6.9	8,783	39.4	3,721	16.7	6,307	28.3	990	4.4
Racine	31,816	9.9	1,167	3.7	3,976	12.5	7,188	22.6	4,943	15.5	13,254	41.7	1,288	4.0
Walworth	83,984	26.1	4,030	4.8	13,747	16.4	17,037	20.3	20,779	24.7	25,952	30.9	2,439	2.9
Washington	53,600	16.6	803	1.5	3,450	6.4	21,423	40.0	12,574	23.5	14,251	26.6	1,099	2.0
Waukesha	88,228	27.4	4,224	4.8	15,320	17.4	26,065	29.5	19,037	21.6	20,924	23.7	2,658	3.0
Total	322,226	100.0	19,584	6.1	42,529	13.2	90,684	28.1	64,920	20.1	92,761	28.8	11,748	3.7

[a] *Includes quarries, landfill sites, and unused lands.*

Source: SEWRPC.

Table 287

EXISTING AND PROPOSED AGRICULTURAL LAND USE IN THE REGION BY COUNTY
1970 AND 2000 RECOMMENDED LAND USE PLAN

County	Agricultural Land Use in Acres							
	Total				Net Prime[a]			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	113,928	- 7,016	106,912	- 6.2	66,038	- 2,295	63,743	- 3.5
Milwaukee	28,607	- 8,427	20,180	- 29.5	7,116	- 782	6,334	- 11.0
Ozaukee	100,491	- 7,989	92,502	- 7.9	37,080	- 185	36,895	- 0.5
Racine	147,207	- 6,243	140,964	- 4.2	68,951	- 1,097	67,854	- 1.6
Walworth	261,744	- 6,474	255,270	- 2.5	112,439	- 607	111,832	- 0.5
Washington	186,466	- 15,747	170,719	- 8.4	49,531	- 563	48,968	- 1.1
Waukesha	201,676	- 27,883	173,793	- 13.8	63,729	- 2,866	60,863	- 4.5
Total	1,040,119	- 79,779	960,340	- 7.7	404,884	- 8,395	396,489	- 2.1

[a] *Net prime agricultural lands are defined as those areas which: 1) contain soils rated in the regional detailed operational soil survey as very good or good for agriculture, and 2) occur in concentrated areas over five square miles in extent and which have been designated as exceptionally good for agricultural production by agricultural specialists.*

Source: SEWRPC.

Table 288

EXISTING AND PROPOSED OPEN LAND USES
IN THE REGION BY COUNTY: 1970 AND 2000
RECOMMENDED LAND USE PLAN

County	Open Land Uses in Acres[a]			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha	36,453	- 1,111	35,342	- 3.0
Milwaukee	20,199	- 6,026	14,173	- 29.8
Ozaukee	25,776	- 906	24,870	- 3.5
Racine	35,285	- 1,233	34,052	- 3.5
Walworth	75,922	- 827	75,095	- 1.1
Washington	66,141	- 545	65,596	- 0.8
Waukesha	93,349	- 4,397	88,952	- 4.7
Total	353,125	- 15,045	338,080	- 4.3

[a] *Includes woodlands, wetlands, water, quarries, and unused lands.*

Source: SEWRPC.

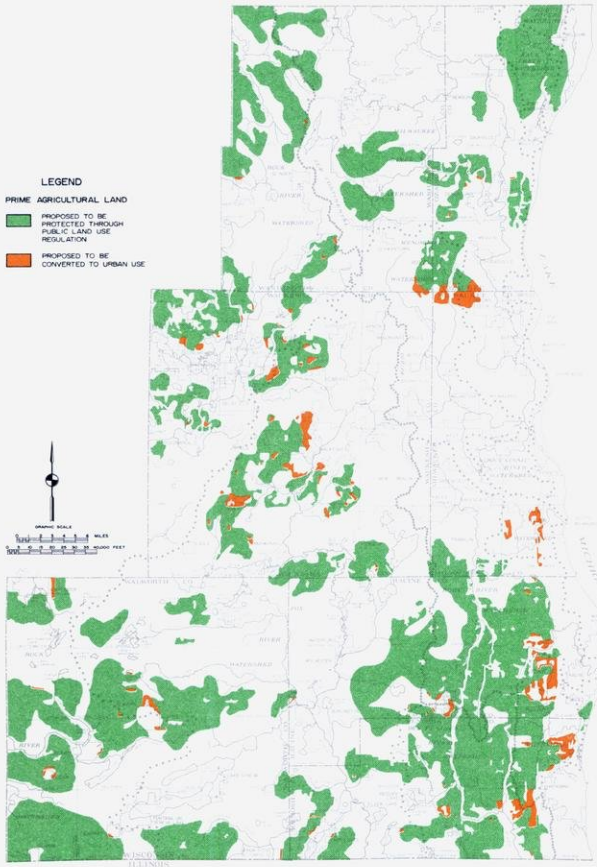
mended land use plan, a total of 15,000 acres, or about 4 percent of the remaining acreage of these other open lands, would be converted to urban use or to rural estate residential use by the year 2000. Most of this acreage, it should be noted, would consist of individual woodlots located directly in the path of urban growth, most of which are of insufficient size or quality to warrant permanent preservation. Careful subdivision design, however, can preserve full aesthetic and some of the ecological value of these woodlands and can, at the same time, provide more desirable and valuable building sites.

Population Distribution

The 1970 resident population of the Region was estimated at about 1,756,100 persons; and the population forecasts presented in Chapter III of this volume indicate that approximately 463,000 persons could be expected to be added to the regional population by the year 2000. According to the forecast, this population growth would be distributed by county as indicated in Table 289. The land use pattern proposed by the recommended land use plan would accommodate these forecast regional and county population levels. The absolute changes in county population levels would range from an increase of nearly 190,000 persons in Waukesha County to a decrease of nearly 5,000 persons in Milwaukee County, while the relative changes would range from a gain of 124 percent in Washington County to a loss of about one half of one percent in Milwaukee County. These changes, it should be noted, would significantly alter the year 2000 population distribution within the Region from the 1970

Map 59

PRIME AGRICULTURAL LANDS IN THE REGION
2000 RECOMMENDED LAND USE PLAN



In accordance with the regional development objectives, the recommended land use plan proposes to preserve about 396,000 acres of net prime agricultural lands for permanent agricultural use. These areas have been delineated on the basis of soils, the size and extent of the area farmed, and the historic capability of the area to consistently produce better than average crop yields and the capital invested in such improvements as irrigation and drainage systems and soil and water conservation practices. Approximately 8,400 acres, or 2 percent of the total net prime agricultural lands within the Region would be converted to urban use by the year 2000.

Source: SEWRPC.

distribution. Most notably, Milwaukee County's proportion of the total regional population would decrease from about 60 percent in 1970 to approximately 47 percent in the year 2000. Conversely, the proportion of the regional population within each of the remaining six counties in the Region would increase over the plan period, with the most significant increase, from about 13 percent to about 19 percent, occurring in Waukesha County.

The population level of the Region in the year 2000 anticipated under the recommended land use plan, 2.2 million persons, is substantially lower than the population level of the Region in 1990 anticipated under the adopted 1990 land use plan, 2.68 million. While the population forecast used in the preparation of the 1990 land use plan, like the revised population forecast, indicated substantially higher population growth rates in the outlying counties of the Region than in Milwaukee County, the initial forecast did not indicate an actual decline in population in Milwaukee County which is anticipated under the recommended year 2000 land use plan. Consequently, a somewhat greater decentralization of the population within the Region is anticipated under the revised land use plan than under the initial 1990 land use plan.

The recommended land use plan proposes an amount of urban land use sufficient to accommodate the forecast regional and county population levels. The increase in the amount of urban land proposed under the recommended land use plan is compared with the forecast population increase within each county in Table 290. In total, the recommended land use plan would accommodate an approximate 26 percent increase in the regional population with an approximate 22 percent increase in urban land area.

As indicated in Table 291 and Figure 41, the population density within the developed area of the Region under the recommended land use plan would continue to decline over the planning period from the 1970 level of about 4,300 persons per square mile to a year 2000 level of about 3,500 persons per square mile, thus continuing the trend toward declining densities evident in the Region since 1920. The rate of decline would be reduced, however, by implementation of the plan proposals to develop the majority of new residential land use within the Region at medium, instead of low, densities and to provide such development with public sanitary sewer and water supply services. In this respect, the recommended land use plan is similar to the adopted 1990 land use plan. If this regional development objective is achieved, residential development densities will become higher than those prevalent in the more recent past. Lot sizes per dwelling unit would be reduced somewhat in order to facilitate the more economical provision of sanitary sewer and water service, while meeting urban land market demands.

Employment Distribution

In 1972 the total number of jobs within the Region was estimated at nearly 749,000, and the economic forecast prepared by the Commission as presented in Chapter III of this volume indicates that, by the year 2000, total regional employment should increase to slightly more than 1,000,000 jobs. As indicated in Table 292, the recommended land use plan would accommodate significant employment increases within each county of the Region, ranging from an additional 13,600 jobs in Kenosha County to more than 85,000 jobs in Milwaukee County and Waukesha County. Employment would increase at a faster relative rate in the outlying counties

Table 289

EXISTING AND PROPOSED POPULATION DISTRIBUTION IN THE REGION BY COUNTY: 1970 AND 2000 RECOMMENDED LAND USE PLAN

County	1970 Population		Planned Increment		2000 Population	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha	117,900	6.7	56,900	48.3	174,800	7.9
Milwaukee	1,054,300	60.1	- 4,700	- 0.4	1,049,600	47.3
Ozaukee	54,500	3.1	59,500	109.2	114,000	5.1
Racine	170,800	9.7	46,900	27.5	217,700	9.8
Walworth	63,500	3.6	36,100	56.9	99,600	4.5
Washington	63,800	3.6	79,200	124.1	143,000	6.4
Waukesha	231,300	13.2	189,300	81.8	420,600	19.0
Total	1,756,100	100.0	463,200	26.4	2,219,300	100.0

Source: SEWRPC.

Table 290

URBAN LAND AREA AND POPULATION INCREMENT IN THE REGION BY COUNTY: 1970-2000 RECOMMENDED LAND USE PLAN

County	Increment: 1970-2000			
	Urban Land Area		Population	
	Acres	Percent	Number	Percent
Kenosha	6,643	9.2	56,900	48.3
Milwaukee	14,453	19.9	- 4,700	- 0.4
Ozaukee	7,652	10.5	59,500	109.2
Racine	5,679	7.8	46,900	27.5
Walworth	5,186	7.2	36,100	56.9
Washington	8,974	12.4	79,200	124.1
Waukesha	23,931	33.0	189,300	81.8
Total	72,518	100.0	463,200	100.0

Source: SEWRPC.

of the Region than in Milwaukee County, and, consequently, Milwaukee County's share of the total regional employment would decline somewhat. The proportion of total regional employment in Milwaukee would continue to decline from 68 percent in 1972 to 58 percent by the year 2000. Conversely, the proportion of total regional employment in Waukesha County would increase significantly, from under 10 percent in 1972 to almost 16 percent in the year 2000. A similar decentralization of economic activity, it should be noted, was anticipated under the adopted 1990 land use plan.

Public Sanitary Sewer and Water Supply Service

Under the recommended land use plan, all of the proposed new urban development within the Region would be served with public sanitary sewer and water supply facilities. In addition, under the recommended plan, public sanitary sewer and water supply service would be extended to certain existing urban areas lacking these facilities in 1970. Areas of the Region which would be served with public sanitary sewer and water supply facilities under the recommended land use plan are shown on Map 60. In 1970, about 287 square miles, or 72 percent of the total developed urban area of the Region, and about 1.49 million persons, or about 85 percent of the resident population of the Region, were served by public sanitary sewer facilities (see Table 293). About 236 square miles, or 60 percent of the developed area of the Region, and about 1.39 million persons, or about 79 percent of the resident population of the Region, were served by public water supply facilities in 1970. Under the recommended plan, about 586 square miles, or about 92 percent of the developed urban area, and about 2.06 million persons, or about 93 percent of the total population, would be served by public sanitary sewer facilities and public water supply facilities by the year 2000. As indicated in Table 294, public water supply service would be provided within several small communities for which public sanitary sewer service is not planned. On a county basis, the proportion of developed areas served by sanitary sewer and water supply service by the year 2000 would range from a low of about 79 percent in Washington County to a high of nearly 100 percent in Milwaukee County. The percentage of total resident population so served would similarly range from a low of about 75 percent in Washington County to a high of almost 100 percent in Milwaukee County.

Table 291

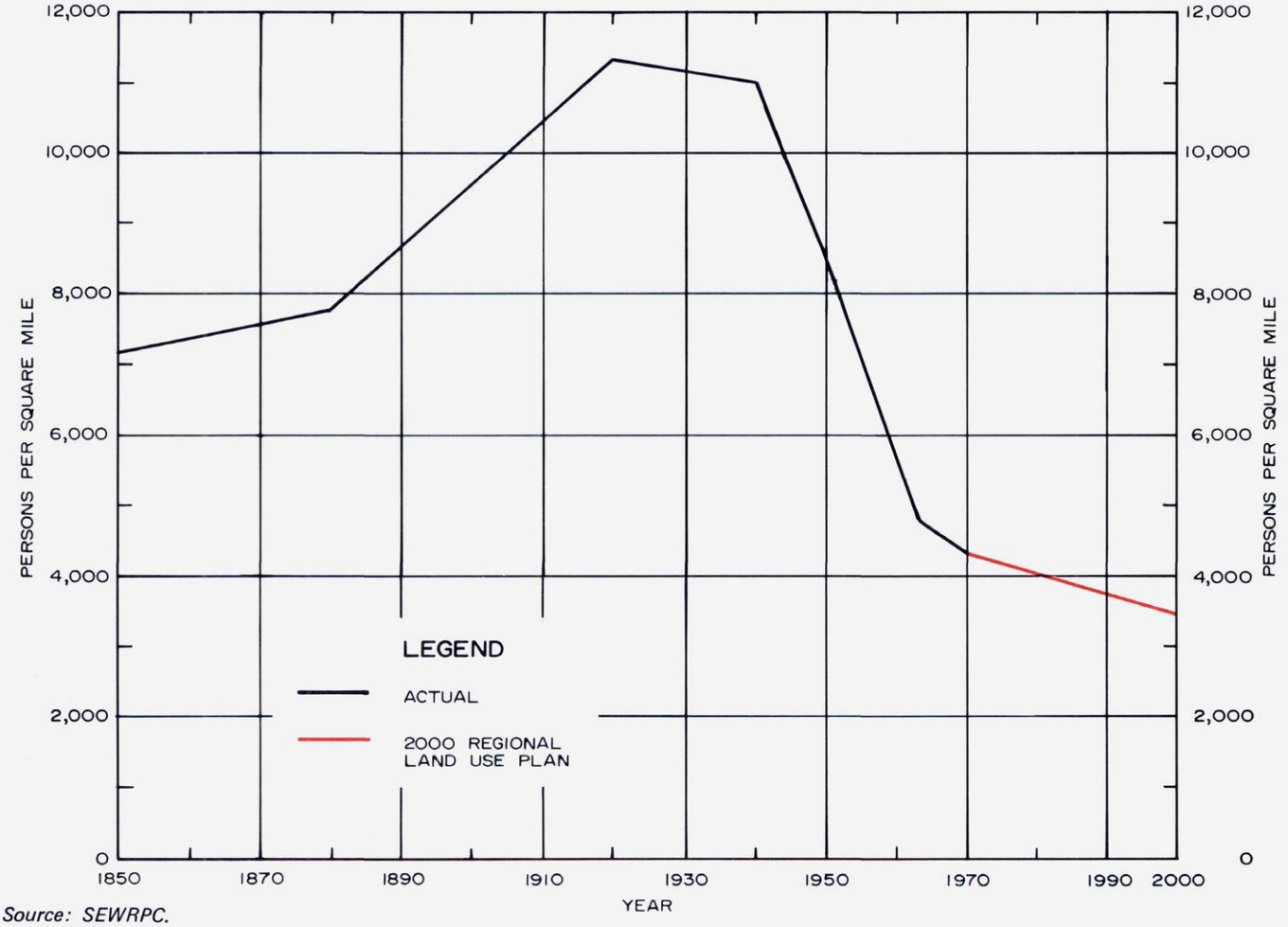
POPULATION DENSITY IN THE REGION: SELECTED YEARS
1850-1970 AND 2000 RECOMMENDED LAND USE PLAN

Year	Population					Area (square miles)		Persons Per Square Mile	
	Urban		Rural						
	Number	Percent of Total	Number	Percent of Total	Total	Urban	Total	Urban	Total
1850	28,623	25.2	84,766	74.8	113,389	4	2,689	7,156	42.2
1880	139,509	50.3	137,610	49.7	277,119	18	2,689	7,751	103.1
1900	354,082	70.6	147,726	29.4	501,808	37	2,689	9,570	186.6
1920	635,376	81.1	148,305	18.9	783,681	56	2,689	11,346	291.4
1940	991,535	92.9	76,164	7.1	1,067,699	90	2,689	11,017	397.1
1950	1,179,084	95.0	61,534	5.0	1,240,618	138	2,689	8,544	461.4
1963	1,634,200	97.6	40,100	2.4	1,674,300	340	2,689	4,807	622.6
1970	1,728,949	98.5	27,137	1.5	1,756,086	397	2,689	4,355	653.1
2000	2,201,100	99.2	18,200	0.8	2,219,300	635	2,689	3,466	825.3

Source: SEWRPC.

Figure 41

URBAN POPULATION DENSITY IN THE REGION: ACTUAL 1850-1970 AND PLANNED 2000



Source: SEWRPC.

Table 292

EXISTING AND PROPOSED EMPLOYMENT IN THE REGION BY COUNTY
1972 AND 2000 RECOMMENDED LAND USE PLAN

County	1972 Employment		Planned Increment 1972-2000		2000 Employment	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total
Kenosha	40,700	5.4	13,600	33.4	54,300	5.4
Milwaukee	508,400	67.9	85,200	16.8	593,600	58.4
Ozaukee	19,300	2.6	18,700	96.9	38,000	3.7
Racine	63,600	8.5	31,900	50.2	95,500	9.4
Walworth	24,200	3.2	17,000	70.2	41,200	4.1
Washington	21,200	2.8	14,800	69.8	36,000	3.5
Waukesha	71,500	9.6	85,900	120.1	157,400	15.5
Total	748,900	100.0	267,100	35.7	1,016,000	100.0

Source: SEWRPC.

Table 293

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN THE REGION: 1970 AND 2000 RECOMMENDED LAND USE PLAN

Area and Population	Existing Service 1970		Planned Service Increment		Total Service 2000	
	Public Sanitary Sewer	Public Water Supply	Public Sanitary Sewer	Public Water Supply	Public Sanitary Sewer	Public Water Supply
Developed Area[c]						
Total Square Miles	396.9	396.9	238.4	238.4	635.3	635.3
Square Miles Served	286.5[a]	236.2[b]	299.6	351.2	586.1	587.4
Percent of Total Served	72.2	59.5	--	--	92.3	92.5
Population						
Total Population	1,756,100	1,756,100	463,200	463,200	2,219,300	2,219,300
Population Served	1,488,700	1,390,000	571,100	670,600	2,059,800	2,060,600
Percent of Total Served	84.8	79.2	--	--	92.8	92.8

[a] *Does not include 22.9 square miles of land served with public sanitary sewer located outside the 1970 urban growth ring.*

[b] *Does not include 23.25 square miles of land served with public water supply located outside the 1970 urban growth ring.*

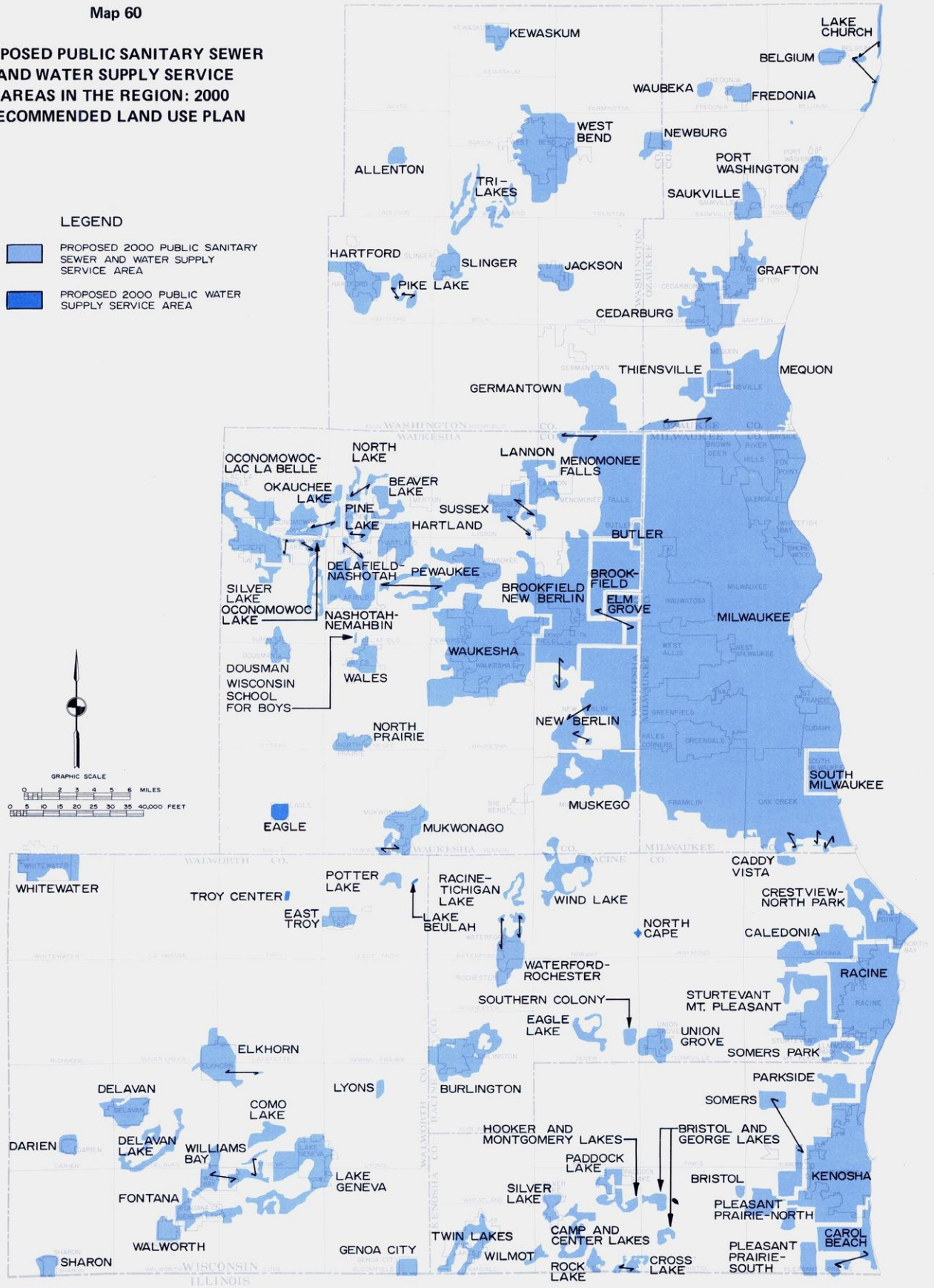
[c] *Based on historic urban growth analysis; see Table 61, page 122, Volume One, of this report.*

Source: SEWRPC.

The recommended land use plan is similar to the adopted 1990 land use plan in the emphasis on the provision of public sanitary sewer and water supply facilities. Under the initial land use plan, approximately 95 percent of the resident population of the Region in 1990 would have been served by public sanitary sewer and water supply facilities, compared to 93 percent of the population of the Region in the year 2000 under the revised land use plan. The recommended year 2000 land use plan, like the initial land use plan, seeks to discourage the development of residential areas dependent upon onsite sewage disposal systems and shallow private wells and to encourage such development served by gravity drainage centralized sanitary sewer facilities tributary to existing sewerage systems and by public water supply systems. Thus, coupled with implementation of the adopted

Map 60

PROPOSED PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE AREAS IN THE REGION: 2000 RECOMMENDED LAND USE PLAN



The recommended land use plan proposes to serve essentially all new urban development within the Region with public sanitary sewer and public water supply service. Approximately 586 square miles, or about 92 percent of the total urban land areas of the Region and about 2.1 million persons, or 93 percent of the total population would be served with public sanitary sewer and water supply facilities by the year 2000.

Source: SEWRPC.

Table 294

EXISTING AND PLANNED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY IN THE REGION BY COUNTY: 1970 AND 2000 RECOMMENDED LAND USE PLAN

County	Total Area (square miles)	Developed Area[a] (square miles)	Existing 1970								Planned 2000				
			Public Sewer Service				Public Water Supply Service				Public Sewer and Water Supply Service[b]				
			Developed Area Served[c]		Population Served		Developed Area Served[d]		Population Served		Developed Area (square miles)	Developed Area Served		Population Served	
			Square Miles	Percent of County	Number	Percent of County	Square Miles	Percent of County	Number	Percent of County		Square Miles	Percent of County	Number	Percent of County
Kenosha	278.3	32.5	21.1	64.9	94,000	79.7	15.7	48.3	81,000	68.7	51.1	48.2	94.3	159,700	91.4
Milwaukee	242.3	174.6	170.3	97.5	1,034,700	98.1	151.6	86.8	1,013,400	96.1	221.3	220.7	99.9	1,048,100	99.9
Ozaukee	234.4	19.8	14.5	73.2	36,300	66.7	6.0	30.3	25,700	47.2	46.9	44.1	94.0	101,700	89.2
Racine	339.9	46.4	27.1	58.4	135,900	79.5	23.3	50.2	120,900	70.8	56.7	52.0	91.7	196,300	90.2
Walworth	578.1	28.9	10.4	36.0	35,500	56.0	11.4	39.4	36,300	57.2	39.9	32.1	80.5	76,500	76.8
Washington	435.5	16.3	8.1	49.7	30,200	47.3	6.8	41.7	28,300	44.3	41.7	33.0	79.1	106,600	74.5
Waukesha	580.7	78.4	35.0	44.6	122,100	52.8	21.4	27.3	84,400	52.3	177.7	156.0	87.8	370,900	88.2
Total	2,689.2	396.9	286.5	72.2	1,488,700	84.8	236.2	59.5	1,390,000	79.2	635.3	586.1	92.3	2,059,800	92.8

[a] *Based on historic urban growth analysis; see Table 61, page 122, Volume One of this report.*

[b] *Does not include a total of 1.3 square miles and a population of 1,800 in the Village of Eagle in Waukesha County, and in the unincorporated communities of Lake Beulah, and Troy in Walworth County, and North Cape in Racine County, which, in the year 2000, will have public water supply systems and not public sanitary sewer service.*

[c] *Does not include 22.9 square miles of land served with public sanitary sewer located outside the 1970 urban growth ring.*

[d] *Does not include 23.2 square miles of land served with public water supply located outside the 1970 urban growth ring.*

Source: SEWRPC.

regional sanitary sewerage system plan, the plan proposals should serve to reduce and control the amount of untreated and partially treated domestic and industrial wastes discharged into the streams, rivers, lakes, and groundwater reservoirs of the Region; to permit a better adjustment of waste treatment and disposal facilities to the assimilation capacities of the streams and rivers; and to assure a pure supply of water for all existing and potential users within the Region.

PLAN STAGING

The recommended regional land use plan as set forth in the previous section of this chapter provides recommendations for the placement in space of the various land uses required to meet the needs of the forecast regional population in the design year. To be complete, a land use plan should also contain recommendations concerning the placement of development over time. The total land use configuration proposed in the recommended plan cannot be brought into being immediately but must be evolved gradually over the planning period. The demand for this total configuration does not presently exist, and the evaluation of land use development with respect to the plan must be undertaken within the context of the growth and change in the demand for various land uses. Furthermore, community growth and development entails public expenditures, and a balance must be struck between the rate of these expenditures to meet growing land use demands and the public ability to generate the revenues required to meet the necessary expenditures. For these reasons, it becomes necessary to stage the development of the recommended regional land use plan.

Even if development is placed properly in space, the question of the rate at which it should proceed is a most important one. Failure to place development properly in time may lead to a decline in the quality of community services; inadequate basic public utility and community facilities, such as streets, schools, water and sewer mains, and mass transit facilities; a certain formlessness of urban development occasioned by the lack of properly developed neighborhood units; and continuously rising tax levels. Proper placement of development in time, as well as in space, will not only permit the quality of governmental facilities and services to remain unimpaired through the timely extension of community utilities and facilities but will permit public expenditures to be more nearly kept within revenue limitations. Since not all of the proposals contained in the recommended land use plan can or should be carried out at once, it is logical that the most needed proposals be carried out first. Indeed, the rate of development should hinge primarily upon need.

Staging Periods

Two staging periods—the first ending in 1985 and the second ending in 2000—were selected to facilitate the staging of the recommended land use plan over the approximately 30-year planning period. The primary

inputs into the staging process were population and employment forecasts prepared for the end years of the two staging periods. It should be noted that these population and employment forecasts, like all forecasts, involve uncertainty and cannot take into account events which are unpredictable but may have major effects upon future growth within the Region. To the extent that growth in regional population and employment levels depart from the forecast levels, land development will have to be accelerated or decelerated.

As noted throughout this chapter, the recommended land use plan for the year 2000 incorporates the basic concepts of the adopted 1990 land use plan. Progress towards implementation of many important recommendations of the adopted land use plan was achieved by 1970, including, most notably, progress with respect to the preservation of primary environmental corridors and prime agricultural lands, the development of the recommended major commercial and industrial centers, and the acquisition of the proposed major park sites. Further progress towards the plan implementation in these areas is expected during the first staging period, from 1970 to 1985. On the other hand, between 1963 and 1970 there was a continued proliferation of low-density residential development, often resulting in incomplete, isolated neighborhoods, contrary to the recommendations of the adopted 1990 plan. Accordingly, the first staging period would also represent a period of "infilling," that is, intensifying residential land use in already platted and partially developed areas of the Region. During this time, local communities would exhibit a greater willingness to adjust their land use control regulations and, in particular, their zoning ordinances to more closely reflect the regional land use pattern of the recommended plan as well as to extend public sanitary sewer, public water supply, and other public services in accordance with recommendations explicitly or implicitly contained in that plan.

The second staging period, 1985-200, represents a period of full regional land use plan implementation, wherein the attainment of the regional development objectives would be possible and the full benefits of these objectives to the Region would become demonstrable. This period would emphasize new urban development primarily at medium density within well-planned neighborhood units having a full range of urban facilities and services.

Land Use

During the first staging period extending from 1970 to 1985 there would be a continuation of efforts, initiated under the adopted 1990 land use plan, to stem the proliferation of sporadic low-density urban development. As already noted, the first staging period would emphasize "infilling," thereby intensifying residential land development within areas already platted or otherwise committed to residential use but not yet developed for residential purposes. As indicated in Table 295, the demand for urban residential land within the Region during this period would require an increase of about 17,000 acres of such land, an increase of about 11 percent over the 1970 acreage. During this period, certain areas of existing low-density development would evolve into the medium-density range, and certain areas platted for future suburban density residential use would actually be developed for such use.

During the second staging period extending from 1985 to the year 2000, the demand for residential land is expected to require an increase of about 21,600 acres in the stock of urban residential land, an increase of about 12 percent over the 1985 level and an increase of about 25 percent over the 1970 level. The higher rate of urban land development during the second staging period reflects an anticipated increase in the rate of conversion of rural to urban lands for residential use after major portions of the partially developed lands existing within the Region in 1970 have been absorbed. Over the second staging period, new residential land development would occur predominantly at medium densities.

Implicit in the staged development of the recommended urban land use pattern, as shown on Map 61, is the staged provision of the major commercial and industrial centers and the major outdoor recreation sites proposed in the recommended land use plan. The staged population and employment forecasts and concomitant staged residential land use development patterns indicate that, of the five additional major commercial centers proposed in the recommended land use plan, the centers proposed in the Cities of Milwaukee and Racine would be required by 1985,[1] and the centers proposed in the Cities of Oak Creek, Waukesha, and West Bend would be required by the year 2000. Of the five proposed new major industrial areas included in the recommended land use plan, the centers proposed in the Cities of Milwaukee, Waukesha, and Oak Creek should be fully developed by 1985 and the centers proposed in and near the Cities of Burlington and Kenosha should be fully developed by the year 2000.

It is recommended that land required for the additional major parks proposed under the recommended land use plan be acquired by 1985. Remaining land acquisition requirements in this regard include land for the proposed Sugar Creek park site in Walworth County and the proposed Paradise Valley park site in Washington County, as well as land required for the expansion of the Monches park site in Waukesha County. The acquisition of these site areas should proceed immediately both to protect these prime recreational areas from loss to urban development and to best serve economic interests. For these same reasons, the entire net area of the primary environmental corridors shown on the recommended land use plan, comprising a total area of about 322,000 acres, should be protected from incompatible development through appropriate public land use controls during the first stage of the plan implementation.

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[1] *The major commercial center proposed in the City of Milwaukee, the Northridge Shopping Center, was essentially complete by 1972.*

Table 295

EXISTING AND PROPOSED LAND USE IN THE REGION
1970, 1985, AND 2000 RECOMMENDED LAND USE PLAN

Land Use Category	Existing 1970		1985 Plan Stage				2000 Plan Stage					
			Planned Increment 1970-1985		Total 1985		Planned Increment 1985-2000		Planned Increment 1970-2000		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use												
Residential												
Urban High Density	24,389	7.4	152	0.6	24,541	6.8	219	0.9	371	1.5	24,760	6.2
Urban Medium Density	37,092	11.3	16,846	45.4	53,938	14.9	24,200	44.9	41,046	110.7	78,138	19.5
Urban Low Density	72,701	22.2	- 5,663	- 7.7	67,038	18.5	2,026	- 3.0	- 7,689	- 10.6	65,012	16.2
Suburban Density	22,079	6.7	5,647	25.6	27,726	7.7	- 785	- 2.8	4,862	22.0	26,941	6.7
Subtotal	156,261	47.6	16,982	10.9	173,243	47.9	21,608	12.5	38,590	24.7	194,851	48.6
Commercial	6,517	2.0	362	5.6	6,879	1.9	336	4.9	698	10.7	7,215	1.8
Industrial	10,038	3.1	3,542	35.3	13,580	3.7	3,130	23.0	6,672	66.5	16,710	4.2
Governmental and Institutional	16,628	5.1	324	1.9	16,952	4.7	627	3.7	951	5.7	17,579	4.4
Transportation, Communication, and Utilities[a]	109,430	33.4	10,690	9.8	120,120	33.2	10,751	9.0	21,441	19.6	130,871	32.7
Recreation	28,982[b]	8.8	2,293[c]	7.9	31,275	8.6	1,873[c]	6.0	4,166[c]	14.4	33,148	8.3
Urban Land Use Subtotal	327,856	100.0	34,193	10.4	362,049	100.0	38,325	10.6	72,518	22.1	400,374	100.0
Rural Land Use												
Residential	--[d]	--	8,165	--	8,165	0.6	14,141	173.2	22,306	--	22,306	1.7
Agriculture	1,040,119	74.7	- 35,090	- 3.4	1,005,029	73.9	- 44,689	- 4.4	- 79,779	- 7.7	960,340	72.7
Other Open Lands[e]	353,125	25.3	- 7,268	- 2.1	345,857	25.5	- 7,777	- 2.2	- 15,045	- 4.3	338,080	25.6
Rural Land Use Subtotal	1,393,244	100.0	- 34,193	- 2.5	1,359,051	100.0	- 38,325	- 2.8	- 72,518	- 5.2	1,320,726	100.0
Total	1,721,100	--	--	--	1,721,100	--	--	--	--	--	1,721,100	--

[a] *Includes off-street parking uses.*

[b] *Includes net site area of public and nonpublic recreation sites.*

[c] *Includes only that net site area recommended for public recreation use.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

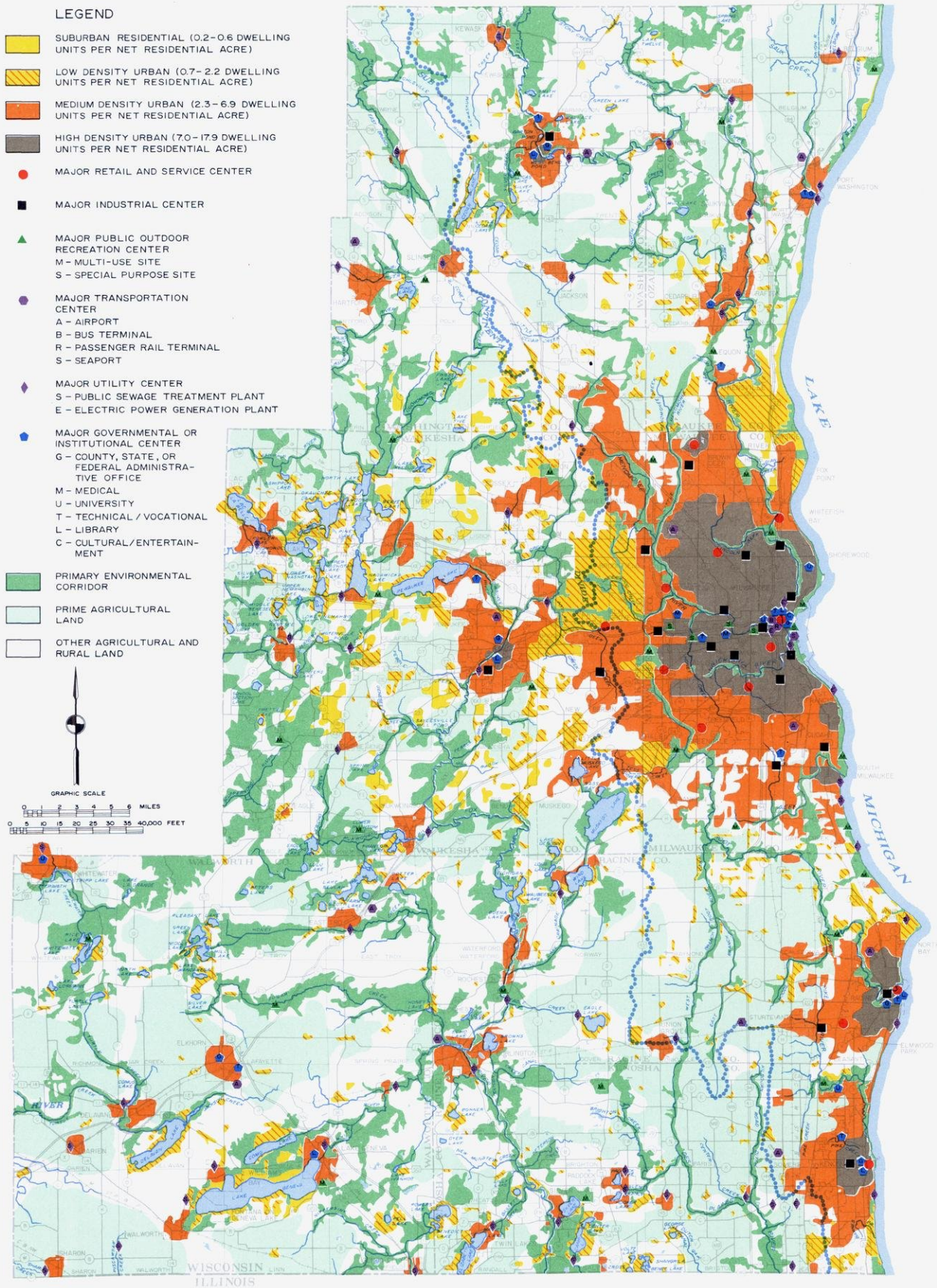
Population and Housing Unit Distribution

The staged development of the regional land use pattern proposed in the recommended land use plan as described above would accommodate the forecast population levels of the Region and its constituent counties set forth in Table 296. A regional population of about 1.95 million persons is anticipated by 1985, an increase of 11 percent over the 1970 levels; and a regional population of about 2.22 million persons is anticipated by the year 2000, an increase of 14 percent over the 1985 level and an increase of 26 percent over the 1970 level. As already noted, Milwaukee County's proportion of the regional population would decline from about 60 percent to about 47 percent over the plan design period, while the proportion of the regional population would increase at least slightly within each of the remaining six counties. It should be noted, however, that while a decrease of about 39,000 persons is expected in the population of Milwaukee County during the first staging period, an increase of almost 35,000 persons is expected in Milwaukee County in the second staging period, with the net effect being a population decline of only about 4,000 persons between 1970 and the year 2000.

The level of occupied housing units, or households, in the Region is expected to reach about 632,000 households by 1985, an increase of about 18 percent over the 1970 level (see Table 297). Among the seven counties, the increase in households between 1970 and 1985 would range from 5,300 households in Walworth County to 27,100 households in Waukesha County. Between 1985 and 2000, the number of households in the Region is expected to increase to 739,400 households, an increase of about 17 percent over the 1985 level and about 38 percent over the 1970 level. During this staging period, the largest increase in households, almost 32,000,

Map 61

RECOMMENDED LAND USE PLAN: 1985 STAGE



By 1985 it is expected that the regional population will increase by about 200,000 persons over the 1970 level and that an additional area of 53 square miles will have to be converted from rural to urban use to bring the total land in urban use within the Region to more than 565 square miles. It is also envisioned that by 1985 proposed new major commercial facilities would be provided in the Cities of Milwaukee and Racine, that proposed new industrial centers would be fully developed in the Cities of Milwaukee, Waukesha, and Oak Creek and all lands would be purchased for the Monches, Sugar Creek, and Paradise Valley major recreational sites.

Source: SEWRPC.

Table 296

EXISTING AND PROPOSED POPULATION IN THE REGION BY COUNTY
1970, 1985, AND 2000 RECOMMENDED LAND USE PLAN

County	1970 Population		1985 Plan Stage				2000 Plan Stage					
			Planned Increment 1970-1985		1985 Population		Planned Increment 1985-2000		Planned Increment 1970-2000		2000 Population	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total	Number	Percent Change	Number	Percent Change	Number	Percent of Total
Kenosha	117,900	6.7	31,900	27.1	149,800	7.7	25,000	16.7	56,900	48.3	174,800	7.9
Milwaukee	1,054,300	60.1	-39,300	-3.7	1,015,000	52.0	34,600	3.4	-4,700	-0.4	1,049,600	47.3
Ozaukee	54,500	3.1	32,300	59.3	86,800	4.4	27,200	31.3	59,500	109.2	114,000	5.1
Racine	170,800	9.7	24.700	14.5	195,500	10.0	22,200	11.4	46,900	27.5	217,700	9.8
Walworth	63,500	3.6	17,000	26.8	80,500	4.1	19,100	23.7	36,100	56.9	99,600	4.5
Washington	63,800	3.6	40,100	62.9	103,900	5.3	39,100	37.6	79,200	124.1	143,000	6.4
Waukesha	231,300	13.2	91,300	39.5	322,600	16.5	98,000	30.4	189,300	81.8	420,600	19.0
Total	1,756,100	100.0	198,000	11.3	1,954,100	100.0	265,200	13.6	463,200	26.4	2,219,300	100.0

Source: SEWRPC.

Table 297

EXISTING AND PROPOSED OCCUPIED HOUSING UNITS IN THE REGION BY COUNTY
1970, 1985, AND 2000 RECOMMENDED LAND USE PLAN

County	1970 Occupied Housing Units		1985 Plan Stage				2000 Plan Stage					
			Planned Increment 1970-1985		1985 Occupied Housing Units		Planned Increment 1985-2000		Planned Increment 1970-2000		2000 Occupied Housing Units	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total	Number	Percent Change	Number	Percent Change	Number	Percent of Total
Kenosha	35,500	6.6	10,700	30.1	46,200	7.3	10,200	22.1	20,900	58.9	56,400	7.6
Milwaukee	338,600	63.1	22,500	6.6	361,100	57.1	31,600	8.8	54,100	16.0	392,700	53.1
Ozaukee	14,800	2.8	9,600	64.9	24,400	3.9	8,100	33.2	17,700	119.6	32,500	4.4
Racine	49,800	9.3	8,600	17.3	58,400	9.2	9,400	16.1	18,000	36.1	67,800	9.2
Walworth	18,500	3.5	5,300	28.6	23,800	3.8	6,100	25.6	11,400	61.6	29,900	4.0
Washington	17,400	3.2	11,900	68.4	29,300	4.6	12,900	44.0	24,800	142.5	42,200	5.7
Waukesha	61,900	11.5	27,100	35.1	89,000	14.1	28,900	32.5	56,000	90.5	117,900	16.0
Region	536,500	100.0	95,700	17.8	632,200	100.0	107,200	17.0	202,900	37.8	739,400	100.0

Source: SEWRPC.

is expected in Milwaukee County, while the smallest increase in households, about 6,000, is again expected in Walworth County.

Employment Distribution

The staged development of the regional land use plan pattern proposed in the recommended land use plan would also accommodate the forecast employment levels in the Region and its constituent counties indicated in Table 298. Regional employment is anticipated to increase to 879,000 jobs in 1985. Milwaukee County is expected to have the largest employment increase—about 44,000 jobs—during the first staging period, while Waukesha County, with an anticipated increase of about 41,000 jobs, would be a close second. As indicated in Table 298, regional employment is anticipated to increase further to over 1,000,000 jobs by the year 2000, an increase of about 16 percent over the 1985 level and about 36 percent over the 1972 level. During the second staging period, the largest increase in employment, about 45,000 jobs, is anticipated in Waukesha County, while a substantial increase, more than 41,000 jobs, is expected in Milwaukee County.

Public Sanitary Sewer and Water Supply Service

To meet the adopted regional development standards, all proposed new urban development within the Region would have to be served by public sanitary sewer and public water supply facilities. In addition, many areas presently served by onsite soil absorption sewage disposal systems and by shallow private wells would have to be converted to centralized public sanitary sewer and water supply service over the plan design period. As indicated in Table 299, urban development within the Region is

Table 298

EXISTING AND PROPOSED EMPLOYMENT IN THE REGION BY COUNTY 1972, 1985, AND 2000 RECOMMENDED LAND USE PLAN

County	1972 Employment		1985 Plan Stage				2000 Plan Stage					
			Planned Increment 1972-1985		1985 Employment		Planned Increment 1985-2000		Planned Increment 1972-2000		2000 Employment	
	Number	Percent of Total	Number	Percent Change	Number	Percent of Total	Number	Percent Change	Number	Percent Change	Number	Percent of Total
Kenosha	40,700	5.4	6,000	14.7	46,700	5.3	7,600	16.3	13,600	33.4	54,300	5.4
Milwaukee	508,400	67.9	43,800	8.6	552,200	62.8	41,400	7.5	85,200	16.8	593,600	58.4
Ozaukee	19,300	2.6	8,700	45.1	28,000	3.2	10,000	35.7	18,700	96.9	38,000	3.7
Racine	63,600	8.5	15,100	23.7	78,700	9.0	16,800	21.3	31,900	50.2	95,500	9.4
Walworth	24,200	3.2	8,500	35.1	32,700	3.7	8,500	26.0	17,000	70.2	41,200	4.1
Washington	21,200	2.8	7,000	33.0	28,200	3.2	7,800	27.7	14,800	69.8	36,000	3.5
Waukesha	71,500	9.6	40,800	57.1	112,300	12.8	45,100	40.2	85,900	120.1	157,400	15.5
Total	748,900	100.0	129,900	17.3	878,800	100.0	137,200	15.6	267,100	35.7	1,016,000	100.0

Source: SEWRPC.

Table 299

EXISTING AND PROPOSED DEVELOPED AREA AND POPULATION SERVED BY PUBLIC SANITARY SEWER AND WATER SUPPLY SERVICE IN THE REGION: 1970, 1985, AND 2000 RECOMMENDED LAND USE PLAN

Type of Public Service	Area and Population	Existing 1970	1985 Plan Stage			2000 Plan Stage				
			1970-1985			1985-2000		1970-2000		
			Planned Increment	Percent Change	Total 1985	Planned Increment	Percent Change	Planned Increment	Percent Change	Total 2000
Sanitary Sewer	Developed Area									
	Total Square Miles	396.9	130.3	32.8	527.2	108.1	20.5	238.4	60.1	635.3
	Square Miles Served	286.5[a]	191.0	66.7	476.5	109.6	23.0	299.6	104.6	586.1
	Percent of Total Served	72.2	--	--	90.4	--	--	--	--	92.3
	Population									
	Total Population	1,756,100	198,000	11.3	1,954,100	265,200	13.6	463,200	26.4	2,219,300
	Population Served	1,488,700	319,400	21.5	1,808,100	251,700	13.9	571,100	38.4	2,059,800
	Percent of Total Served	84.8	--	--	92.5	--	--	--	--	92.8
Water Supply	Developed Area									
	Total Square Miles	396.9	130.3	32.8	527.2	108.1	20.5	238.4	60.1	635.3
	Square Miles Served	236.2[b]	241.6	102.3	477.8	109.6	22.9	351.2	148.7	587.4
	Percent of Total Served	59.5	--	--	90.6	--	--	--	--	92.5
	Population									
	Total Population	1,756,100	198,000	11.3	1,954,100	265,200	13.6	463,200	26.4	2,219,300
	Population Served	1,390,000	419,900	30.2	1,809,900	250,700	13.9	670,600	48.2	2,060,600
	Percent of Total Served	79.2	--	--	92.6	--	--	--	--	92.8

[a] *Does not include about 22.9 square miles located beyond the delineated urban growth ring for 1970.*

[b] *Does not include about 23.2 square miles located beyond the delineated urban growth ring for 1970.*

Source: SEWRPC.

expected to increase by nearly 33 percent to a total of about 527 square miles by 1985 and by an additional 21 percent to a total of about 635 square miles by the year 2000. Under the recommended land use plan, sanitary sewer service areas in the Region would be increased by about 67 percent to a total of 477 square miles by 1985 and by an additional 23 percent to a total of about 586 square miles by 2000. In 1970 about 72 percent of the total urban development within the Region and about 85 percent of the total regional population were served by centralized public sanitary sewer systems. If the regional plan recommendations are fully implemented, by 1985 about 90 percent of the urban development and 92 percent of the total regional population would be provided with such service; and by the year 2000 about 92 percent of the developed area of the Region and about 93 percent of the regional population would be provided with such service. As further indicated in Table 299, the proportion of the urban development within the Region provided with public water supply facilities by 1985 and by 2000 would be similar to that provided with public sanitary sewer service.

REGIONAL LAND USE PLAN— AN ALTERNATIVE VIEW

Previous sections of this chapter have described in detail the recommended year 2000 land use plan. The graphic presentation of this plan, shown on Map 53, indicates the spatial distribution of urban lands in the Region in the year 2000 by specific urban density category as well as the locations of major commercial, industrial, recreation, government and institutional land uses, and transportation, communication and utility land uses. The map also identifies the Commission designated primary environmental corridor and prime agricultural lands. Map 53 represents the traditional approach utilized by the Commission in the graphic display of its regional land use plan. This section presents an alternative approach to the graphic display of the adopted year 2000 regional land use plan (see Map 62). Whereas the traditional approach portrays the recommended plan within the context of urban residential densities and specific concentrations of major land uses, this alternative views the plan within a "development framework" context. Viewed within a development framework context, as indicated on Map 62, the land use plan would be separated into two major elements: an urban service area element and a rural service area element. A development framework to guide future land use development—keyed to the Commission adopted regional land use objectives—would be implemented within each of these service areas. For example, a development framework setting forth growth management policies which seek to restrict urban growth in predominantly rural areas while at the same time encouraging policies to preserve agricultural and other open space lands would be stressed in the rural service area, while growth management policies which seek to encourage orderly urban growth through the proper allocation and spatial distribution of urban land uses, including the logical extension of public facilities, would be stressed in the urban service area.

Urban Service Area Element

The urban service area element consists of two components: the contiguous expanse of urban development represented by the Milwaukee, Racine, and Kenosha urbanized areas, and 12 freestanding urban growth centers (see Map 62). The urban service area, by the year 2000, would encompass 516 square miles, or 81 percent of the total 635 square miles of urban land anticipated in the Region. Year 2000 population of these areas is estimated to be 1.88 million, or about 85 percent of the total regional population. These areas would also provide 939,300 jobs, or 93 percent, of the year 2000 total regional employment.

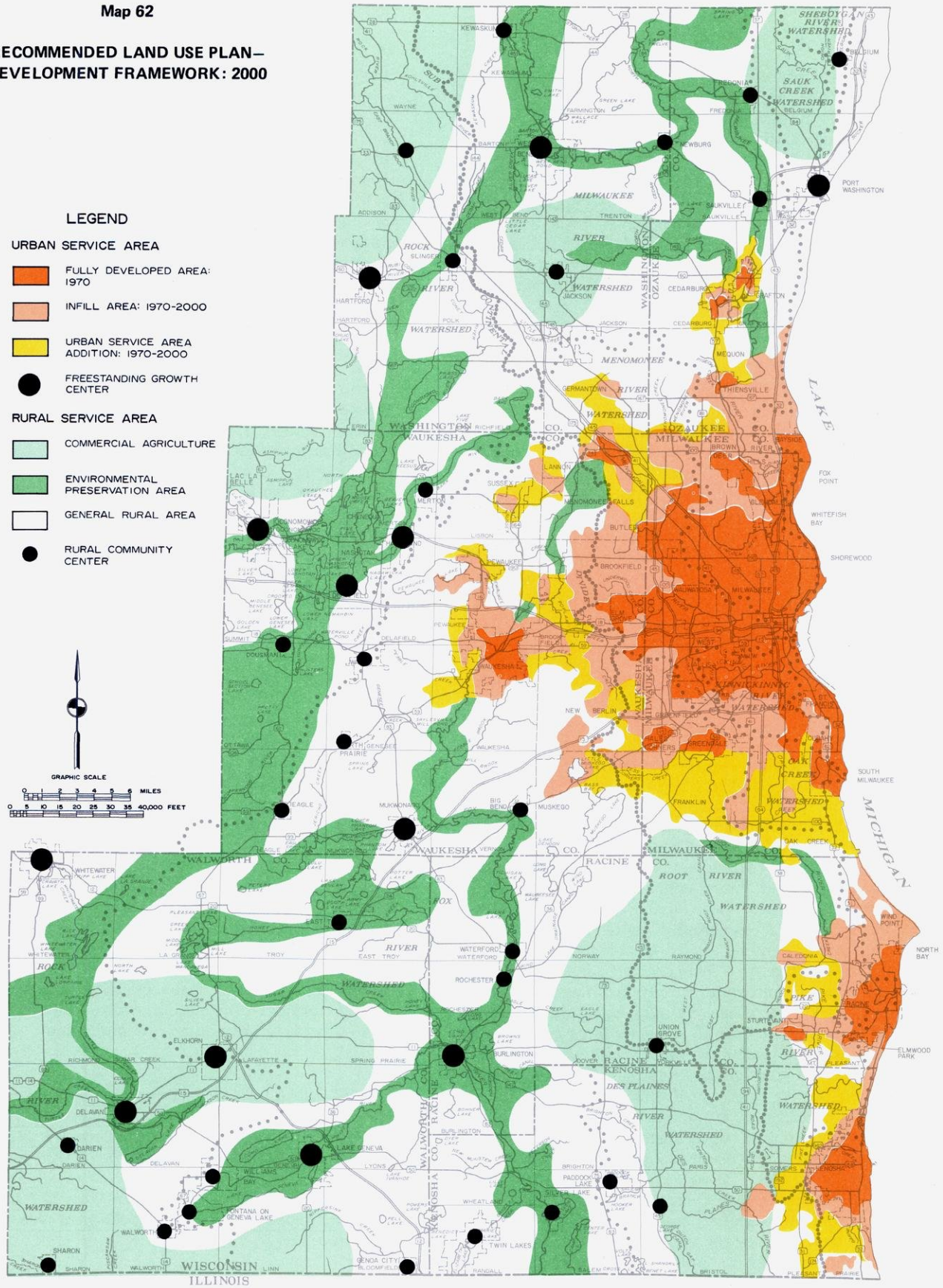
A full range of urban services and facilities would be provided within the urban service area, including centralized sanitary sewer and water supply, solid waste collection, police, fire and rescue services, and in the Milwaukee, Racine, and Kenosha urbanized areas, mass transit facilities.

Milwaukee, Racine, and Kenosha Urbanized Areas: The Milwaukee, Racine, and Kenosha urbanized areas would by the year 2000 encompass 453 square miles, or 88 percent of the total areal extent of the urban service area shown on Map 62, and 71 percent of the total 635 square miles of urban lands within the Region in the year 2000. These three urbanized areas would have an estimated year 2000 population of about 1.71 million which represents 91 percent of the year 2000 urban service area population and 77 percent of the total regional population. They would also provide an estimated 854,800 jobs, or 91 percent of the year 2000 urban service area employment and 84 percent of the total year 2000 regional employment. Within the urban-rural development framework context shown on Map 62, a specific growth management policy encouraged in the Milwaukee, Racine, and Kenosha urban areas would be the development and redevelopment of the urban areas in planned residential development units or neighborhoods. Areas designated on Map 62 as "urban service area additions" would utilize this neighborhood concept and all new residential development would be properly serviced by public sanitary sewerage and water supply facilities; would contain within the immediate vicinity of each dwelling unit the full complement of public facilities needed by the family in its daily activities such as an elementary school and church, and local park and convenient shopping facilities; and would provide ready access from residential areas to the regional transportation system. Such a policy would not only promote the efficient provision of community facilities and services to residential areas but would provide for the development of stable residential areas containing a wide range of housing types, designs, and costs and would provide a most desirable environment for family life.

Areas designated on Map 62 as "fully developed" could also utilize the neighborhood concept in the development proposals but in a slightly different manner. Instead of planning for new urban growth, because such areas are fully developed, existing neighborhood boundaries

Map 62

RECOMMENDED LAND USE PLAN— DEVELOPMENT FRAMEWORK: 2000



A display of the regional land use plan viewed within a development framework context highlights the rural-urban dichotomy which would exist in the Region in the year 2000. The urban service area which consists of the "cities" represented by Milwaukee, Racine, and Kenosha urbanized areas and by 12 freestanding urban growth centers would encompass about 516 square miles, or 19 percent of the total area of the Region. This area, however, would contain about 1.88 million persons, or 85 percent of the total population of the Region, and provide 939,000 jobs, or 93 percent of the total regional employment. The remaining rural service area, while encompassing 2,173 square miles, or 81 percent of the total area of the Region, would contain about 335,000 persons, or 15 percent of the year 2000 regional population and 76,700 jobs, or 7 percent of the year 2000 regional employment.

Source: SEWRPC.

would be determined, and policies to conserve and rehabilitate not only the residential portions but the commercial, industrial, and recreational components of such neighborhoods would be stressed.

Freestanding Growth Centers: Freestanding growth centers are defined as incorporated communities outside of the Milwaukee, Racine, and Kenosha urbanized areas identified on Map 62 having a year 2000 population of at least 7,000 and a diversified economic base sufficient to provide at least 2,000 jobs. These areas represent urban activity centers in predominantly rural areas of the Region. The 12 freestanding urban growth centers would by the year 2000 encompass 63 square miles, or 12 percent, of the areal extent of the urban service area and 10 percent of the total urban lands in the Region. These areas would have an estimated year 2000 population of 179,400, or 9 percent, of the urban service area population, and 8 percent of the year 2000 total regional population. Such areas would also provide an estimated 84,500 jobs, or 9 percent of the year 2000 urban service area employment, and 9 percent of the year 2000 total regional employment. Growth management policies to be encouraged within these freestanding growth centers would be similar in most respects to those instituted within the Milwaukee, Racine, and Kenosha urbanized areas.

Rural Service Area

The year 2000 rural service area, as indicated on Map 62, consists of all lands in the Region outside of the Milwaukee, Racine, and Kenosha urbanized areas and the 12 freestanding growth centers. The rural service area, while encompassing 2,173 square miles, or 81 percent, of the total area of the Region in the year 2000, would contain only about 335,000 persons, or 15 percent, of the year 2000 regional population, and 76,700 jobs, or 7 percent, of the year 2000 regional employment. As might be expected, however, the rural service area includes an overwhelming majority of the Region's agricultural and open space lands, shown on Map 62, as well as 28 rural community centers. Like the freestanding growth centers, almost all the rural community centers have urban type facilities and services including centralized sewer and water supply facilities. Such areas, however, lack the poulation concentrations and the diversified economic base to sustain a large employment level. Growth management policies to be encouraged in the rural service area include policies to preserve agricultural areas which because of their unique productive capabilities should remain indefinitely in agricultural use as well as other natural open areas containing significant elements of the natural resource base.

Concluding Remarks—An Alternative View

In conclusion, the regional land use plan viewed within a development framework context highlights the rural-urban dichotomy which should exist in the Region in the year 2000. The graphic display of the plan shown on Map 62 clearly indicates the stratification of urban areas ranging from rural community centers to freestanding growth centers to the contiguous urban growth concentration represented by the Milwaukee, Racine, and Kenosha urbanized area. A description of the Milwaukee, Racine, and Kenosha urbanized areas by the categories of "fully developed areas," "infill areas," or "urban service area additions," rather than by ultimate residential density as indicated in the traditional approach utilized by the Commission on Map 62 facilitates a better understanding of the various growth management policies which would have to be encouraged in order to implement various aspects of the year 2000 land use plan within these areas.

PUBLIC REACTION TO THE RECOMMENDED PLAN

The recommended regional land use plan described in this chapter was, together with the recommended regional transportation plan, the subject of a series of public hearings held in the late Fall of 1977. Minutes of these public hearings were prepared and are available from the Commission.[2] In addition, the park and open space elements of the land use plan were the subject of a separate series of public informational meetings and hearings held pertaining directly to the regional park and open space plan for southeastern Wisconsin.[3] These informational meetings and hearings were held in August 1977.[4] The regional land use plan and the regional park and open space plan were prepared in a fully coordinated manner and contain common elements.

Out of these two sets of public informational meetings and public hearings, there were three specific changes made to the recommended regional land use plan. The first of these three changes relates to the preservation of prime agricultural lands in Walworth County. In the development of a new county zoning ordinance designed to implement the original 1990 regional land use plan, the Walworth County Park and Planning Commission refined and detailed the prime agricultural land delineation in that County. In so doing, the County formally designated more prime agricultural lands than the Commission did in its 1966 delineation. As a result of the comments received at the public hearings, the more extensive delineation of prime agricultural lands in Walworth County was incorporated into the final regional land use plan and the final regional park and open space plan. Accordingly, the amount of prime agricultural lands in Walworth County increased from about 175 square

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[2] *See Minutes of Public Informational Meetings and Public Hearings, A Regional Land Use Plan and A Regional Transportation Plan for Southeastern Wisconsin: 2000, November 28, 1977 to December 5, 1977.*

[3] *See SEWRPC Planning Report No. 27, A Regional Park and Open Space Plan for Southeastern Wisconsin, November 1977.*

[4] *See Minutes of Informational Meetings and Public Hearing, Regional Park and Open Space Plan for Southeastern Wisconsin: 2000, August 22, 1977 to August 31, 1977.*

miles under the preliminary plan to about 289 square miles under the final plan, while the total such lands in the Region accordingly increased from about 619 square miles under the preliminary plan to about 733 square miles under the final plan. A comparison of the initial and revised delineation of prime agricultural lands in Walworth County is shown on Map 63. The revised delineation of prime agricultural lands in Walworth County was used in preparing the final recommended regional land use plan map contained in the pocket attached to the back cover of this report.

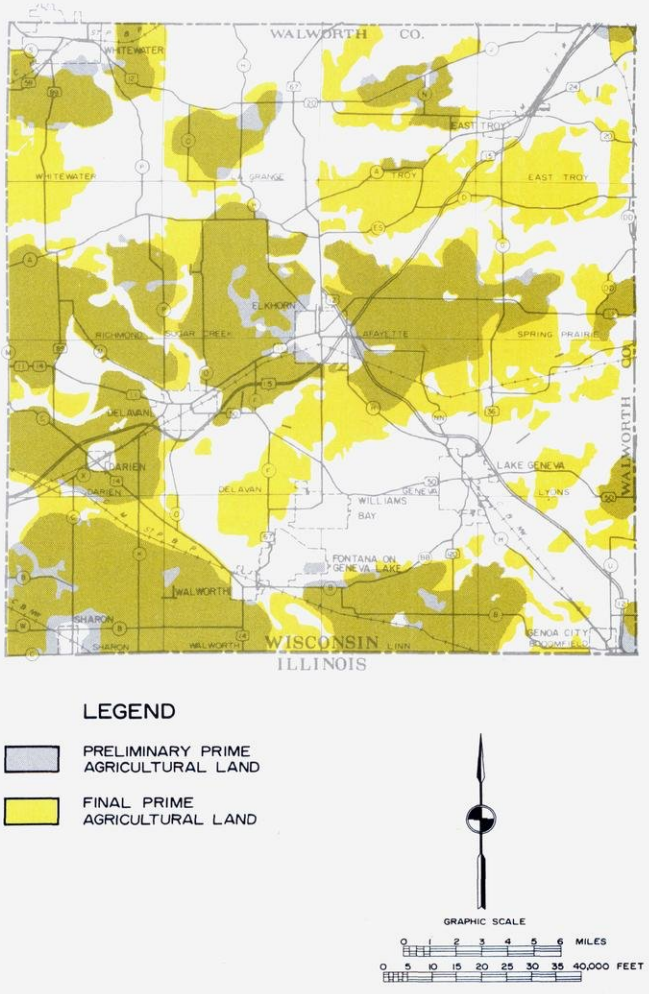
The Commission has always maintained that its delineation of prime agricultural lands was intended to be generalized in nature and has recommended that the actual areas to be protected through zoning be locally delineated, as Walworth County has done. The Commission recommends that the final establishment of boundaries of prime agricultural areas be done at the local level by the County Park and Planning Agency in conjunction with the County Soil and Water Conservation District. The Commission can assist, however, by providing aerial photographs and soil survey and land use data and by providing technical assistance in delineating the areas more precisely and writing the necessary land use control ordinance.

In its original delineation of prime agricultural lands, the Commission identified lands which were determined to be highly productive for agricultural purposes on the basis of the soils present, the size of the farms, the size and extent of the area being farmed, the demonstrated capability of the farms in the area to consistently produce better than average crop yields, and the capital invested in such improvements as irrigation and drainage systems and soil and water conservation practices. In the local refinement of the Commission's original delineation, it may be desirable to expand the criteria used to identify which agricultural lands ought to be preserved. For example, it may be desirable to preserve through exclusive agricultural zoning general agricultural areas, even where the individual farm units are relatively small, simply to maintain the rural character and heritage of an area.

The second change in the land use plan coming out of the series of public informational meetings and hearings involves the proposed major park to be located in the primary environmental corridor along Sugar Creek in the Town of Lafayette in Walworth County. Both the final regional park and open space plan and the final regional land use plan continue to recommend the development of a park at that site, but have reduced the scope of the proposed development from an approximately 1,325-acre state park in the preliminary plans to an approximately 250-acre county park in the final plans. The plans further recommend that every effort be made by Walworth County to minimize any potential adverse impacts of park development on local property owners. Most importantly, the plans call for careful design of the park site in order to preserve the natural resource amenities and minimize disturbance of the existing character of the site, while providing the needed recreational facilities.

Map 63

PRELIMINARY AND FINAL DELINEATIONS OF PRIME AGRICULTURAL LANDS IN WALWORTH COUNTY



The prime agricultural lands shown on the preliminary land use plan map for Walworth County were taken from the regional land use plan adopted by the Commission in 1966. The Walworth County Park and Planning Commission in the development of a new county zoning ordinance and attendant zoning district maps properly refined and detailed the original prime agricultural land delineation and in so doing designated more prime agricultural lands than were indicated in the original land use plan delineations. Based upon comments made at the public hearings on the preliminary plan, the Technical and Citizen Advisory Committee recommended that the more extensive delineation of prime agricultural lands in Walworth County be incorporated into the final year 2000 land use plan. As a result of this revision delineated prime agricultural lands in Walworth County were increased from 175 square miles under the preliminary plan to 289 square miles under the final open space plan. Similar efforts toward the refinement of the prime agricultural land delineations should be carried out in Kenosha, Ozaukee, Racine, Washington, and Waukesha Counties as part of the regional land use plan implementation effort.

Source: SEWRPC.

The third change to the recommended regional land use plan involved the designation of the Bong Recreation Area in Kenosha County as the site of a special purpose major outdoor recreation center. The hearings on the park and open space and land use plans brought out the fact that under relatively recent legislation, the Wisconsin Department of Natural Resources has been authorized to provide a wide range of opportunities for relatively specialized recreation pursuits at the Bong Recreation Area. Given this legislative mandate, the recommended new regional land use plan was modified to reflect the committed development at the Bong site as a major special purpose outdoor recreation center.

SUMMARY

The Southeastern Wisconsin Region of 2000 will be significantly different from the Region of today. There may be expected to be more than 460,000 additional residents and about 267,000 additional jobs in the Region by the plan design year. This anticipated growth will generate demands for land and for improved transportation facilities and will press upon the limited natural resource base. The recommended land use plan described in this chapter seeks to provide for this anticipated regional growth and development in a manner which will not only permit the efficient provision of the necessary public facilities and services but which will meet, to the maximum extent possible, the eight specific regional land use development objectives formulated and adopted by the Commission. The extent to which the recommended land use plan would meet the agreed upon development objectives and associated standards is indicated in Table 300. A summary of the recommended land use plan within the context of the eight specific development objectives is presented below.

1. Implementation of the recommended land use plan would meet the social, physical, and economic needs of the future regional population by providing a balanced allocation of space to each of the various major land use categories. The plan allocates sufficient land to each of the major land use categories to satisfy the known and anticipated demand for each use, meeting both the demands of the urban land market and approved land use plan design standards.

2. The recommended land use plan seeks to achieve a compatible arrangement of land uses by providing a spatial distribution of major land uses which will avoid or minimize hazards and dangers to health, safety, and welfare and would, at the same time, maximize amenity and convenience in terms of accessibility to supporting land uses.

3. The recommended land use plan attempts to protect and enhance the natural resource base of the Region, particularly the soil, inland lakes and streams, wetlands, woodlands, and wildlife habitat areas, and to assist in maintaining an ecological balance between the activities of man and the natural environment which supports him. The plan allocates new urban and rural development only to those areas of the Region which are covered by soils well suited to such development. In particular, the plan seeks to avoid development requiring onsite septic tank sewage disposal systems in those areas of the Region covered by soils unsuited to the utilization of such systems, thereby abating water pollution problems and avoiding the intensification of existing, and the creation of new, environmental problems. The plan seeks to protect the shoreline frontage of the lakes and the perennial streams of the Region from incompatible development, to protect the floodways and floodplains of perennial streams and water courses of the Region from urban encroachment, and to protect the remaining wetland areas from destruction through improper urban or rural development. The plan proposes to maintain appropriate levels of woodland cover and to maintain the remaining high value resource areas of the Region in a wholesome state in order to assure suitable habitat for the maintenance of wildlife within the Region.

4. The implementation of the recommended land use plan would permit a more economical provision of public utility and municipal services to future urban development. The plan recognizes the interdependence between the land use pattern and the transportation and public utility systems which serve and sustain it. It seeks to encourage urban development in those areas of the Region which can be readily provided with gravity drainage sanitary sewer service and public water supply. It seeks to maximize the use of existing transportation and public utility facilities and to require the provision of transportation and utility services only to those areas of the Region which should be allocated to urban use.

5. The recommended land use plan seeks to provide for the development and conservation of residential areas within a physical environment that is healthy, safe, convenient, and attractive. The plan would not only promote the efficient provision of community facilities and services to residential areas but would provide for the development of stable residential areas containing a wide range of housing types, designs, and costs and would provide a most desirable environment for family life. The plan proposes to allocate new low-, medium-, and high-density residential development to planned development units which would be properly serviced by public sanitary sewerage and water supply facilities; would contain within the immediate vicinity of each dwelling unit the full complement of public facilities needed by the family in its daily activities, such as elementary school and church, local park, and convenient shopping facilities; and would provide ready access from residential areas to the regional

Table 300

ABILITY OF THE RECOMMENDED REGIONAL LAND USE PLAN TO MEET THE LAND USE DEVELOPMENT STANDARDS

Development Objective and Supporting Standards	Recommended Regional Land Use Plan
Objective No. 1—Balanced Allocation of Land Use	
1. Residential Land Allocation	
a. High Density Urban—25 net acres per 1,000 persons	Met
b. Medium Density Urban—65 net acres per 1,000 persons	Met
c. Low Density Urban—238 net acres per 1,000 persons	Met
d. Suburban Density—429 net acres per 1,000 persons	Met
e. Rural Density—1,430 net acres per 1,000 persons	Met
2. Park and Recreation Land Allocation	
a. Regional—5 gross acres per 1,000 persons	Met
b. Local—9 gross acres per 1,000 persons	Met
3. Industrial Land Allocation	
a. Major and Other—7 net acres per 100 added employees	Met
4. Commercial Land Allocation	
a. Major—1 net acre per 100 added employees	Met
b. Other—2 net acres per 100 added employees	Met
5. Governmental and Institutional Land Allocation	
a. Major and Other—9 net acres per 1,000 persons	Met
Objective No. 2—Compatible Arrangement of Land Uses	
1. Neighborhood Units for Urban High, Medium, and Low Density Residential Development	Could be Met[a]
2. Suburban and Rural Residential Land Location	Met
3. Industrial Land Location	Met
4. Regional Commercial Land Location	Met
Objective No. 3—Protection, Wise Use, and Development of Natural Resource Base	
1. Soils	
a. Sewered Urban Development	Met
b. Unsewered Suburban Development	Met
c. Rural Development	Met
2. Inland Lakes and Streams	
a. Major Inland Lakes—50 acres or more	
(1) 25 percent of shoreline in natural state	Met for 42 or 100 Lakes
(2) 50 percent of shoreline in nonurban use	Met for 33 of 100 Lakes
(3) 10 percent of shoreline in public use	Met for 15 of 100 Lakes
b. Minor Inland Lakes—under 50 acres	
(1) 25 percent of shoreline in natural state or low-intensity public use	Partially Met
c. Perennial Streams	
(1) 25 percent of shoreline in natural state	Met for 121 of 129 Streams
(2) 50 percent of shoreline in nonurban use	Met for 121 of 129 Streams
d. Floodlands Free from New Incompatible Urban Development	Met
e. Restrict Encroachments in Channels and Floodways	Met
3. Wetlands	
a. Protect Wetlands Over 50 Acres and Those With High Resource Value	Met
4. Woodlands	
a. Protect 10 Percent of Watershed	Partially Met
b. Preserve 40 Acres Each Per County of 4 Forest Types	Could be Met
c. Maintain 5 acres per 1,000 persons for recreation use	Met
5. Wildlife	
a. Ensure Preservation of Suitable Habitat	Met

Table 300 (continued)

Development Objective and Supporting Standards	Recommended Regional Land Use Plan
Objective No. 4—Properly Relate Development to Transportation and Utility Systems	
1. Locate Urban Development so as to Maximize Use of Existing Transportation and Utility Systems	Met
2. Locate Urban Development Where Transportation System Can Provide Ready Access	Met
3. Locate Urban High, Medium, and Low Density Residential Development Where Readily Serviceable by Public Sanitary Sewerage Facilities	Met
4. Locate Urban High, Medium, and Low Density Residential Development Where Readily Serviceable by Public Water Supply Facilities	Met
5. Locate Urban High, Medium, and Low Density Residential Development Where Readily Serviceable by Mass Transit	Partially Met
6. Minimize Penetration by Major Transportation Routes of Residential Neighborhood Units	Could be Met[a]
7. Locate Transportation Terminal Facilities Near Principal Land Uses Served	Could be Met[a]
Objective No. 5—Conserve and Develop Healthy, Safe, Convenient, and Attractive Residential Areas	
1. Locate Urban High, Medium, and Low Density Residential Development in Physically Self-Contained Neighborhood Units	Could be Met[a]
2. Locate Appropriate Land Uses Within Neighborhood Units	Could be Met[a]
3. Locate Suburban and Rural Residential Development Properly to Environment	Met
Objective No. 6—Preserve, Develop, and Redevelop Variety of Industrial and Commercial Sites	
1. Regional Industrial Site Requirements	Met
2. Regional Commercial Site Requirements	Met
3. Local Industrial Site Requirements	Could be Met[a]
4. Local Commercial Site Requirements	Could be Met[a]
Objective No. 7—Preserve and Provide Open Space	
1. Regional Park Spatial Location	Met
2. Local Park Spatial Location	Could be Met[a]
3. Preserve Unique Scientific, Cultural, Scenic, or Educational Sites	Partially Met
Objective No. 8—Preserve Land Areas for Agricultural Uses	
1. Preserve Prime Agricultural Lands	98 Percent Preserved
2. Preserve Other Agricultural Land Areas Within a 1/2 Mile Radius of High-Value Scientific, Educational, or Recreational Sites	4,300 Acres Lost

[a] *This standard could be met only by local community action.*

Source: SEWRPC.

transportation system. The plan further proposes that existing suburban-density residential areas be provided with partial urban services, including solid waste collection and police, fire, and rescue services, but not including walk-in elementary school or centralized sanitary sewer and water supply services.

6. The recommended land use plan also attempts to ensure the provision of a variety of suitable industrial and commercial sites within the Region in terms of both physical characteristics and location. The plan proposes to meet the needs of increased commercial and industrial activity within the Region, not only through the provision

of new planned industrial and commercial centers, but also through the expansion and improvement of existing commercial and industrial areas and through the provision of adequate transportation and utility services to both new and existing concentrations of economic activities.

7. Implementation of the recommended land use plan would assure the preservation and provision of enough open space land within the Region to enhance the total quality of the regional environment, lend form and structure to urban development, and facilitate attainment of a balanced outdoor recreational program providing a full range of facilities for all age groups. The plan seeks to preserve and protect the primary environmental corridors of the Region, which contain the best remaining potential park and related open space sites; the best remaining woodlands, wetlands, and wildlife habitat areas; many of the scenic, historic, scientific, and cultural sites; and most of the surface water resources of the Region. The preservation of these environmental corridors is essential to the preservation and wise use of the natural resource base; to the enrichment of the physical, intellectual, and spiritual development of the resident population; and to the maintenance of a sound ecological balance within the Region.

8. The recommended land use plan attempts to preserve the best remaining agricultural areas within the Region for agricultural and open space uses. The maintenance of agricultural areas within an urbanizing Region serves not only to provide agricultural products to the resident population but to contribute significantly to maintaining the ecological balance, to lend form and structure to urban development, and to provide important land reserve for presently unforeseen urban and rural development needs.

9. After a series of public informational meetings and public hearings, the recommended regional land use plan described in this chapter was modified in three ways. First, the prime agricultural land preservation element was modified to reflect more recent and more extensive delineations of prime agricultural land in Walworth County. Second, the plan was modified to reduce the geographic scope of the major public outdoor recreation center called for at Sugar Creek in the Town of Lafayette, Walworth County, to reflect a county park site of about 250 acres. Finally, the plan was modified to reflect a legislative commitment to develop a major special purpose outdoor recreation center on the abandoned Bong Air Force Base in Kenosha County.

Chapter VIII

THE RECOMMENDED TRANSPORTATION PLAN

INTRODUCTION

As discussed in Chapter VI of this volume, the Commission, after careful review of the public reaction to the alternative regional transportation plans presented at the public informational meetings in April 1976, directed its staff, the two Advisory Committees, and a special Task Force to merge the highway-supported transit and transit-supported highway alternative plans into a single recommended regional transportation system plan. This chapter presents the results of the process of merging the two alternative plans.

The first section of this chapter describes in brief the work of the Task Force and the reaction of the Technical Coordinating and Advisory Committee on Regional Land Use Transportation Planning and the Citizens Advisory Committee on the Freeway-Transit Element of the Regional Land Use and Transportation Plan Reevaluation to the Task Force-nominated final regional transportation plan. This is followed by a section describing the final regional transportation plan alternatives developed in the process of merging the initial plan alternatives, and a section comparing and evaluating these final plan alternatives. This is followed by a section reporting the Advisory Committee and Commission actions on the final plan alternatives; a section setting forth the preliminary recommended regional transportation plan; a section documenting public reaction to the preliminary plan; and a section setting forth the final recommended regional transportation plan, including the staging of the recommended plan for the year 1985 and the results of an analysis of the sensitivity of the recommended plan to changes in motor fuel price and availability and in automobile occupancy. The chapter concludes with a summary section.

PROCESS OF FINAL PLAN SYNTHESIS

Task Force Nomination

In July 1976 the Commission created a special Task Force consisting of representatives of State and certain local agencies concerned with transportation system development and two members from the Citizens Advisory Committee. The Task Force was charged with the responsibility of assisting the Commission staff in nominating a new regional transportation plan that would combine the best elements of the highway-supported transit and transit-supported highway alternative plans previously considered.

The Task Force directed the preparation of an initial regional transportation system plan consisting of freeway, standard arterial street and highway, and transit networks. Potentially required additions to the freeway network were identified on an initial basis by special screenline analyses across major travel corridors conducted for both the transit-supported highway and the highway-supported transit alternative plans previously considered. If the screenline analyses for both alternative plans indicated a gross need for an additional major arterial highway facility and if it could be further shown that the construction of a freeway facility would be less disruptive than providing a series of capacity improvements to existing surface arterials, then the freeway facility was tentatively included in the Task Force nominated plan. If neither the highway-supported transit nor the transit-supported highway alternative screenline analyses identified a gross need for a major new arterial highway facility, then the facility was not included in the Task Force nominated plan. If the two screenline analyses indicated that a major new highway facility would likely be warranted under the transit-supported highway alternative plan but not under the highway-supported transit alternative plan, the analyses of the Task Force were expanded to include other considerations, such as system continuity and performance of the arterial system under the alternative plan evaluation set forth in Chapter VI, in order to arrive at a determination as to whether or not to include the freeway facility for further test and evaluations in the nominated plan.

The Task Force also made every effort to minimize capital investment in facilities on the standard arterial street and highway network. This was done by generally selecting highway improvement cross sections for standard surface arterial streets from the highway-supported transit system plan alternative.

Since the transit networks included in the alternative transportation plans discussed in Chapters V and VI were essentially the same, the process of identifying an initial Task Force nominated regional transit network was simpler than for the highway network. Those exclusive transitways found to be warranted under either alternative were included. In addition, refinements were made in the secondary and tertiary transit networks in order to reflect the new regional land use plan. The precise structure of the primary transit network was determined in part by the results of the analyses leading to determinations as to whether or not given freeway segments would be included, since freeway facilities provide a basis for the provision of primary transit service.

The Task Force gave careful consideration in its deliberations to the basic assumptions concerning the levels of transit ridership that could be expected under varying service levels and fare structures, recognizing in these deliberations the fact that the simulation models utilized to calculate transit use were calibrated over a relatively

narrow range of service levels and fares. Those members of the Task Force most knowledgeable and experienced in transit system development and operation in a Region indicated that in their judgment a doubling in transit ridership over the 1972 level of about 53 million revenue passengers annually was a reasonably attainable objective. Accordingly, the Task Force determined that its nominated plan would be based upon an attempt to double the transit use over the plan design period, with an assumed maintenance of the current $0.50 fare structure and the current parking price structure in the Milwaukee area, and an assumed maintenance of the current $0.25 fare structure in the Kenosha and Racine areas.

The results of the Task Force work are documented in a memorandum entitled, "Report of SEWRPC Task Force on Regional Transportation Plan Synthesis," a copy of which is on file at the Commission office. The Task Force plan—nominated after consideration of 17 alternatives identified as A through Q and described in the referenced memorandum—included the following major new freeway facilities in the Region: the West Bend Freeway in Washington County, the USH 41 Freeway in Washington County, the USH 16 Freeway in Waukesha County, the USH 12 Freeway in Walworth County, the Stadium Freeway-North to the Fond du Lac Freeway in Milwaukee County, the Park Freeway-West in Milwaukee County, the Stadium Freeway-South in Milwaukee County, the Lake Freeway-South in Milwaukee, Racine, and Kenosha Counties, the Lake Freeway-North in Milwaukee County, the Park Freeway-East in Milwaukee County, and the Airport Spur Freeway in Milwaukee County. In all, the Task Force recommended 117 miles of new regional freeways. The Task Force did not include in its nominated plan the Milwaukee Metropolitan Belt Freeway in its entirety and the Bay Freeway from the Village of Pewaukee to the Fond du Lac Freeway, which had been included in the transit-supported highway alternative plan described in Chapter V of this report. The Task Force gave consideration to, but rejected, other freeway facilities, including the previously proposed extension of the Stadium Freeway-North from the Fond du Lac Freeway to IH 43 near Saukville, the Bay Freeway along the Hampton Avenue Corridor in Milwaukee County, the Racine Loop Freeway, a freeway along STH 50 in Kenosha County, and a proposed extension of the West Bend Freeway in Washington County to and around the Village of Kewaskum. As noted above, the Task Force did include in its nominated plan the USH 12 Freeway completion in Walworth County, which had not been included on the previous transit-supported highway alternative plan. The specific rationale of the Task Force for acceptance or rejection of each particular freeway segment is included in the aforementioned Task Force report on file in the Commission offices.

The Task Force also recommended urban transit systems in the Milwaukee, Racine, and Kenosha urbanized areas. Of particular importance in the Milwaukee urbanized area was the Task Force recommendation to provide rapid transit service, that is, the operation of transit vehicles over exclusive fully grade separated rights-of-way, over a total of about 20 miles of exclusive transitway. These transitways were proposed by the Task Force to be located in the east-west travel corridor in Milwaukee County paralleling the East-West Freeway; in the northwest travel corridor in Milwaukee County, assumed to be constructed concurrently with the Park Freeway-West and Stadium Freeway-North; and in the north-south travel corridor in Milwaukee County extending from the Lake interchange of the East-West and Lake Freeways to and along the Milwaukee River valley on the Milwaukee County-owned abandoned Chicago & North Western Transportation Company railroad right-of-way to IH 43 in the vicinity of Hampton Avenue.

The merged transportation plan nominated by the Task Force became known as Plan A for convenient reference purposes later in the plan synthesis process. This plan is more fully described and evaluated in a later section of this chapter. Plan A, as the Task Force's nomination, was then reported to the Citizens Advisory Committee and the Technical Coordinating and Advisory Committee for their review and action.

Citizens Advisory Committee Action

In midwinter 1977, the Citizens Advisory Committee considered the Task Force recommendation identified as Plan A. The Citizens Advisory Committee also deliberated at length over other proposals that, as already noted, had been considered by the Task Force, but rejected, identified as Plans B through Q. The Citizens Advisory Committee then directed the SEWRPC staff to test and fully evaluate another plan in addition to Plan A that became identified as Plan R. In essence, Plan R is a nonfreeway development plan, substituting new or improved standard surface arterial facilities in some previously proposed freeway corridors. Dislocation due to transportation system improvements was to be held by Committee direction to a maximum of 50 residential units in Milwaukee County, thus constraining the design of arterial street improvements. Plan A had no such constraint.

The Citizens Advisory Committee further directed that Plan R assume a $0.25 base transit fare in the Milwaukee urbanized area as was previously assumed in the highway-supported transit alternative plan described in Chapter V. The Citizens Advisory Committee also directed that Plan R assume certain disincentives to automobile use, including an all-day parking fee in downtown Milwaukee equal to a round-trip transit fare and extensive ramp metering of the existing freeway system. The Citizens Advisory Committee further deleted the three Task Force nominated exclusive transitways on the basis that ramp metering could be used to insure a relatively free-flowing operation on the existing freeway system, thus enabling primary transit service to be effectively provided on that system.

Technical Coordinating and Advisory Committee Action

The Technical Coordinating and Advisory Committee received the Task Force nomination of Plan A at a meeting held soon after the Citizens Advisory Committee

reaction was obtained. After careful deliberation of the Task Force recommendation and the Citizen Advisory Committee action, the Technical Coordinating and Advisory Committee directed the SEWRPC staff to proceed with a full test and evaluation of Plan A as nominated by the Task Force, together with a full test and evaluation of two additional plans which became identified as Plan A'(25) and Plan A'(50). Plan A'(25) included all of the regional freeways that were included in the Task Force nominated plan, but did not include transitways. Plan A'(25) also assumed a $0.25 base transit fare in the Milwaukee urbanized area, automobile use disincentives including a $0.50 all-day parking fee in downtown Milwaukee, and the use of extensive ramp metering of the freeway system, all as proposed under Plan R. Plan A'(50) was identical to Plan A'(25) except that it assumed a $0.50 base transit fare in the Milwaukee urbanized area.

Concluding Remarks

Rather than arriving at a single merged regional transportation system plan, then, the Commission was faced with a continued division of opinion among its Advisory Committees in that the committees directed the Commission staff to proceed with a full test and evaluation of four final regional transportation alternatives: Plan A, Plan A'(25), Plan A'(50), and Plan R. In addition, it was necessary to proceed with the testing and evaluation of a "no build" alternative in order to provide a proper basis for benefit-cost analyses for each of the plans. These final alternative regional transportation plans are described, compared, and evaluated in the next two sections of this chapter.

DESCRIPTION OF FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES

Freeway Networks

As of January 1, 1977, there were a total of 228 miles of freeways open to traffic in the Region (see Table 301). Under the "no build" plan, the following additional freeways were included as committed facilities at the time of plan preparation:

1. Airport Spur Freeway—Milwaukee County (1.4 miles)
2. East-West Freeway Extension to Harbor Bridge—Milwaukee County (0.2 mile)
3. Lake Freeway (Harbor Bridge)—Milwaukee County (2.6 miles)
4. USH 16 Freeway Extension to Oconomowoc—Waukesha County (5.9 miles)

In total the "no build" plan included 10.1 miles of committed freeway facilities (see Map 64).

Plans A, A'(25), and A'(50) contain identical proposed freeway systems. In addition to the freeways noted above considered as committed under the "no build" plan, Plans A, A'(25), and A'(50) include the following proposed freeways:

1. West Bend Freeway—Washington County (12.7 miles)

Table 301

EXISTING, COMMITTED, AND PROPOSED FREEWAYS IN THE REGION FINAL 2000 TRANSPORTATION PLAN ALTERNATIVES

Freeway Facility	Number of Miles								
	Existing January 1, 1977	No Build		Plan A		Plans A'(25) and A'(50)		Plan R	
		Proposed	Total	Proposed	Total	Proposed	Total	Proposed	Total
Airport	5.1	--	5.1	--	5.1	--	5.1	--	5.1
Airport Spur	--	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
East-West	33.3	0.2	33.5	0.2	33.5	0.2	33.5	0.2	33.5
Fond du Lac	4.5	--	4.5	--	4.5	--	4.5	--	4.5
Lake	--	2.6	2.6	39.0	39.0	39.0	39.0	2.6	2.6
North-South	78.0	--	78.0	--	78.0	--	78.0	--	78.0
Park	1.2	--	1.2	3.7	4.9	3.7	4.9	0.2	1.4
Rock	48.7	--	48.7	--	48.7	--	48.7	--	48.7
Stadium	2.7	--	2.7	9.5	12.2	9.5	12.2	0.5	3.2
USH 12	19.1	--	19.1	17.0	36.1	17.0	36.1	--	19.1
USH 16	8.3	5.9	14.2	12.4	20.7	12.4	20.7	5.9	14.2
USH 41	11.3	--	11.3	21.0	32.3	21.0	32.3	--	11.3
West Bend	1.0	--	1.0	12.7	13.7	12.7	13.7	--	1.0
Zoo	14.5	--	14.5	--	14.5	--	14.5	--	14.5
Total	227.7	10.1	237.8	116.9	344.6	116.9	344.6	10.8	238.5

Source: SEWRPC.

2. USH 41 Freeway Conversion—Washington County (21.0 miles)

3. USH 16 Freeway Conversion (Pewaukee)—Waukesha County (1.1 miles)

4. USH 16 Freeway Extension (Oconomowoc Bypass)—Waukesha County (5.4 miles)

5. USH 12 Freeway Extension—Walworth County (17.0 miles)

6. Stadium Freeway-North "Gap Closure"—Milwaukee County (5.5 miles)

7. Park Freeway-West—Milwaukee County (2.8 miles)

8. Stadium Freeway-South—Milwaukee County (4.0 miles)

9. Lake Freeway-South—Milwaukee, Racine, and Kenosha Counties (35.5 miles)

10. Milwaukee Downtown Freeway Loop Closure (Lake Freeway-North and Park Freeway-East)—Milwaukee County (1.8 miles).

Including the previously noted committed freeways, Plans A, A'(25), and A'(50) propose a total of 116.9 additional miles of freeways (see Map 65). Plans A, A'(25), and A'(50) also include the provision of two additional traffic lanes on IH 43 from about the Silver Spring Drive interchange northerly to Mequon Road.

In addition to the committed freeways identified under the "no build" alternative and to the IH 43 improvement noted under Plans A, A'(25), and A'(50) Plan R includes only two minor freeway additions: an extension of the Park Freeway-East to complete an interchange with a pair of one-way streets in downtown Milwaukee, a distance of 0.2 mile; and an extension of the Stadium Freeway-South interchange at National Avenue to Greenfield Avenue, a distance of 0.5 mile. In addition, Plan R includes the following surface arterial proposals in place of previously proposed freeways (see Map 66):

1. Substitution of an expressway for the West Bend Freeway.

2. Retention of the existing USH 41 expressway in Washington County instead of its conversion to a freeway.

3. Substitution of a surface arterial for the Oconomowoc USH 16 Freeway Bypass.

4. Substitution of the reconstruction of existing USH 12 in Walworth County generally on existing alignment, for the USH 12 Freeway.

5. Substitution of a new surface arterial for the Park Freeway-West extending from the Hillside Interchange with the North-South Freeway to N. Sherman Boulevard.

6. Substitution of a new surface arterial along S. 43rd Street from W. Greenfield Avenue to W. Loomis Road for the Stadium Freeway-South.

7. Substitution of surface arterial improvements along Russell Avenue together with the utilization of existing Clement Avenue, Whitnall Avenue, and Pennsylvania Avenue and a new surface arterial from Oakwood Road to the Illinois State Line, for the Lake Freeway-South.

8. Substitution of improvements to N. Jackson Street and N. Van Buren Street and N. Milwaukee Street and N. Broadway Street in the Milwaukee downtown area for the Milwaukee Downtown Freeway Loop, with such streets to operate as two sets of one-way pairs.

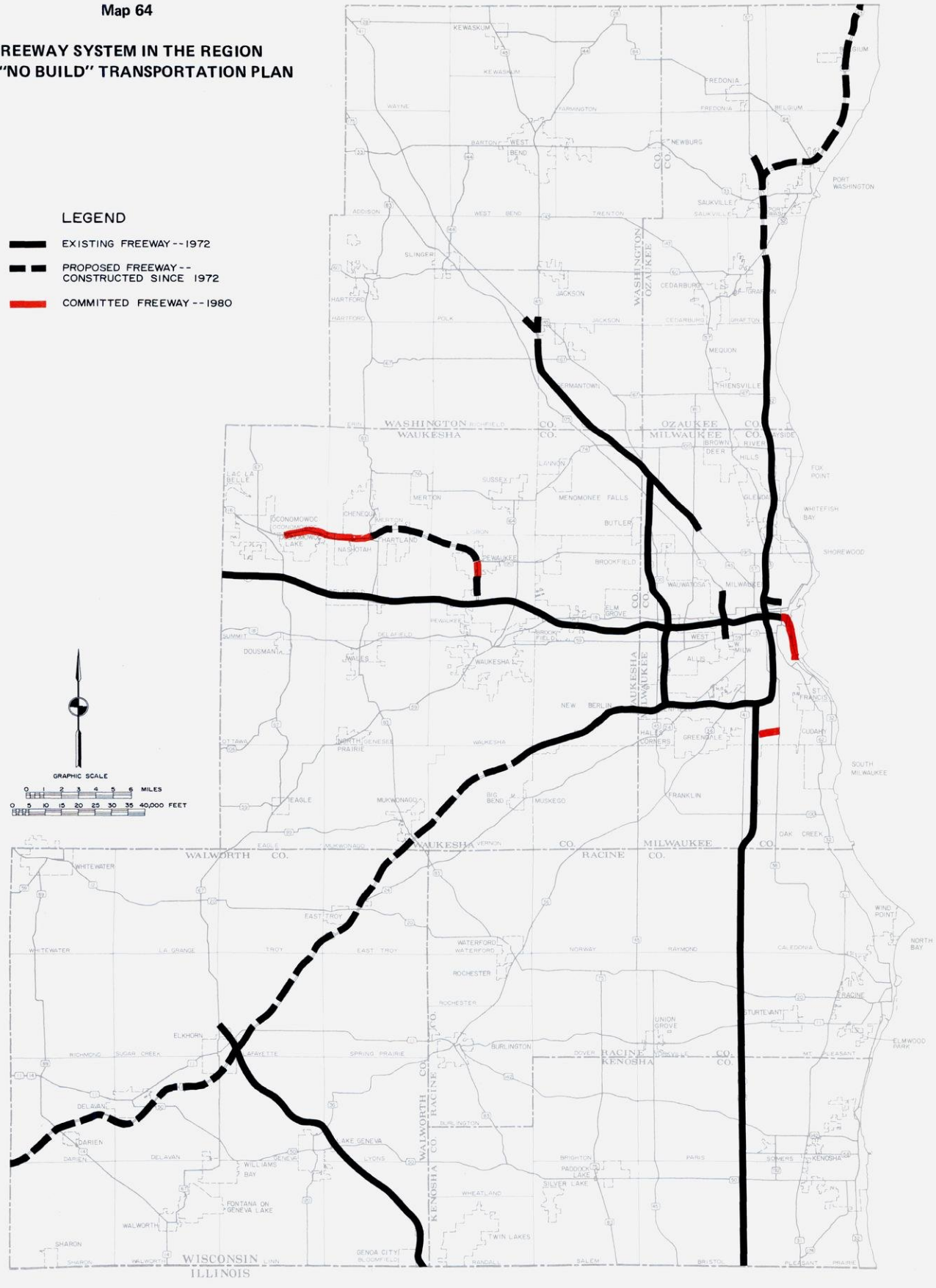
As noted earlier, Plans A, A'(25), A'(50), and R differed significantly with respect to assumed automobile use disincentives in the Milwaukee urbanized area. Under Plan A, no change was assumed in the downtown Milwaukee all-day parking fee structure and no significant change was assumed in current ramp metering practices. Under Plans A'(25), A'(50) and R it was assumed that a minimum downtown Milwaukee all-day parking fee equal to a round-trip transit fare would be imposed and that significant additional ramp metering would be undertaken to constrain the operation of the existing freeway system as necessary to insure uninterrupted traffic flow conditions at all times. The major purpose of the latter assumption is to permit utilization of the freeway system for the provision of a high level of primary transit service. Transit vehicles would have preferential access to the freeway system over automobiles via specially designed bypasses at freeway entrance ramps. The ramp metering system would continuously measure traffic volumes on those portions of the freeway system needed for primary transit service through an interconnected series of traffic sensing devices. As traffic volumes approach the level beyond which the operation of the primary transit system would deteriorate, fewer automobiles and trucks would be permitted to enter the freeway system. At times some entrance ramps could even be closed. To ensure the proper functioning of this system, ramp meters would be necessary throughout the entire Milwaukee-metropolitan area.

Standard Arterial Street and Highway Networks

The additions and changes to the standard arterial street and highway system in the Region under each of the alternative plans considered are summarized in Table 302 by county and by arterial facility type. The total proposed arterial street and highway system in the "no build" alternative and in alternatives A, A'(25), A'(50), and R are shown on Maps 67, 68, 69, and 70, respectively. In 1972 the surface arterial system in the Region consisted of 2,847 miles. By the year 2000, the surface arterial system would be increased by about 224 miles under the "no build" alternative, about 298 miles under Plan A, about 297 miles under Plans A'(25) and A'(50), and about 364 miles under Plan R. The additional mileage proposed reflects primarily the addition of existing nonarterial facilities to the arterial system. Construction of new

Map 64

FREEWAY SYSTEM IN THE REGION 2000 "NO BUILD" TRANSPORTATION PLAN

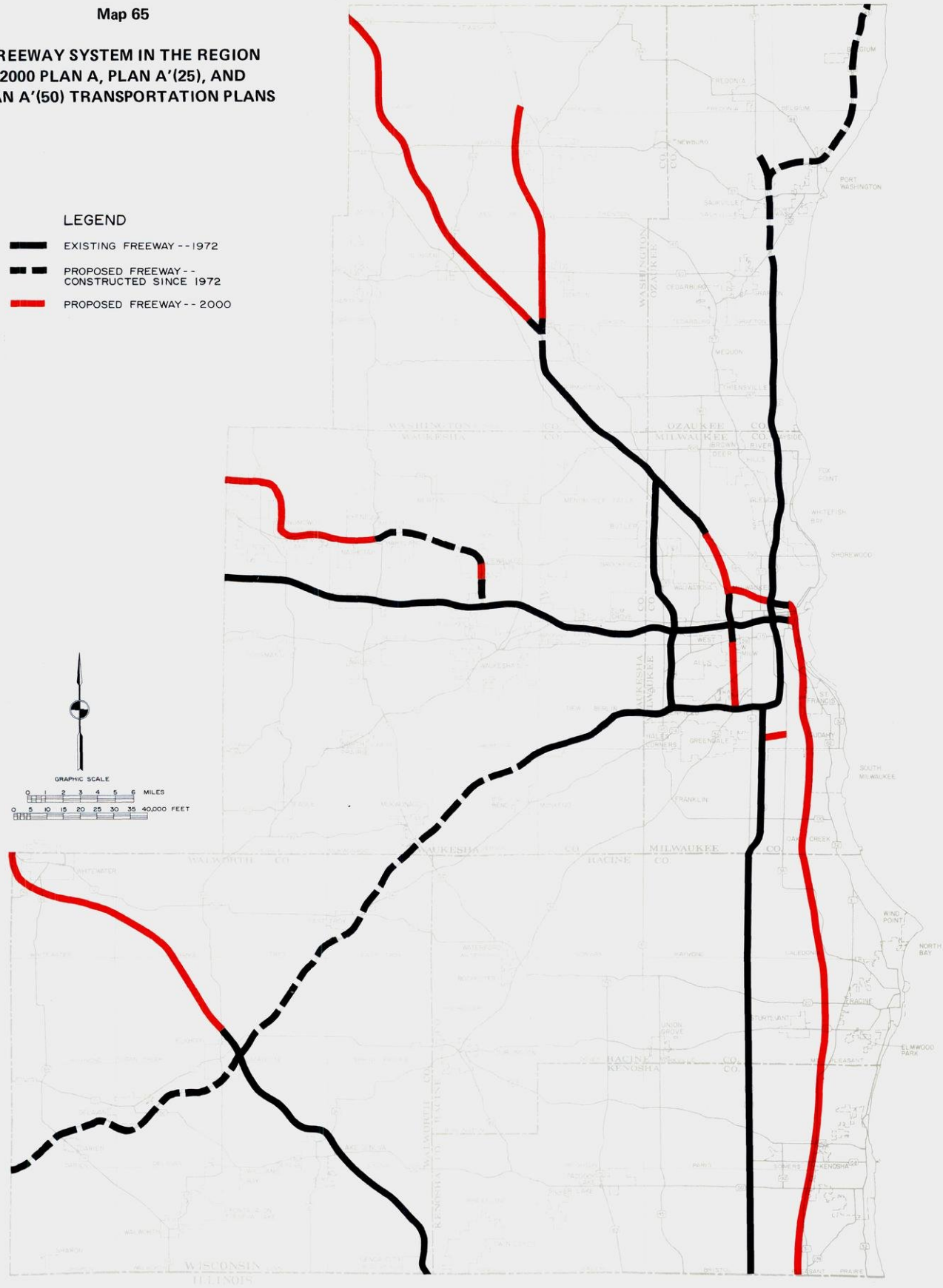


As of January 1, 1977, there were nearly 228 miles of freeways open to traffic in the Region. Under the "no build" plan, about 10 additional miles of freeways were included as committed facilities at the time of plan preparation. These consist of the Airport Spur Freeway, the Daniel Webster Hoan Memorial Bridge section of the Lake Freeway, a minor extension of the East-West Freeway to the Daniel Webster Hoan Memorial Bridge, and the completion of the conversion of USH 16 to a freeway as far west as the City of Oconomowoc.

Source: SEWRPC.

Map 65

FREEWAY SYSTEM IN THE REGION 2000 PLAN A, PLAN A'(25), AND PLAN A'(50) TRANSPORTATION PLANS

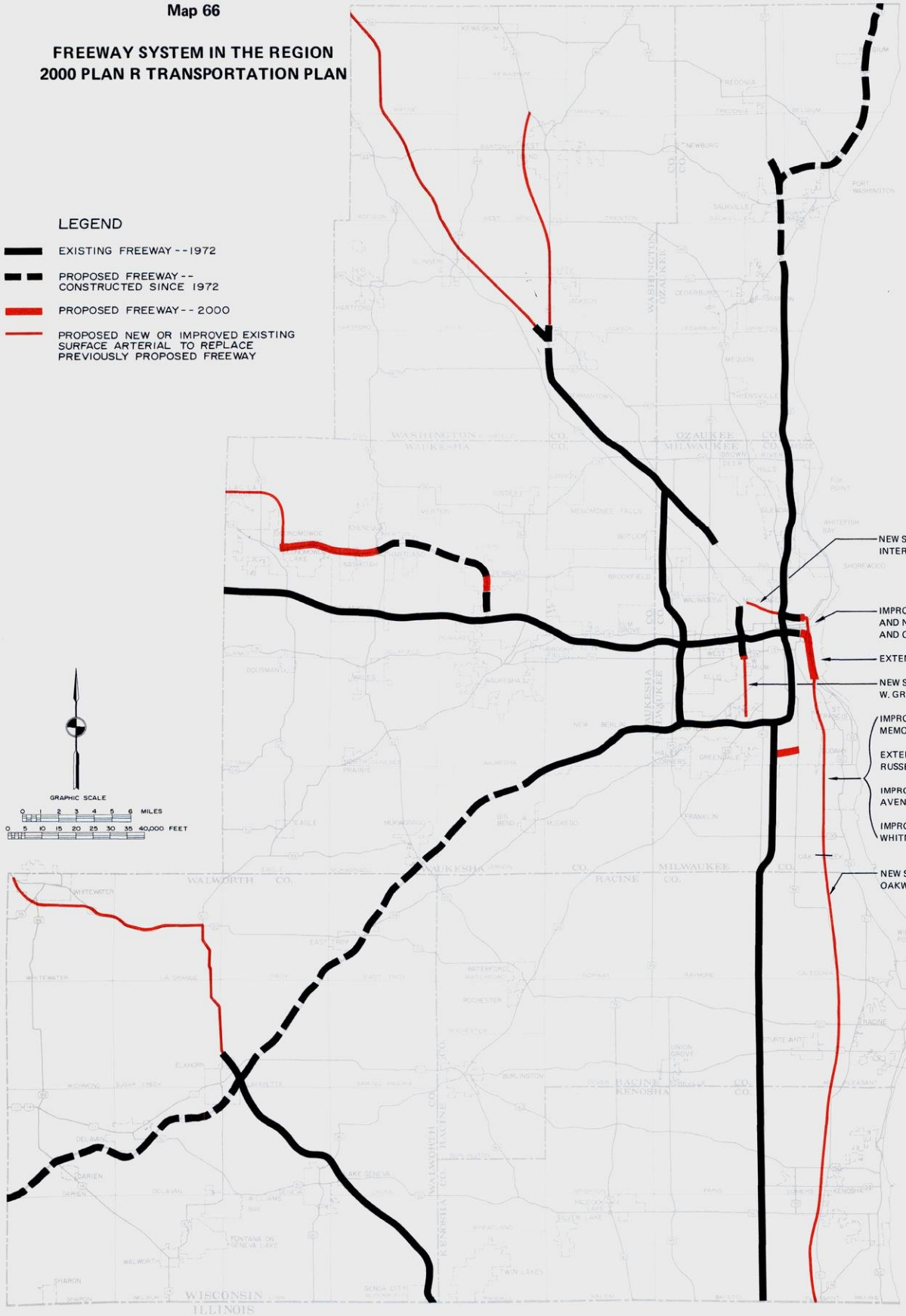


Alternative Plans A, A'(25), and A'(50) contain identical proposed freeway systems. In addition to the 10 miles of committed freeway facilities identified on Map 64, these alternative plans include nearly 117 miles of new freeways, consisting of the Lake Freeway North and South in Milwaukee County, the Park Freeway East and West in Milwaukee County, the Stadium Freeway North and South in Milwaukee County, the West Bend and USH 41 Freeways in Washington County, the USH 16-Oconomowoc bypass freeway in Waukesha County, and the USH 12 Freeway in Walworth County.

Source: SEWRPC.

Map 66

FREEWAY SYSTEM IN THE REGION 2000 PLAN R TRANSPORTATION PLAN



Under alternative Plan R, virtually no further freeway construction beyond the 10 miles of committed freeway facilities identified on Map 64 would take place within the Region. The only additions to the freeway system would consist of a minor extension of the Park Freeway-East and a minor extension of the Stadium Freeway-South. As shown on this map, Plan R includes a number of surface arterial proposals in place of proposed freeways, including new surface arterials on previously proposed freeway rights-of-way for the Lake Freeway-South in Racine and Kenosha Counties, the West Bend Freeway, and the freeway bypasses of Oconomowoc and Whitewater.

Source: SEWRPC.

Table 302

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY 1972 AND FINAL 2000 REGIONAL TRANSPORTATION PLAN ALTERNATIVES

Arterial Facility Type	Miles of Arterial Facilities								
		Alternative Plan Increments				Alternative Plan Totals			
	1972	No Build	A	A'(25) and A'(50)	R	No Build	A	A'(25) and A'(50)	R
Kenosha County									
Freeway									
4-lane	--	--	--	--	--	--	--	--	--
6-lane	12.1	--	12.2	12.2	--	12.1	24.3	24.3	12.1
8-lane	--	--	--	--	--	--	--	--	--
Subtotal	12.1	--	12.2	12.2	--	12.1	24.3	24.3	12.1
Standard Arterial									
2-lane	243.6	43.2	17.7	17.7	17.7	286.8	261.3	261.3	261.3
4-lane	24.1	8.7	38.4	38.4	50.6	32.8	62.5	62.5	74.7
6-lane	--	--	10.0	10.0	10.0	--	10.0	10.0	10.0
Subtotal	267.7	51.9	66.1	66.1	78.3	319.6	333.8	333.8	346.0
County Total	279.8	51.9	78.3	78.3	78.3	331.7	358.1	358.1	358.1
Milwaukee County									
Freeway									
4-lane	12.7	1.4	- 1.9	- 1.9	- 4.0	14.1	10.8	10.8	8.7
6-lane	49.0	4.0	28.3	28.3	10.1	53.0	77.3	77.3	59.1
8-lane	2.1	--	4.2	4.2	--	2.1	6.3	6.3	2.1
Subtotal	63.8	5.4	30.6	30.6	6.1	69.2	94.4	94.4	69.9
Standard Arterial									
2-lane	339.5	- 107.7	- 38.5	- 37.5	- 45.8	231.8	301.0	302.0	293.7
4-lane	268.7	23.7	56.8	54.8	39.1	293.1	325.5	323.5	307.8
6-lane	62.2	80.3	- 6.8	- 6.8	18.3	142.5	55.4	55.4	80.5
Subtotal	670.4	- 3.7	11.5	10.5	11.6	667.4	681.9	680.9	682.0
County Total	734.2	1.7	42.1	41.1	17.7	736.6	776.3	775.3	751.9
Ozaukee County									
Freeway									
4-lane	10.8	16.8	16.8	16.8	16.8	27.6	27.6	27.6	27.6
6-lane	--	--	--	--	--	--	--	--	--
8-lane	--	--	--	--	--	--	--	--	--
Subtotal	10.8	16.8	16.8	16.8	16.8	27.6	27.6	27.6	27.6
Standard Arterial									
2-lane	233.0	38.1	20.6	20.6	20.6	271.1	253.6	253.6	253.6
4-lane	6.5	1.5	21.8	21.8	21.8	5.0	28.3	28.3	28.3
6-lane	--	--	--	--	--	--	--	--	--
Subtotal	239.5	36.6	42.4	42.4	42.4	276.1	281.9	281.9	281.9
County Total	250.3	53.4	59.2	59.2	59.2	303.7	309.5	309.5	309.5
Racine County									
Freeway									
4-lane	--	--	--	--	--	--	--	--	--
6-lane	12.0	--	12.1	12.1	--	12.0	24.1	24.1	12.0
8-lane	--	--	--	--	--	--	--	--	--
Subtotal	12.0	--	12.1	12.1	--	12.0	24.1	24.1	12.0
Standard Arterial									
2-lane	303.5	39.9	6.2	6.2	6.2	343.4	309.7	309.7	309.7
4-lane	28.0	4.7	32.6	32.6	44.7	32.7	60.6	60.6	72.7
6-lane	5.9	4.4	7.9	7.9	7.9	1.5	13.8	13.8	13.8
Subtotal	337.4	40.2	46.7	46.7	58.8	377.6	384.1	384.1	396.2
County Total	349.4	40.2	58.8	58.8	58.8	389.6	408.2	408.2	408.2

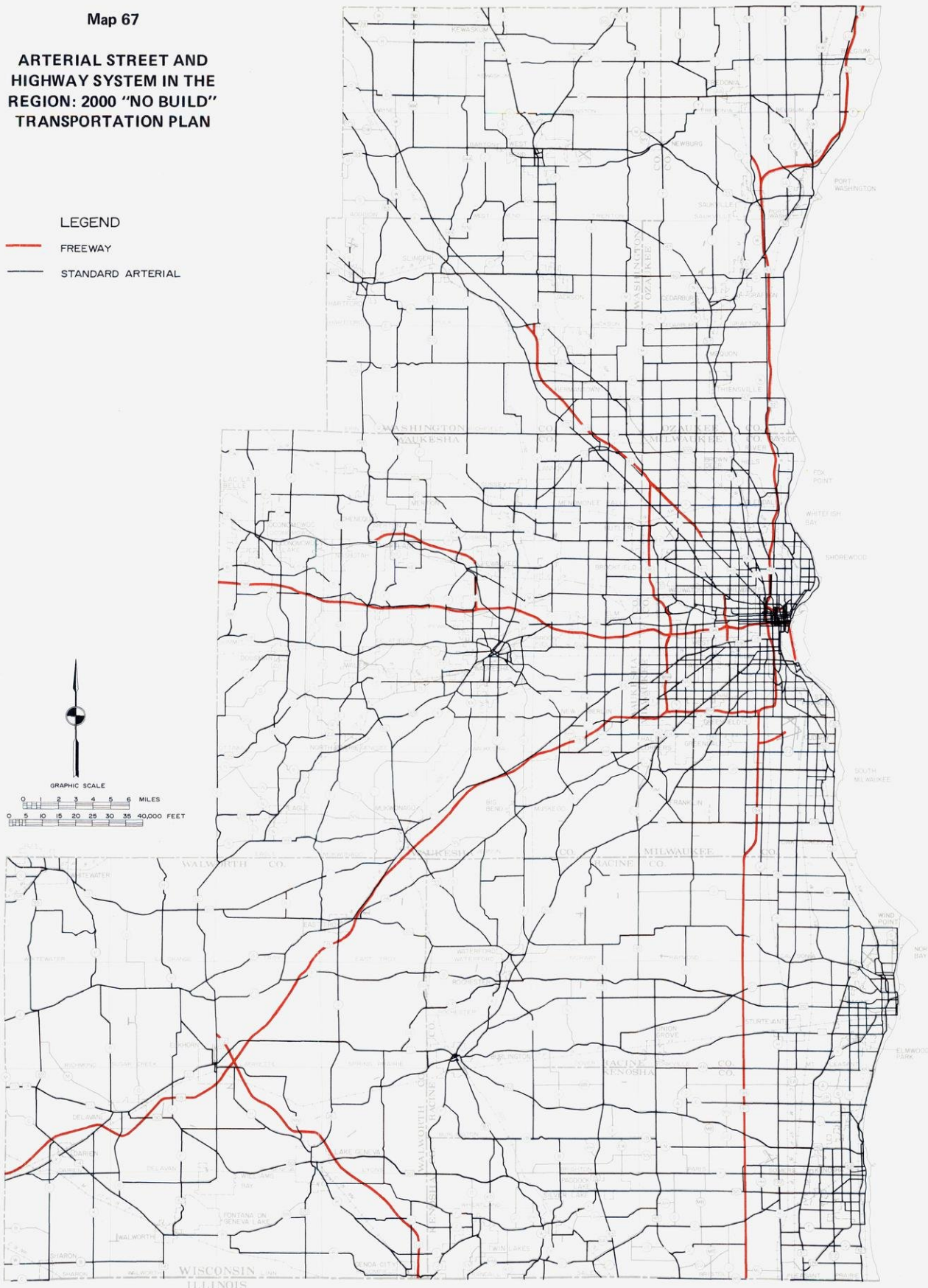
Table 302 (continued)

Arterial Facility Type	Miles of Arterial Facilities								
		Alternative Plan Increments				Alternative Plan Totals			
	1972	No Build	A	A'(25) and A'(50)	R	No Build	A	A'(25) and A'(50)	R
Walworth County									
Freeway									
4-lane	19.1	31.2	48.1	48.1	31.2	50.3	67.2	67.2	50.3
6-lane	--	--	--	--	--	--	--	--	--
8-lane	--	--	--	--	--	--	--	--	--
Subtotal	19.1	31.2	48.1	48.1	31.2	50.3	67.2	67.2	50.3
Standard Arterial									
2-lane	379.4	11.3	10.0	10.0	- 5.4	390.7	389.4	389.4	374.0
4-lane	9.7	- 0.2	16.9	16.9	35.9	9.5	26.6	26.6	45.6
6-lane	--	--	--	--	--	--	--	--	--
Subtotal	389.1	11.1	26.9	26.9	30.5	400.2	416.0	416.0	419.6
County Total	408.2	42.3	75.0	75.0	61.7	450.5	483.2	483.2	469.9
Washington County									
Freeway									
4-lane	0.4	1.8	35.6	35.6	1.8	2.2	36.0	36.0	2.2
6-lane	6.4	--	--	--	--	6.4	6.4	6.4	6.4
8-lane	--	--	--	--	--	--	--	--	--
Subtotal	6.8	1.8	35.6	35.6	1.8	8.6	42.4	42.4	8.6
Standard Arterial									
2-lane	305.6	68.2	62.7	62.7	62.7	373.8	368.3	368.3	368.3
4-lane	26.8	1.0	3.7	3.7	37.5	27.8	30.5	30.5	64.3
6-lane	--	--	--	--	--	--	--	--	--
Subtotal	332.4	69.2	66.4	66.4	100.2	401.6	398.8	398.8	432.6
County Total	339.2	71.0	102.0	102.0	102.0	410.2	441.2	441.2	441.2
Waukesha County									
Freeway									
4-lane	29.1	16.0	22.6	22.6	16.0	45.1	51.7	51.7	45.1
6-lane	8.7	4.2	4.2	4.2	4.2	12.9	12.9	12.9	12.9
8-lane	--	--	--	--	--	--	--	--	--
Subtotal	37.8	20.2	26.8	26.8	20.2	58.0	64.6	64.6	58.0
Standard Arterial									
2-lane	565.5	18.7	- 67.4	- 67.4	- 67.4	584.2	498.1	498.1	498.1
4-lane	41.3	1.9	90.7	90.7	93.8	43.2	132.0	132.0	135.1
6-lane	3.9	- 1.7	14.2	14.2	16.2	2.2	18.1	18.1	20.1
Subtotal	610.7	18.9	37.5	37.5	42.6	629.6	648.2	648.2	653.3
County Total	648.5	39.1	64.3	64.3	62.8	687.6	712.8	712.8	711.3
Southeastern Wisconsin Region									
Freeway									
4-lane	72.1	67.2	121.3	121.3	61.8	139.3	193.3	193.3	133.9
6-lane	88.2	8.2	56.8	56.8	14.3	96.4	145.0	145.0	102.5
8-lane	2.1	--	4.2	4.2	--	2.1	6.3	6.3	2.1
Subtotal	162.4	75.4	182.3	182.3	76.1	237.8	344.6	344.6	238.5
Standard Arterial									
2-lane	2,370.1	111.7	11.3	12.3	- 11.4	2,481.8	2,381.4	2,382.4	2,358.7
4-lane	405.1	38.3	260.9	258.9	323.4	444.1	666.0	664.0	728.5
6-lane	72.0	74.2	25.3	25.3	52.4	146.2	97.3	97.3	124.4
Subtotal	2,847.2	224.2	297.5	296.5	364.4	3,072.1	3,144.7	3,143.7	3,211.6
Region Total	3,009.6	299.6	479.8	478.8	440.5	3,309.9	3,489.3	3,488.3	3,450.1

Source: SEWRPC.

Map 67

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 "NO BUILD" TRANSPORTATION PLAN

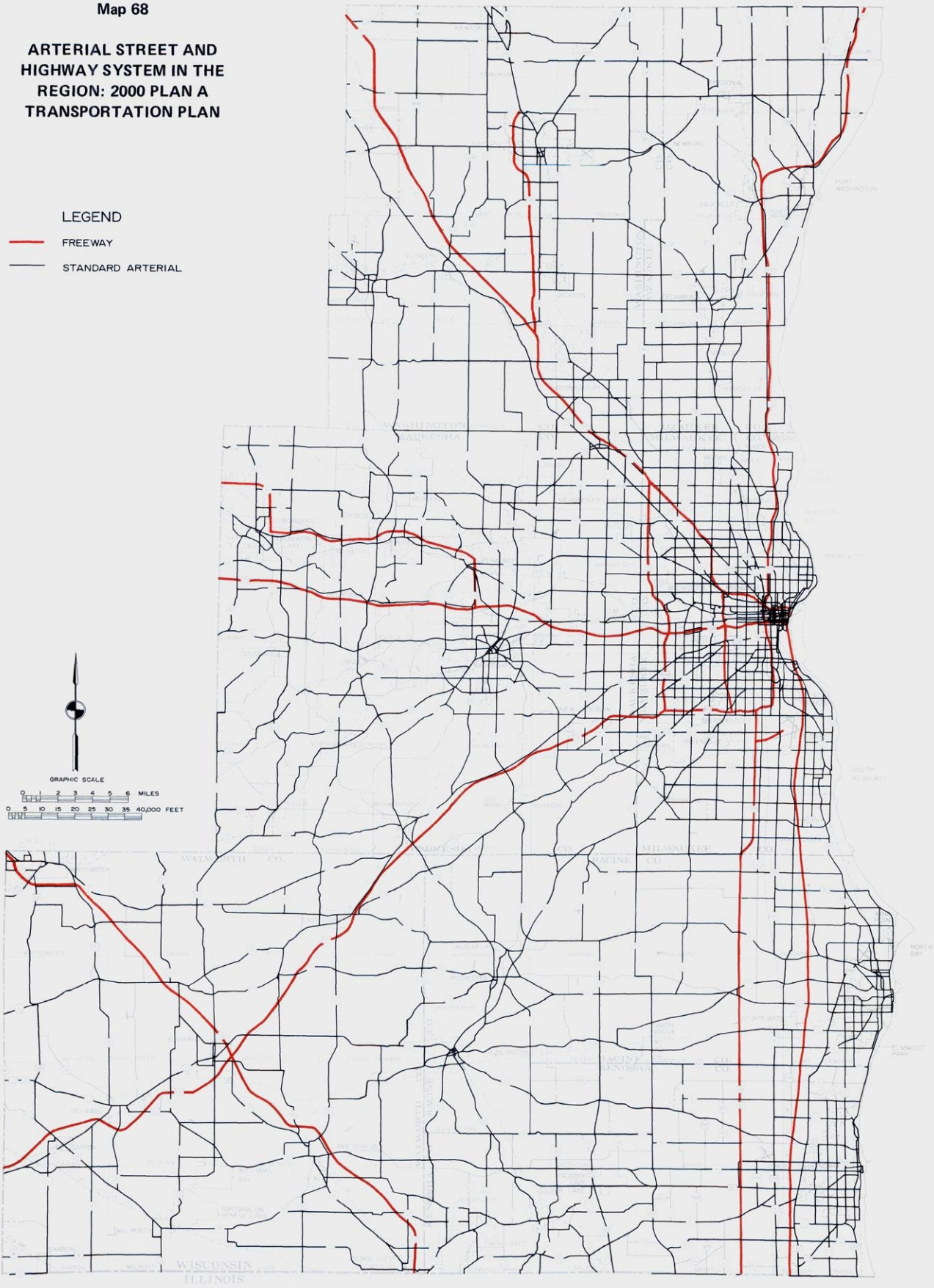


Under the "no build" alternative transportation system plan, arterial street and highway system mileage within the Region would total about 3,310 miles by the year 2000, an increase of 300 miles, or about 10 percent, over 1972. Of these additional 300 miles, 80 miles, or 27 percent, represent existing nonarterial collector and land access—facilities that would be converted to arterial facilities as land use development and attendant increases in traffic demand occurred within the Region. Freeways would comprise 238 miles, or 7 percent, of the total arterial system in the year 2000, an increase of 75 miles over 1972. This increase in freeway mileage is represented entirely by freeways either actually under construction in 1972—such as the STH 15-Rock Freeway in Walworth County—or considered to be fully committed to construction in 1972—such as the Airport Spur Freeway in Milwaukee County.

Source: SEWRPC.

Map 68

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 PLAN A TRANSPORTATION PLAN

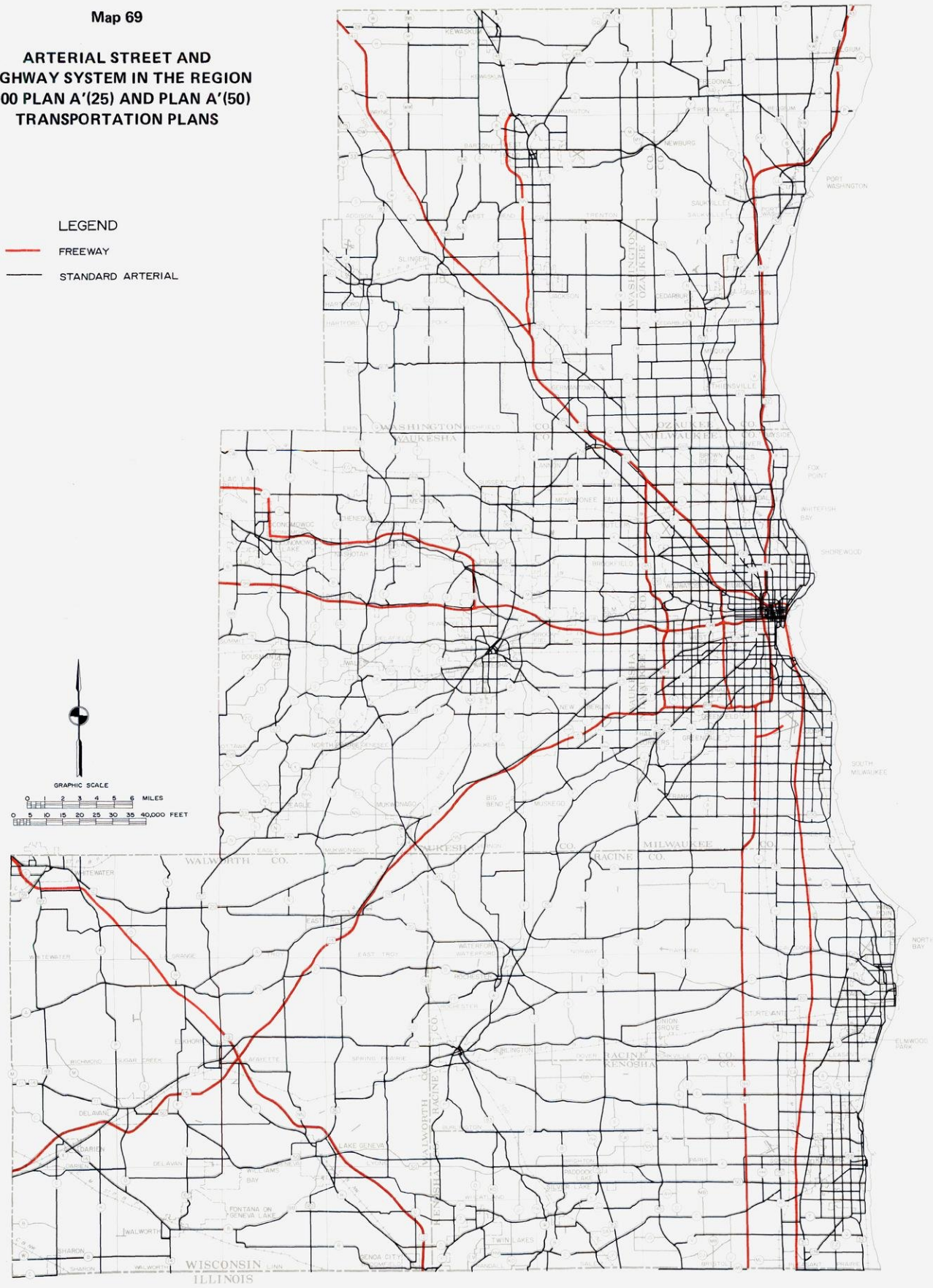


Under the alternative transportation system Plan A, arterial street and highway system mileage within the Region would total about 3,489 miles by the year 2000, an increase of 479 miles, or about 16 percent, over 1972. Freeways would comprise 344 miles, or 10 percent, of the total arterial system in the year 2000, an increase of 181 miles over 1972. Of this increase, 106 miles represent 10 planned new freeways.

Source: SEWRPC.

Map 69

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION 2000 PLAN A'(25) AND PLAN A'(50) TRANSPORTATION PLANS

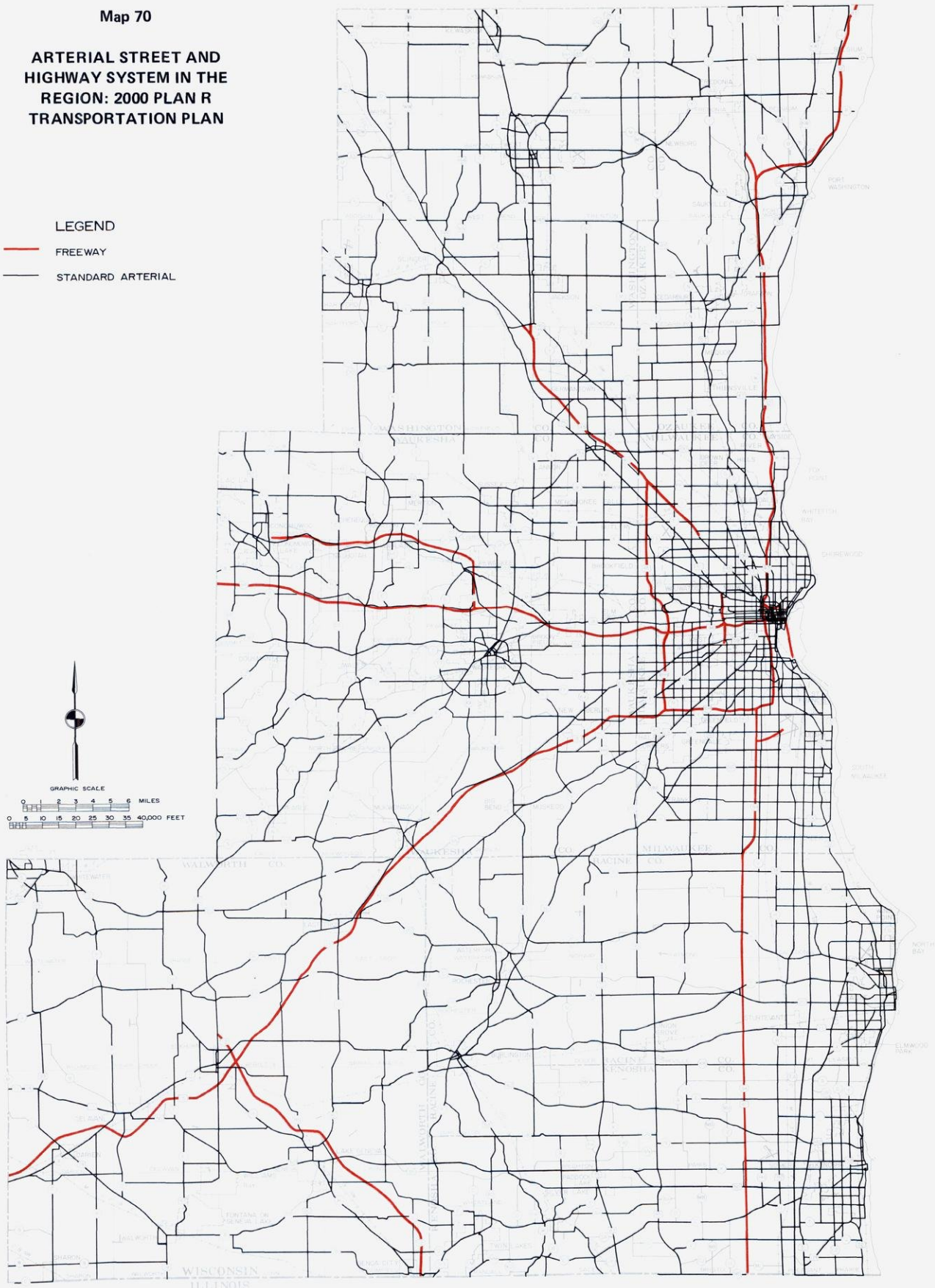


Under the alternative transportation system Plans A'(25) and A'(50) arterial street and highway system mileage within the Region would total about 3,488 miles by the year 2000, an increase of 478 miles, or about 16 percent, over 1972. Freeways would comprise 344 miles, or 10 percent, of the total arterial system in the year 2000, an increase of 181 miles over 1972. Of this increase, 106 miles represent 10 planned new freeways.

Source: SEWRPC.

Map 70

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 PLAN R TRANSPORTATION PLAN



Under the alternative transportation system Plan R, arterial street and highway system mileage within the Region would total about 3,450 miles by the year 2000, an increase of 440 miles, or about 15 percent, over 1972. Freeways would comprise 238 miles, or 7 percent, of the total arterial system in the year 2000, an increase of 75 miles over 1972. This increase in freeway mileage is represented entirely by freeways either actually under construction in 1972, or considered to be fully committed to construction in 1972.

Source: SEWRPC.

surface arterial facilities would total about 101 miles under Plan A, about 100 miles under Plans A'(25) and A'(50), and about 145 miles under Plan R.

Tables 303 through 306 summarize by county and by arterial facility type the improvements proposed on the entire arterial street and highway system under each alternative plan. The improvements are broadly categorized by system preservation, system improvement, and system expansion. System preservation is defined to include all arterial improvement projects that are required to maintain the structural adequacy and serviceability of the existing arterial system without significantly increasing the capacity of that system. Included under this category of improvements are resurfacing and reconstruction for structural purposes only. System improvement is defined to include all arterial improvement projects which significantly increase the capacity of the existing system through widening or relocation of existing facilities. System expansion is defined to include

Table 303

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2000 "NO BUILD" TRANSPORTATION PLAN

Arterial Facility Type	System Preservation				System Improvement			System Expansion		Total (miles)
	No Work Required (miles)	Resurface (miles)	Reconstruct for Same Capacity (miles)	Percent of Total	Reconstruct for Additional Capacity (miles)	New Construction—Replacement Facility (miles)	Percent of Total	New Construction—New Facility	Percent of Total	
Kenosha County										
Freeway	–	12.1	--	100.0	--	--	--	--	--	12.1
Standard Arterial	0.9	203.3	113.6	99.5	0.5	--	0.1	1.3	0.4	319.6
Subtotal	0.9	215.4	113.6	99.5	0.5	--	0.1	1.3	0.4	331.7
Milwaukee County										
Freeway	9.8	57.6	--	97.4	--	--	--	1.8	2.6	69.2
Standard Arterial	60.1	537.0	66.6	99.4	3.7	--	0.6	--	--	667.4
Subtotal	69.9	594.6	66.6	99.3	3.7	--	0.5	1.8	0.2	736.6
Ozaukee County										
Freeway	16.8	10.8	--	100.0	--	--	--	--	--	27.6
Standard Arterial	2.8	186.5	85.3	99.5	1.5	--	0.5	--	--	276.1
Subtotal	19.6	197.3	85.3	99.5	1.5	--	0.5	--	--	303.7
Racine County										
Freeway	--	12.0	--	100.0	--	--	--	--	--	12.0
Standard Arterial	5.7	180.5	189.1	99.4	0.1	1.3	0.4	0.9	0.2	377.6
Subtotal	5.7	192.5	189.1	99.4	0.1	1.3	0.4	0.9	0.2	389.6
Walworth County										
Freeway	50.3	--	--	100.0	--	--	--	--	--	50.3
Standard Arterial	7.3	253.8	139.0	100.0	0.1	--	--	--	--	400.2
Subtotal	57.6	253.8	139.0	100.0	0.1	--	--	--	--	450.5
Washington County										
Freeway	2.2	6.4	–	100.0	--	--	--	--	--	8.6
Standard Arterial	1.8	281.2	117.4	99.6	1.2	--	0.4	--	--	401.6
Subtotal	4.0	287.6	117.4	99.6	1.2	--	0.4	--	--	410.2
Waukesha County										
Freeway	14.5	38.9	--	92.1	4.6	--	7.9	--	--	58.0
Standard Arterial	15.5	443.5	165.9	99.3	4.3	0.4	0.7	--	--	629.6
Subtotal	30.0	482.4	165.9	98.7	8.9	0.4	1.3	--	--	687.6
Southeastern Wisconsin Region										
Freeway	93.6	137.8	–	97.5	4.6	--	1.9	1.8	0.6	237.8
Standard Arterial	94.1	2,085.8	876.9	99.5	11.4	1.7	0.4	2.2	0.1	3,072.1
Total	187.7	2,223.6	876.9	99.4	16.0	1.7	0.5	4.0	0.1	3,309.9

Source: SEWRPC.

all arterial improvement projects which significantly increase the capacity of the existing system through construction of new facilities.

As shown in Table 303, under the "no build" plan nearly all of the work required on the surface arterial system would fall into the system preservation category. A total of 2,086 miles would be resurfaced during the plan implementation period, 877 miles reconstructed for the same capacity, and 94 miles would have no work required.

As shown in Table 304, under Plan A about 2,371 miles would fall into the system preservation category, or about 76 percent of the total surface arterial system, including 101 miles where no work is required, 1,411 miles where resurfacing is required, and 859 miles where reconstruction for the same capacity is required. An additional 673 miles, or 21 percent would fall into the system improvement category, including 628 miles that would be reconstructed for additional capacity and 45 miles involving new construction of a replacement arterial facility. The remaining 101 miles, or 3 percent fall into

Table 304

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2000 ALTERNATIVE TRANSPORTATION PLAN A

Arterial Facility Type	System Preservation				System Improvement			System Expansion		Total (miles)
	No Work Required (miles)	Resurface (miles)	Reconstruct for Same Capacity (miles)	Percent of Total	Reconstruct for Additional Capacity (miles)	New Construction—Replacement Facility (miles)	Percent of Total	New Construction—New Facility	Percent of Total	
Kenosha County										
Freeway	--	12.1	--	49.8	--	--	--	12.2	50.2	24.3
Standard Arterial	0.9	131.2	114.2	73.8	67.0	9.7	23.0	10.8	3.2	333.8
Subtotal	0.9	143.3	114.2	72.2	67.0	9.7	21.4	23.0	6.4	358.1
Milwaukee County										
Freeway	9.8	53.0	--	66.5	5.4	--	5.7	26.2	27.8	94.4
Standard Arterial	61.1	324.2	66.6	66.3	216.1	3.9	32.3	10.0	1.4	681.9
Subtotal	70.9	377.2	66.6	66.3	221.5	3.9	29.0	36.2	4.7	776.3
Ozaukee County										
Freeway	16.8	10.8	--	100.0	--	--	--	--	--	27.6
Standard Arterial	4.0	148.2	88.7	85.4	38.0	--	13.5	3.0	1.1	281.9
Subtotal	20.8	159.0	88.7	86.7	38.0	--	12.3	3.0	1.0	309.5
Racine County										
Freeway	--	12.0	--	49.8	--	--	--	12.1	50.2	24.1
Standard Arterial	5.7	100.4	170.4	72.0	78.5	8.1	22.5	21.0	5.5	384.1
Subtotal	5.7	112.4	170.4	70.7	78.5	8.1	21.2	33.1	8.1	408.2
Walworth County										
Freeway	50.3	--	--	74.9	--	--	--	16.9	25.1	67.2
Standard Arterial	9.3	226.8	134.0	89.0	21.9	10.2	7.7	13.8	3.3	416.0
Subtotal	59.6	226.8	134.0	87.0	21.9	10.2	6.6	30.7	6.4	483.2
Washington County										
Freeway	2.2	6.4	--	20.3	21.1	--	49.8	12.7	29.9	42.4
Standard Arterial	1.8	218.7	110.8	83.1	42.2	6.8	12.3	18.5	4.6	398.8
Subtotal	4.0	225.1	110.8	77.0	63.3	6.8	15.9	31.2	7.1	441.2
Waukesha County										
Freeway	14.1	38.8	--	81.9	5.6	--	8.7	6.1	9.4	64.6
Standard Arterial	18.5	261.7	174.3	70.1	164.2	6.0	26.3	23.5	3.6	648.2
Subtotal	32.6	300.5	174.3	71.2	169.8	6.0	24.7	29.6	4.1	712.8
Southeastern Wisconsin Region										
Freeway	93.2	133.1	--	65.7	32.1	--	9.3	86.2	25.0	344.6
Standard Arterial	101.3	1,411.2	859.0	75.4	627.9	44.7	21.4	100.6	3.2	3,144.7
Total	194.5	1,544.3	859.0	74.6	660.0	44.7	20.2	186.8	5.4	3,489.3

Source: SEWRPC.

the system expansion category where new construction of new facilities is required.

Table 305 presents similar data for Plans A'(25) and A'(50). Under these plans, 2,371 miles, or 76 percent of the total surface arterial system, falls into the system preservation category, including 101 miles where no work is required, 1,411 miles of resurfacing, and 859 miles of reconstruction for same capacity. An additional 673 miles, or 21 percent, falls into the system improvement category, including 628 miles of reconstruction for additional capacity and 45 miles of new construction involving a replacement arterial facility. The remaining 100 miles, or 3 percent, falls into the system expansion category where new construction of new facilities is required.

Finally, Table 306 sets forth the improvement data for Plan R. A total of 2,375 miles, or 74 percent of the surface arterial system, falls into the system preservation category, including 101 miles where no work is required, 1,416 miles where resurfacing is required, and 858 miles where reconstruction for same capacity is required. An

Table 305

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2000 ALTERNATIVE TRANSPORTATION PLANS A'(25) AND A'(50)

Arterial Facility Type	System Preservation				System Improvement			System Expansion		Total (miles)
	No Work Required (miles)	Resurface (miles)	Reconstruct for Same Capacity (miles)	Percent of Total	Reconstruct for Additional Capacity (miles)	New Construction—Replacement Facility (miles)	Percent of Total	New Construction—New Facility	Percent of Total	
Kenosha County										
Freeway	--	12.1	--	49.8	--	--	--	12.2	50.2	24.3
Standard Arterial	0.9	131.2	114.2	73.8	67.0	9.7	23.0	10.8	3.2	333.8
Subtotal	0.9	143.3	114.2	72.2	67.0	9.7	21.4	23.0	6.4	358.1
Milwaukee County										
Freeway	9.8	53.0	--	66.5	5.4	--	5.7	26.2	27.8	94.4
Standard Arterial	61.1	324.2	66.6	66.4	216.1	3.9	32.3	9.0	1.3	680.9
Subtotal	70.9	377.2	66.6	66.4	221.5	3.9	29.1	35.2	4.5	775.3
Ozaukee County										
Freeway	16.8	10.8	--	100.0	--	--	--	--	--	27.6
Standard Arterial	4.0	148.2	88.7	85.4	38.0	--	13.5	3.0	1.1	281.9
Subtotal	20.8	159.0	88.7	86.7	38.0	--	12.3	3.0	1.0	309.5
Racine County										
Freeway	--	12.0	--	49.8	--	--	--	12.1	50.2	24.1
Standard Arterial	5.7	100.4	170.4	72.0	78.5	8.1	22.5	21.0	5.5	384.1
Subtotal	5.7	112.4	170.4	72.0	78.5	8.1	21.2	33.1	8.1	408.2
Walworth County										
Freeway	50.3	--	--	74.9	--	--	--	16.9	25.1	67.2
Standard Arterial	9.3	226.8	134.0	89.0	21.9	10.2	7.7	13.8	3.3	416.0
Subtotal	59.6	226.8	134.0	87.0	21.9	10.2	6.6	30.7	6.4	483.2
Washington County										
Freeway	2.2	6.4	--	20.3	21.1	--	49.8	12.7	29.9	42.4
Standard Arterial	1.8	218.7	110.8	83.1	42.2	6.8	12.3	18.5	4.6	398.8
Subtotal	4.0	225.1	110.8	77.0	63.3	6.8	15.9	31.2	7.1	441.2
Waukesha County										
Freeway	14.1	38.8	--	81.9	5.6	--	8.7	6.1	9.4	64.6
Standard Arterial	18.5	261.7	174.3	70.1	164.2	6.0	26.3	23.5	3.6	648.2
Subtotal	32.6	300.5	174.3	71.2	169.8	6.0	24.7	29.6	4.1	712.8
Southeastern Wisconsin Region										
Freeway	93.2	133.1	--	65.7	32.1	--	9.3	86.2	25.0	344.6
Standard Arterial	101.3	1,411.2	859.0	75.4	627.9	44.7	21.4	99.6	3.2	3,143.7
Total	194.5	1,544.3	859.0	74.6	660.0	44.7	20.2	185.8	5.4	3,488.3

Source: SEWRPC.

additional 691 miles, or 22 percent, falls into the system improvement category, including 646 miles where reconstruction for additional capacity is required, and 45 miles of new construction involving a replacement arterial facility. The remaining 145 miles, or 5 percent, falls into the system expansion category where new construction of a new facility is required.

Transit Networks

For each of the alternative plans, transit networks were developed for the three urbanized areas in the Region—Milwaukee, Kenosha, and Racine.

Milwaukee Urbanized Area: For all alternatives considered, transit service in the Milwaukee urbanized area would be provided at the primary, secondary, and tertiary levels as those levels have been defined earlier in this report. Primary transit networks would consist of the following:

1. Under the "no build" plan, a continuation of the present system of modified rapid transit service involving the operation of the Freeway Flyer lines to existing and committed transit stations (see Map 71).

Table 306

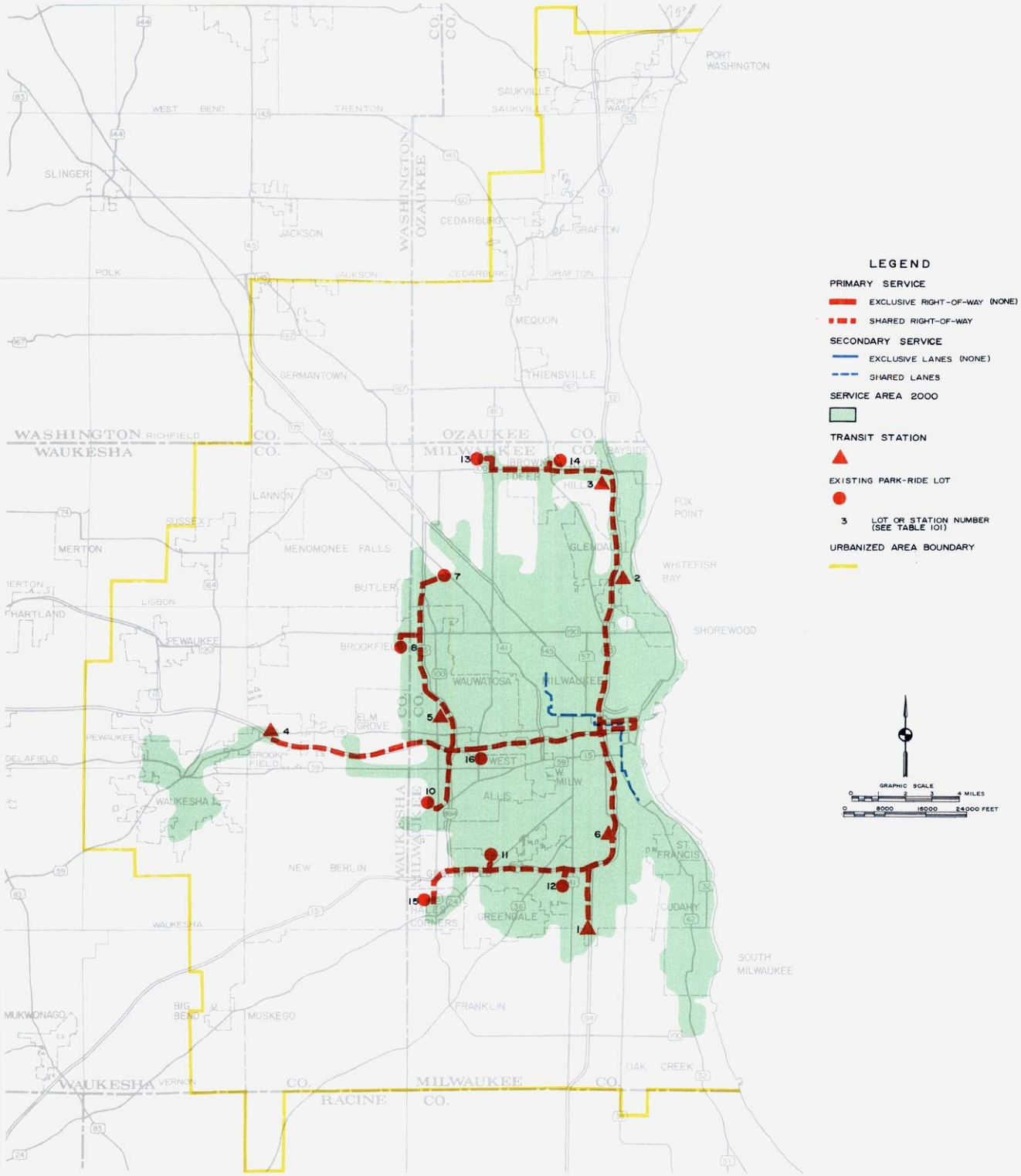
ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2000 ALTERNATIVE TRANSPORTATION PLAN R

Arterial Facility Type	System Preservation				System Improvement			System Expansion		Total (miles)
	No Work Required (miles)	Resurface (miles)	Reconstruct for Same Capacity (miles)	Percent of Total	Reconstruct for Additional Capacity (miles)	New Construction—Replacement Facility (miles)	Percent of Total	New Construction—New Facility	Percent of Total	
Kenosha County										
Freeway	--	12.1	--	100.0	--	--	--	--	--	12.1
Standard Arterial	0.9	131.2	114.2	71.2	67.0	9.7	22.2	23.0	6.6	346.0
Subtotal	0.9	143.3	114.2	72.2	67.0	9.7	21.4	23.0	6.4	358.1
Milwaukee County										
Freeway	9.8	52.3	--	88.8	5.4	--	7.7	2.4	3.5	69.9
Standard Arterial	61.1	321.1	65.9	65.7	218.7	3.9	32.6	11.3	1.7	682.0
Subtotal	70.9	373.4	65.9	67.8	224.1	3.9	30.3	13.7	1.9	751.9
Ozaukee County										
Freeway	16.8	10.8	--	100.0	--	--	--	--	--	27.6
Standard Arterial	4.0	148.2	88.7	85.4	38.0	--	13.5	3.0	1.1	281.9
Subtotal	20.8	159.0	88.7	86.7	38.0	--	12.3	3.0	1.0	309.5
Racine County										
Freeway	--	12.0	--	100.0	--	--	--	--	--	12.0
Standard Arterial	5.7	100.4	170.4	69.8	78.5	8.1	21.9	33.1	8.3	396.2
Subtotal	5.7	112.4	170.4	70.7	78.5	8.1	21.2	33.1	8.1	408.2
Walworth County										
Freeway	50.3	--	--	100.0	--	--	--	--	--	50.3
Standard Arterial	9.3	213.3	132.1	84.5	37.6	10.2	11.4	17.1	4.1	419.6
Subtotal	59.6	213.3	132.1	86.2	37.6	10.2	10.2	17.1	3.6	469.9
Washington County										
Freeway	2.2	6.4	--	100.0	--	--	--	--	--	8.6
Standard Arterial	1.8	240.1	112.7	82.0	42.2	6.8	11.3	29.0	6.7	432.6
Subtotal	4.0	246.5	112.7	82.3	42.2	6.8	10.1	29.0	6.6	441.2
Waukesha County										
Freeway	14.1	38.3	--	90.3	5.6	--	9.7	--	--	58.0
Standard Arterial	18.5	261.6	174.2	69.5	164.2	6.0	26.1	28.8	4.4	653.3
Subtotal	32.6	300.4	174.2	71.3	169.8	6.0	24.7	28.8	4.0	711.3
Southeastern Wisconsin Region										
Freeway	93.2	131.9	--	94.4	11.0	--	4.6	2.4	1.0	238.5
Standard Arterial	101.3	1,415.9	858.2	74.0	646.2	44.7	21.5	145.3	4.5	3,211.6
Total	194.5	1,547.8	858.2	75.4	657.2	44.7	20.3	147.4	4.3	3,450.1

Source: SEWRPC.

Map 71

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 2000 "NO BUILD" TRANSPORTATION PLAN



Under the "no build" alternative transportation plan, transit service would be provided over 1,560 round-trip miles of transit line in the Milwaukee urbanized area: of this total, 256 route miles would provide primary service, 14 route miles secondary service, and 1,275 miles tertiary service. The system would require the operation of about 436 buses during peak ridership periods. This would represent an increase of 499 round-trip route miles over 1972. No increase in the 1972 fleet size would be required.

Source: SEWRPC.

2. Under Plan A, the provision of rapid transit service—that is, the operation of transit vehicles at high speeds over exclusive fully grade separated rights-of-way—over a total of 20 miles of exclusive transitway: an east-west transitway from S. 116th Street to N. 10th Street, a distance of 8.3 miles; an east side transitway from E. Michigan Street north to IH 43 at E. Hampton Avenue, a distance of 5.6 miles; and a north-west transitway from IH 43 at the Hillside Interchange to W. Hampton Avenue and the Fond du Lac Freeway, a distance of 6.4 miles. In addition, Plan A would provide modified rapid transit service—that is, the operation of transit vehicles in mixed traffic over existing and proposed freeways—over a total of 72 miles of facilities. Nonfreeway extensions of primary transit service would be provided over 22 miles of selected high-performance standard arterial facilities (see Map 72). A total of 44 primary transit stations would be established (see Table 307).

3. Under Plans A'(25) and A'(50), no rapid transit service would be provided. Rather, all primary service would consist of modified rapid transit service over a total of 89 miles of freeway facilities, with nonfreeway extensions of such service provided over 22 miles of surface arterial facilities (see Map 73). A total of 38 primary transit stations would be established (see Tables 308 and 309). In addition, ramp metering is proposed to insure that the freeway facilities proposed to be used to provide the primary level of transit service operate in a free-flowing condition at all times in order to make the travel times on the buses fully competitive with the automobile. Buses would receive preferential access to the freeways at the metered ramps.

4. Under Plan R, like Plans A'(25) and A'(50), no rapid transit service would be provided. Rather, modified rapid transit service would be provided over the existing freeway system, including a total of about 67 miles of facilities. Nonfreeway extensions of primary service would be provided over 20 miles of surface arterials (see Map 74). A total of 32 primary transit stations would be established (see Table 310). As in Plans A'(25) and A'(50), ramp metering would be provided to insure a high level of primary transit service on the freeway system.

A secondary level of transit service would also be provided under all of the alternative plans. This level of service would consist of a network of transit vehicles operating limited stop, express service on arterial streets in mixed traffic, or on exclusive transit lanes reserved for this purpose on the arterial streets.

Under the "no build" plan, secondary service would be limited to the two individual transit routes currently provided. Under Plan A, secondary service would be provided over 14 individual transit routes with exclusive transit lanes provided on six arterial streets (see Table 311). Such exclusive lanes would total about 9.5 miles. Shared secondary transit service would be provided over a total of 141 miles of arterial facilities. Under Plans A'(25) and A'(50), secondary service would be provided over 14 individual transit routes with exclusive transit lanes provided on six arterial streets (see Table 311). Such exclusive lanes would total about 9.5 miles. Shared secondary transit service would be provided over a total of 143 miles of arterial facilities. Finally, under Plan R secondary service would be provided over 15 individual transit routes with exclusive transit lanes provided on six arterial streets (see Table 311). Such exclusive lanes would total about 9.5 miles. Shared secondary transit service would be provided over a total of 151 miles of arterial facilities.

A tertiary level of service would also be proposed under all of the final alternative plans. This tertiary level of service consists of a grid of local bus lines operating over arterial and, in some cases, collector streets. Under the "no build" plan the tertiary level of service would consist essentially of that currently provided. Under Plans A, A'(25), A'(50), and R, extensive additions to the local transit service routes would be provided. Under each of these plans it is anticipated that in low-density urban residential areas, particularly in southern Ozaukee and Washington Counties, eastern Waukesha County, and southern Milwaukee County, the tertiary level of service could be fixed route and/or demand-responsive. The specific type and level of tertiary service to be provided in these areas must be determined under supplemental subarea transportation systems management planning. Table 312 summarizes the transit facility requirements in the Milwaukee urbanized area under the four major plan alternatives, including the estimated number of buses required to operate the system.

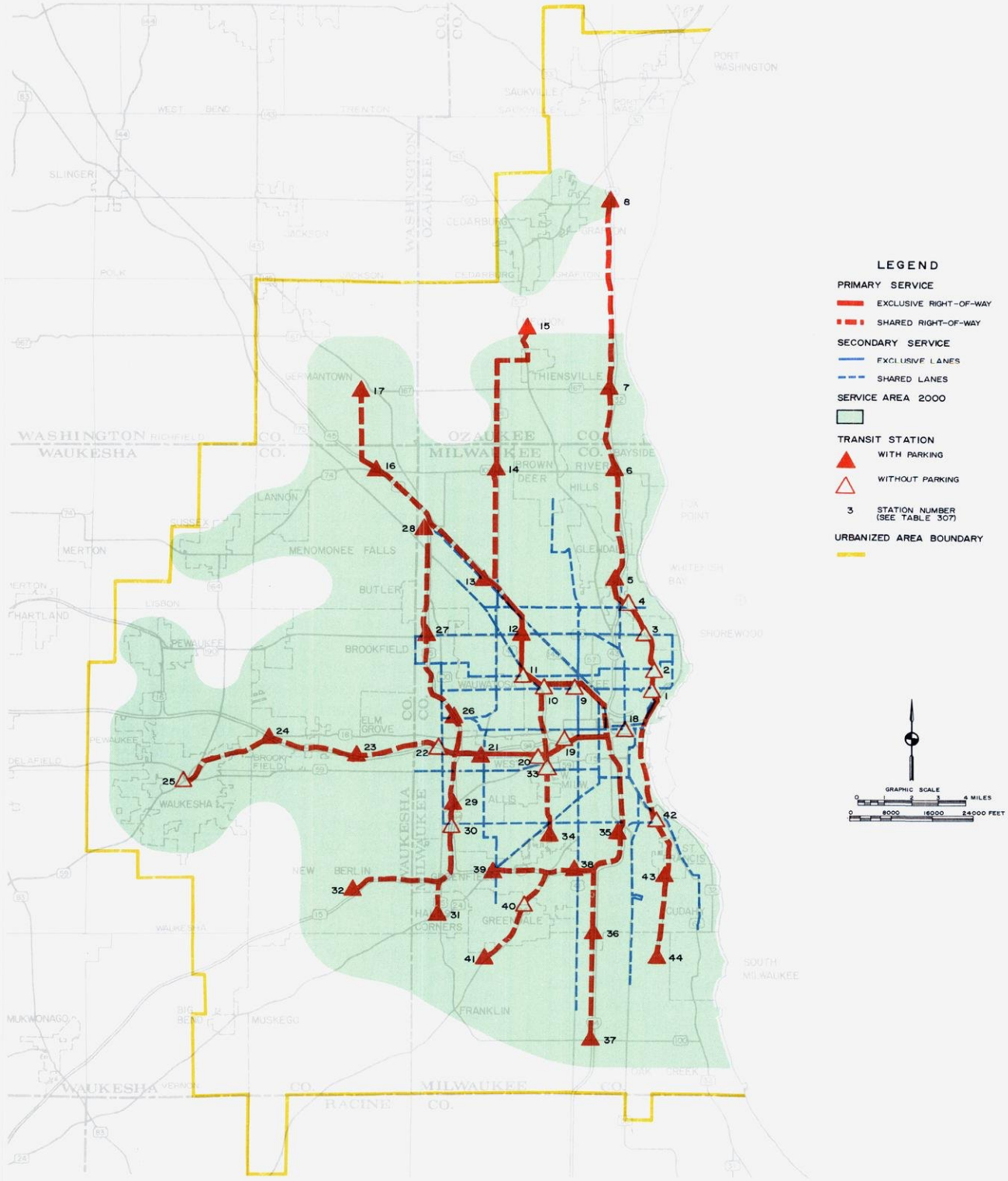
Kenosha and Racine Urbanized Areas

In the Kenosha and Racine urbanized areas, the transit systems proposed under the final set of alternative regional transportation plans are virtually identical to the systems proposed under the alternative transportation plans set forth in Chapter V of this volume. Minor route changes have been made to reflect system modifications that have recently taken place as the transit development programs in these two urbanized areas have been implemented. The network of tertiary transit routes in the Kenosha and Racine urbanized areas is shown on Map 75 for the "no build" situation and on Map 76 for Plans A, A'(25), A'(50), and R.

In the Kenosha urbanized area, tertiary transit service would be provided under Plans A, A'(25), A'(50), and R over 65 miles of arterial and collector facilities, while in the Racine urbanized area, such service would be provided over 68 miles of arterial and collector facilities. Selected characteristics pertaining to the transit facility proposals in the Kenosha and Racine urbanized areas are set forth in Table 313.

Map 72

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 2000 ALTERNATIVE TRANSPORTATION PLAN A



Under the alternative transportation Plan A, transit service would be provided over 3,066 round-trip miles of transit line in the Milwaukee urbanized area: of this total, 1,062 route miles would provide primary service, 351 route miles secondary service, and 1,653 route miles tertiary service. The system would require the operation of about 1,093 buses during peak ridership periods. This would represent an increase of 2,005 round-trip route miles and 651 buses over 1972. The plan also recommends the provision of 44 public transit stations, an increase of 40 stations over 1972, and of demand responsive service to low-density urban residential areas.

Source: SEWRPC.

Table 307

SELECTED CHARACTERISTICS OF PRIMARY TRANSIT STATIONS IN THE MILWAUKEE URBANIZED AREA: 2000 ALTERNATIVE TRANSPORTATION PLAN A

Transit Station Identification[a]					Type of Service				Passenger Facilities		
Primary Service Corridor	Number[b]	Name	Civil Division	Status	Primary	Secondary	Tertiary	Collection-Distribution	Shelter	Number of Parking Spaces	Buses Per Peak Hour in Peak Direction
East Side	1	E. North Avenue	City of Milwaukee	Proposed	X	X	X		X	--	42
	2	E. Locust Street	City of Milwaukee	Proposed	X	X	X		X	--	42
	3	E. Capitol Drive	Village of Shorewood	Proposed	X	X	X		X	--	27
	4	E. Hampton Avenue	Village of Whitefish Bay and City of Glendale	Proposed	X	X	X		X	--	27
	5	North Shore	City of Glendale	Existing	X	X	X	X	X	200	6
	6	W. Brown Deer Road	Village of River Hills	Existing	X		X	X	X	350	8
	7	STH 167—Mequon	City of Mequon	Proposed	X		X	X	X	375	8
	8	CTH Q—Grafton	Town of Grafton	Proposed	X		X	X	X	425	5
Northwest	9	N. 27th Street	City of Milwaukee	Proposed	X	X	X		X	--	49
	10	N. Sherman Boulevard	City of Milwaukee	Proposed	X	X	X		X	--	57
	11	W. Center Street	City of Milwaukee	Proposed	X	X	X		X	--	49
	12	Capitol Court	City of Milwaukee	Proposed	X	X	X		X	475	49
	13	S. Silver Spring Drive	City of Milwaukee	Proposed	X	X	X	X	X	125	7
	14	Northridge	City of Milwaukee	Proposed	X	X	X	X	X	200	29
	15	MATC-Mequon	City of Mequon	Existing	X		X		X	125	5
	16	STH 74—Menomonee Falls	Village of Menomonee Falls	Proposed	X		X	X	X	325	5
	17	Mequon Road—Germantown	Town of Germantown	Proposed	X		X		X	250	8
East-West	18	Downtown Milwaukee	City of Milwaukee	Proposed	X	X	X	X	X	--	199
	19	N. 32nd Street	City of Milwaukee	Proposed	X		X		X	--	74
	20	VA Center	City of Milwaukee	Proposed	X				X	--	7
	21	State Fair Park	City of Milwaukee	Proposed	X	X	X		X	325	21
	22	STH 100	City of West Allis	Proposed	X	X	X		X	--	17
	23	Brookfield Square	City of Brookfield	Proposed	X		X	X	X	100	6
	24	Goerke's Corners	Town of Brookfield	Existing	X		X	X	X	425	11
	25	Waukesha	City of Waukesha	Proposed	X		X	X	X	--	11
Zoo Freeway-North	26	Watertown Plank Road	City of Wauwatosa	Existing	X	X	X	X	X	250	13
	27	W. Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	250	8
	28	W. Good Hope Road	City of Milwaukee	Proposed	X	X	X	X	X	300	3
Zoo Freeway-South	29	W. National Avenue	City of West Allis	Proposed	X		X	X	X	275	10
	30	W. Oklahoma Avenue	City of Milwaukee and City of West Allis	Proposed	X	X	X		X	--	9
	31	Hales Corners	Village of Hales Corners	Proposed	X		X	X	X	325	6
	32	Moorland Road—New Berlin	City of New Berlin	Proposed	X		X	X	X	125	2
Stadium Freeway-South	33	W. National Avenue	Village of West Milwaukee	Proposed	X	X	X		X	--	9
	34	W. Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	100	9
IH 94-South	35	W. Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	175	14
	36	W. College Avenue	City of Milwaukee	Existing	X		X	X	X	350	6
	37	W. Ryan Road	City of Oak Creek	Proposed	X		X	X	X	375	4
Airport Freeway	38	S. 27th Street	City of Milwaukee	Proposed	X	X	X	X	X	375	8
	39	S. 76th Street	City of Greenfield	Proposed	X	X	X	X	X	300	11
	40	W. Grange Avenue	Village of Greendale	Proposed	X		X		X	--	3
	41	W. Rawson Avenue	City of Franklin	Proposed	X		X		X	200	3
Lake Freeway	42	E. Oklahoma Avenue	City of Milwaukee	Proposed	X	X	X		X	--	16
	43	E. Layton Avenue	City of Cudahy	Proposed	X		X	X	X	200	9
	44	E. Rawson Avenue	City of Oak Creek	Proposed	X		X	X	X	425	7

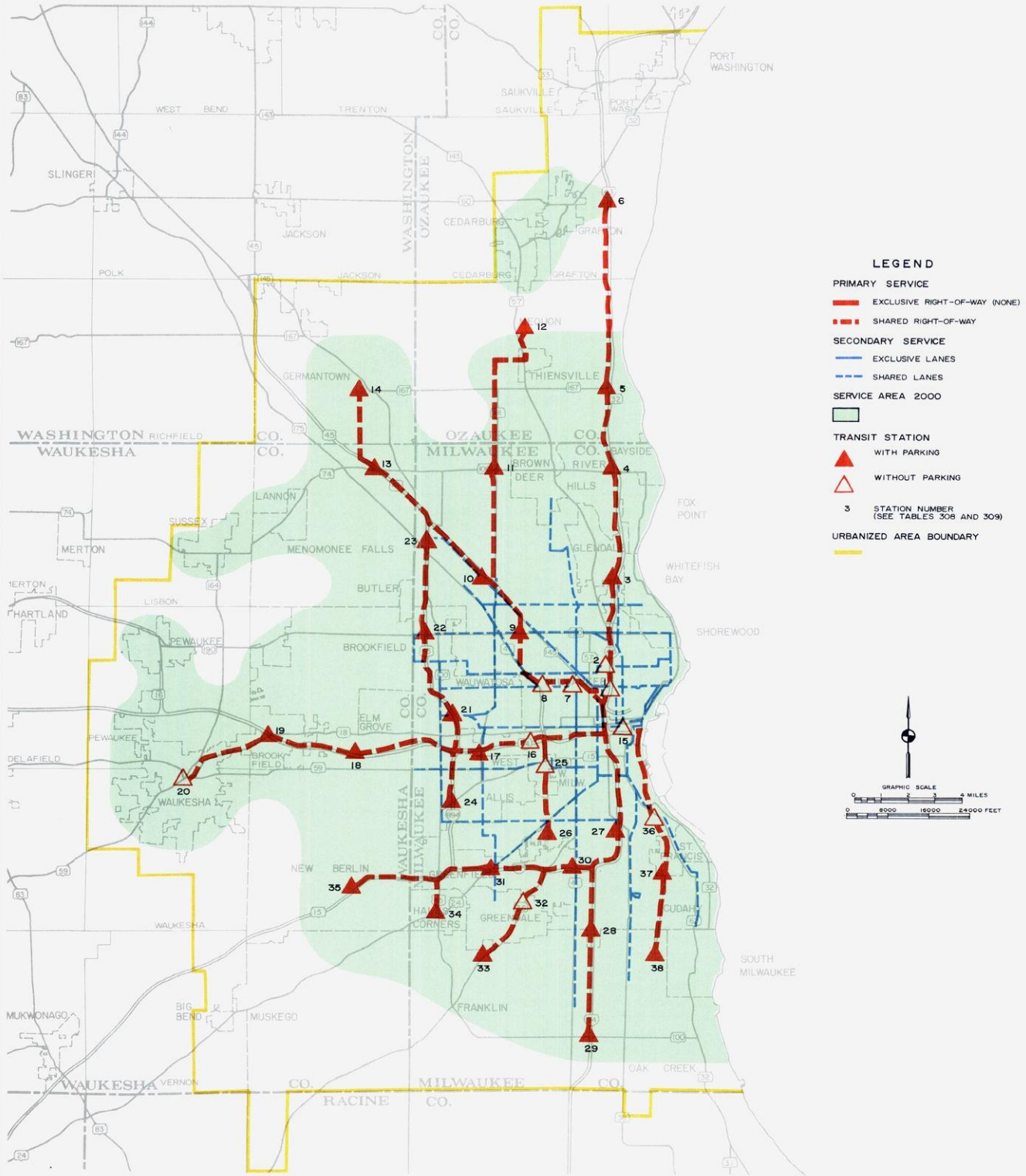
[a] *This table and Tables 308, 309, and 310 do not include the off-street parking spaces required for the U-PARK service operated by the University of Wisconsin-Milwaukee. Two remote U-PARK lots with supporting shuttle bus service were assured in preparation of the alternative plans, one to be located near the Milwaukee central business district and the other to be located near the E. Capitol Drive crossing of the Milwaukee River.*

[b] *See Map 72.*

Source: SEWRPC.

Map 73

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA 2000 ALTERNATIVE TRANSPORTATION PLANS A'(25) AND A'(50)



Under the alternative transportation Plans A'(25) and A'(50), transit service would be provided over 3,090 round-trip miles of transit line in the Milwaukee urbanized area: of this total, 1,092 route miles would provide primary service, 353 route miles secondary service, and 1,645 route miles tertiary service. The system would require the operation of about 1,191 buses under Plan A'(25) and about 1,085 buses under Plan A'(50) during peak ridership periods. This would represent an increase of 2,029 round-trip route miles and 749 buses under Plan A'(25) and 643 buses under Plan A'(50) over 1972. Both plans also recommend the provision of 38 public transit stations, an increase of 34 stations over 1972, and of demand responsive service to low-density urban residential areas.

Source: SEWRPC.

Table 308

SELECTED CHARACTERISTICS OF PRIMARY TRANSIT STATIONS IN THE MILWAUKEE URBANIZED AREA: 2000 ALTERNATIVE TRANSPORTATION PLAN A'(25)

Transit Station Identification					Type of Service				Passenger Facilities		
Primary Service Corridor	Number[a]	Name	Civil Division	Status	Primary	Secondary	Tertiary	Collection-Distribution	Shelter	Number of Parking Spaces	Buses Per Peak Hour in Peak Direction
East Side	1	W. North Avenue	City of Milwaukee	Proposed	X	X	X		X	--	28
	2	W. Locust Street	City of Milwaukee	Proposed	X	X	X		X	--	18
	3	Bayshore	City of Glendale	Existing	X	X	X	X	X	300	6
	4	W. Brown Deer Road	Village of River Hills	Existing	X		X	X	X	400	8
	5	STH 167—Mequon	City of Mequon	Proposed	X		X	X	X	475	8
	6	CTH Q—Grafton	Town of Grafton	Proposed	X		X	X	X	500	6
Northwest	7	N. 27th Street	City of Milwaukee	Proposed	X	X	X		X	--	60
	8	N. Sherman Boulevard	City of Milwaukee	Proposed	X	X	X		X	--	12
	9	Capitol Court	City of Milwaukee	Proposed	X	X	X		X	600	48
	10	W. Silver Spring Drive	City of Milwaukee	Proposed	X	X	X	X	X	200	7
	11	Northridge	City of Milwaukee	Proposed	X	X	X	X	X	275	28
	12	MATC-Mequon	City of Mequon	Existing	X		X		X	175	4
	13	STH 74—Menomonee Falls	Village of Menomonee Falls	Proposed	X		X	X	X	450	5
	14	Mequon Road—Germantown	Town of Germantown	Proposed	X		X		X	350	8
East-West	15	Downtown Milwaukee	City of Milwaukee	Proposed	X	X	X	X	X	--	220
	16	VA Center	City of Milwaukee	Proposed	X				X	--	9
	17	State Fair Park	City of Milwaukee	Proposed	X	X	X		X	425	21
	18	Brookfield Square	City of Brookfield	Proposed	X		X	X	X	150	4
	19	Goerke's Corners	Town of Brookfield	Existing	X		X	X	X	600	15
	20	Waukesha	City of Waukesha	Proposed	X		X	X	X	--	15
Zoo Freeway-North	21	Watertown Plank Road	City of Wauwatosa	Existing	X	X	X	X	X	300	14
	22	W. Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	350	10
	23	W. Good Hope Road	City of Milwaukee	Proposed	X		X	X	X	425	5
Zoo Freeway-South	24	W. National Avenue	City of West Allis	Proposed	X	X	X	X	X	350	12
Stadium Freeway-South	25	W. National Avenue	Village of West Milwaukee	Proposed	X	X	X		X	--	8
	26	W. Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	150	8
IH 94-South	27	W. Morgan Avenue	City of Milwaukee	Proposed	X	X	X	X	X	225	14
	28	W. College Avenue	City of Milwaukee	Existing	X		X	X	X	450	9
	29	W. Ryan Road	City of Oak Creek	Proposed	X		X		X	500	4
Airport Freeway	30	S. 27th Street	City of Milwaukee	Proposed	X	X	X	X	X	450	9
	31	S. 76th Street	City of Greenfield	Proposed	X	X	X	X	X	425	11
	32	W. Grange Avenue	Village of Greendale	Proposed	X		X		X	--	4
	33	W. Rawson Avenue	City of Franklin	Proposed	X		X		X	300	4
	34	Hales Corners	Village of Hales Corners	Proposed	X		X	X	X	450	6
	35	Moorland Road—New Berlin	City of New Berlin	Proposed	X		X		X	275	2
Lake Freeway	36	E. Oklahoma Avenue	City of Milwaukee	Proposed	X	X	X		X	--	21
	37	E. Layton Avenue	City of Cudahy	Proposed	X		X	X	X	250	9
	38	E. Rawson Avenue	City of Oak Creek	Proposed	X		X	X	X	600	12

[a] *See Map 73.*

Source: SEWRPC.

Table 309

SELECTED CHARACTERISTICS OF PRIMARY TRANSIT STATIONS IN THE MILWAUKEE URBANIZED AREA: 2000 ALTERNATIVE TRANSPORTATION PLAN A'(50)

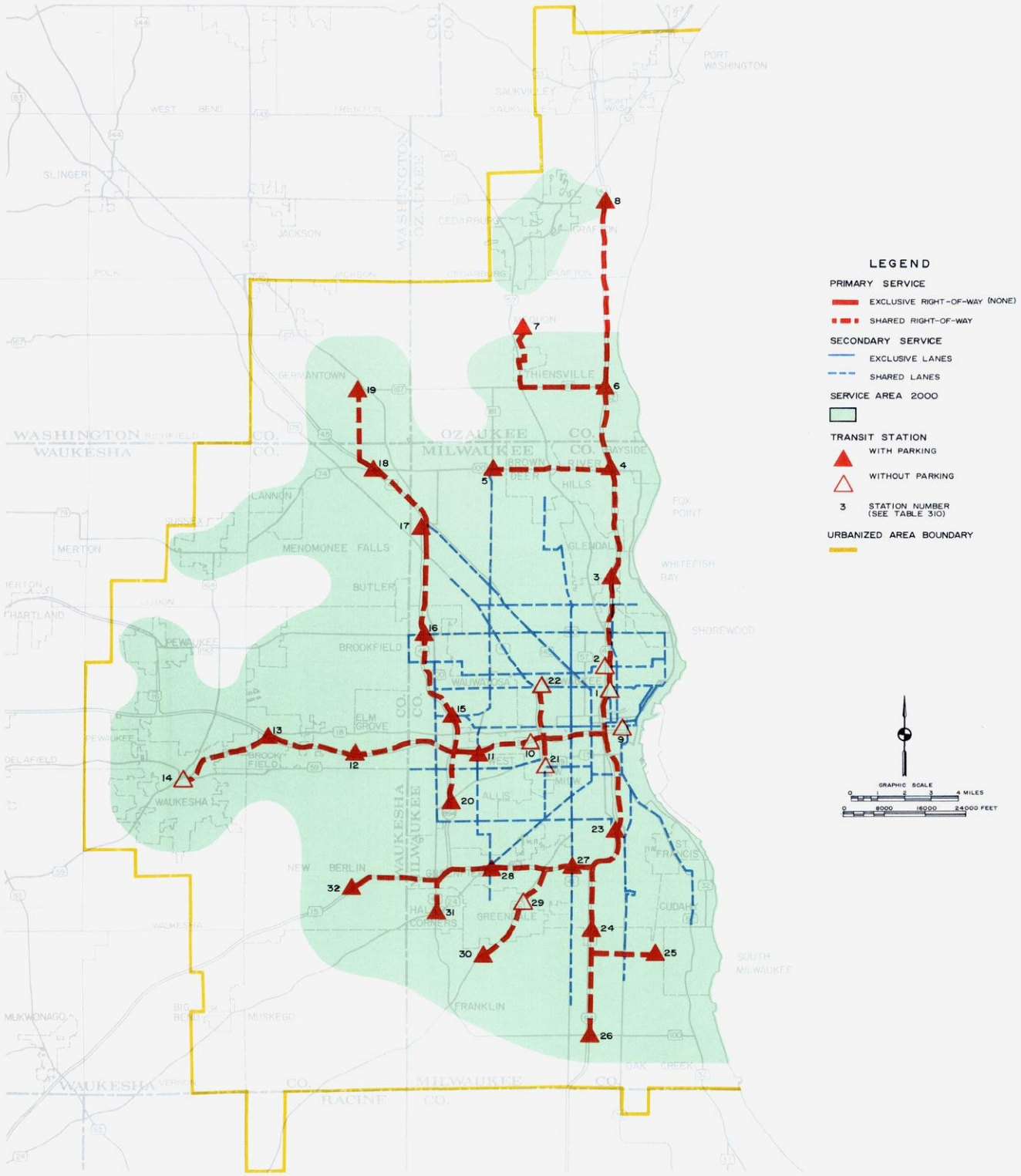
Primary Service Corridor	Transit Station Identification				Type of Service				Passenger Facilities		
	Number[a]	Name	Civil Division	Status	Primary	Secondary	Tertiary	Collection-Distribution	Shelter	Number of Parking Spaces	Buses per Peak Hour in Peak Direction
East Side	1	W. North Avenue	City of Milwaukee	Proposed	X	X	X		X	--	21
	2	W. Locust Street	City of Milwaukee	Proposed	X	X	X		X	--	12
	3	North Shore	City of Glendale	Existing	X	X	X	X	X	200	6
	4	W. Brown Deer Road	Village of River Hills	Existing	X		X	X	X	300	7
	5	STH 167—Mequon	City of Mequon	Proposed	X		X	X	X	350	6
	6	CTH Q—Grafton	Town of Grafton	Proposed	X		X	X	X	375	2
Northwest	7	N. 27th Steet	City of Milwaukee	Proposed	X	X	X		X	--	51
	8	N. Sherman Boulevard	City of Milwaukee	Proposed	X	X	X		X	--	10
	9	Capitol Court	City of Milwaukee	Proposed	X	X	X		X	500	41
	10	W. Silver Spring Drive	City of Milwaukee	Proposed	X	X	X	X	X	150	7
	11	Northridge	City of Milwaukee	Proposed	X	X	X	X	X	200	20
	12	MATC-Mequon	City of Mequon	Existing	X		X		X	100	4
	13	STH 74—Menomonee Falls	Village of Menomonee Falls	Proposed	X		X	X	X	375	6
	14	Mequon Road—Germantown	Village of Germantown	Proposed	X		X		X	250	8
East-West	15	Downtown Milwaukee	City of Milwaukee	Proposed	X	X	X	X	X	--	200
	16	VA Center	City of Milwaukee	Proposed	X				X	--	8
	17	State Fair Park	City of Milwaukee	Proposed	X	X	X		X	300	15
	18	Brookfield Square	City of Brookfield	Proposed	X		X	X	X	100	7
	19	Goerke's Corners	Town of Brookfield	Existing	X		X	X	X	300	11
	20	Waukesha	City of Waukesha	Proposed	X		X	X	X	--	11
Zoo Freeway North	21	Watertown Plank Road	City of Wauwatosa	Existing	X	X	X	X	X	250	13
	22	W. Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	300	8
	23	W. Good Hope Road	City of Milwaukee	Proposed	X		X	X	X	325	4
Zoo Freeway South	24	W. National Avenue	City of West Allis	Proposed	X	X	X	X	X	350	14
Stadium Freeway South	25	W. National Avenue	Village of West Milwaukee	Proposed	X	X	X		X	--	6
	26	W. Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	100	6
IH 94 South	27	W. Morgan Avenue	City of Milwaukee	Proposed	X	X	X	X	X	200	14
	28	W. College Avenue	City of Milwaukee	Existing	X		X	X	X	375	9
	29	W. Ryan Road	City of Oak Creek	Proposed	X		X		X	375	3
Airport Freeway	30	S. 27th Street	City of Milwaukee	Proposed	X	X	X	X	X	375	8
	31	S. 76th Street	City of Greenfield	Proposed	X	X	X	X	X	300	11
	32	W. Grange Avenue	Village of Greenfield	Proposed	X		X		X	--	3
	33	W. Rawson Avenue	City of Franklin	Proposed	X		X		X	200	3
	34	Hales Corners	Village of Hales Corners	Proposed	X		X	X	X	325	6
	35	Moorland Road—New Berlin	City of New Berlin	Proposed	X		X		X	100	2
Lake Freeway	36	E. Oklahoma Avenue	City of Milwaukee	Proposed	X	X	X		X	--	18
	37	E. Layton Avenue	City of Cudahy	Proposed	X		X	X	X	200	8
	38	E. Rawson Avenue	City of Oak Creek	Proposed	X		X	X	X	425	10

Assignment of Travel to Highway and Transit Networks

Automobile Availability: A comparison of the anticipated number of automobiles which may be expected to be available to residents of the Region by county under each of the four alternative regional transportation plans considered is set forth in Table 314. The "no build" plan may be expected to result in a total of about 1.1 million automobiles operating on the streets and highways of the Region by the year 2000; Plan A about 992,000; Plans A'(25) and A'(50) about 993,000; and Plan R about 998,000. These figures may be compared with the regional forecast of automobile availability, based on historic trends, as described in Chapter III of this volume of about 1.2 million. The small differences in automobile availability between Plans A, A'(25), A'(50), and R may be attributed to the slightly differing levels of transit service proposed to be made available under each plan. Plan A, having the most expensive primary transit system, including three exclusive transitways, would provide the highest level of transit service in the Milwaukee area during the peak travel hours and would thus tend to effect a slight reduction in automobile availability over

Map 74

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA
2000 ALTERNATIVE TRANSPORTATION PLAN R



Under the alternative transportation Plan R, transit service would be provided over 3,029 round-trip miles of transit line in the Milwaukee urbanized area: of this total, 993 route miles would provide primary service, 361 route miles secondary service, and 1,675 route miles tertiary service. The system would require the operation of about 1,212 buses during peak ridership periods. This would represent an increase of 1,968 round-trip route miles and 770 buses over 1972. The plan also recommends the provision of 32 public transit stations, an increase of 28 stations over 1972, and of demand responsive service to low-density urban residential areas.

Source: SEWRPC.

Table 310

SELECTED CHARACTERISTICS OF PRIMARY TRANSIT STATIONS IN THE MILWAUKEE URBANIZED AREA: 2000 ALTERNATIVE TRANSPORTATION PLAN R

Transit Station Identification					Type of Service				Passenger Facilities		
Primary Service Corridor	Number[a]	Name	Civil Division	Status	Primary	Secondary	Tertiary	Collection-Distribution	Shelter	Number of Parking Spaces	Buses Per Peak Hour in Peak Direction
East Side	1	W. North Avenue	City of Milwaukee	Proposed	X	X	X		X	--	30
	2	W. Locust Street	City of Milwaukee	Proposed	X	X	X		X	--	14
	3	Bayshore	City of Glendale	Existing	X	X	X	X	X	325	6
	4	W. Brown Deer Road	Village of River Hills	Existing	X		X	X	X	450	10
	5	Northridge	City of Milwaukee	Proposed	X	X	X	X	X	275	5
	6	STH 167—Mequon	City of Mequon	Proposed	X		X	X	X	500	8
	7	MATC-Mequon	City of Mequon	Existing	X		X		X	175	4
	8	CTH Q—Grafton	Town of Grafton	Proposed	X		X	X	X	500	6
East-West	9	Downtown Milwaukee	City of Milwaukee	Proposed	X	X	X	X	X	--	177
	10	VA Center	City of Milwaukee	Proposed	X				X	--	9
	11	State Fair Park	City of Milwaukee	Proposed	X	X	X		X	500	22
	12	Brookfield Square	City of Brookfield	Proposed	X		X	X	X	175	5
	13	Goerke's Corners	Town of Brookfield	Existing	X		X	X	X	600	17
	14	Waukesha	City of Waukesha	Proposed	X		X	X	X	--	17
Zoo Freeway-North	15	Watertown Plank Road	City of Wauwatosa	Existing	X	X	X	X	X	325	19
	16	W. Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	425	8
	17	W. Good Hope Road	City of Milwaukee	Proposed	X		X	X	X	450	5
	18	STH 74—Menomonee Falls	Village of Menomonee Falls	Proposed	X		X	X	X	400	5
	19	Mequon Road—Germantown	Town of Germantown	Proposed	X		X		X	325	6
Zoo Freeway-South	20	W. National Avenue	City of West Allis	Proposed	X	X	X	X	X	400	14
Stadium Freeway-South	21	W. National Avenue	Village of West Milwaukee	Proposed	X	X	X		X	--	8
Stadium Freeway-North	22	N. 46th Street	City of Milwaukee	Proposed	X	X	X		X	--	11
IH 94-South	23	W. Morgan Avenue	City of Milwaukee	Proposed	X	X	X	X	X	275	14
	24	W. College Avenue	City of Milwaukee	Existing	X		X	X	X	475	9
	25	E. Rawson Avenue	City of Oak Creek	Proposed	X		X	X	X	475	10
	26	W. Ryan Road	City of Oak Creek	Proposed	X		X		X	500	4
Airport Freeway	27	S. 27th Street	City of Milwaukee	Proposed	X	X	X	X	X	500	9
	28	S. 76th Street	City of Greenfield	Proposed	X	X	X	X	X	500	11
	29	W. Grange Avenue	Village of Greendale	Proposed	X		X		X	--	4
	30	W. Rawson Avenue	City of Franklin	Proposed	X		X		X	350	4
	31	Hales Corners	Village of Hales Corners	Proposed	X		X	X	x	450	6
	32	Moorland Road—New Berlin	City of New Berlin	Proposed	X		X		X	275	2

[a] *See Map 74.*

Source: SEWRPC.

Plans A'(25), A'(50), and R which, while having high levels of transit service, do not provide quite the same level of service during the peak hours as Plan A.

Person Trip Generation: A comparison of internal person trips generation within the Region on an average weekday by trip purpose which may be expected under each of the four alternative regional transportation plans is set forth in Table 315. Slightly more trips may be expected to be made under the "no build" situation with its attendant greater automobile availability. Very little difference may be expected between the four Plans A, A'(25), A'(50), and R, with respect to total tripmaking, each resulting in an estimated 5.7 million internal person trips on an average weekday in the year 2000.

A comparison of the distribution of internal trips in the Region by mode of travel under each of the alternative plans is summarized in Table 316. Under Plan R, transit tripmaking may be expected to approach 484,000 on an average weekday, representing about 8.4 percent of all trips. Under Plan A'(25), transit tripmaking may be

Table 311

EXCLUSIVE TRANSIT LANES ON STANDARD ARTERIAL STREETS IN THE MILWAUKEE URBANIZED AREA 2000 ALTERNATIVE TRANSPORTATION PLANS A, A'(25), A'(50), and R

Arterial Street			Exclusive Transit Lane							
	Limits					Number of Buses in Peak Hour				
Name	From	To	Type	Direction	Duration	Plan A	Plan A'(25)	Plan A'(50)	Plan R	Remarks
N. 27th Street	W. St. Paul Avenue	W. Capitol Drive	Curb Lane	Southbound	6:00 a.m.-6:00 p.m.	21	23	23	23	Requires removal of curb parking.
			Curb Lane	Northbound	6:00 a.m.-6:00 p.m.	30	36	30	36	Requires removal of curb parking.
N. Farwell Avenue	E. Ogden Avenue	E. North Avenue	Curb Lane	Southbound	6:00 a.m.-9:00 a.m.	38	37	38	38	Requires removal of curb parking.
				Southbound	3:00 p.m.-6:00 p.m.	43	47	44	49	
N. Prospect Avenue	E. Kilbourn Avenue	E. North Avenue	Curb Lane	Northbound	6:00 a.m.-9:00 a.m.	39	39	39	39	Requires removal of curb parking.
				Northbound	3:00 p.m.-6:00 p.m.	43	47	43	49	
Kenwood Boulevard	N. Downer Avenue	N. Oakland Avenue	Curb Lane	Westbound	6:00 a.m.-6:00 p.m.	112	139	126	140	Requires removal of curb parking.
E. and W. Wells Street	N. Prospect Avenue	N. 10th Street	Contra-flow Curb Lane	Westbound	All day	56	73	65	91	Requires removal of curb parking and median construction.
W. Wisconsin Avenue	N. 10th Street	N. 35th Street	Curb Lane	Eastbound	6:00 a.m.-9:00 a.m.	77	77	84	86	Requires removal of curb parking.
				Westbound	3:00 p.m.-6:00 p.m.	97	101	97	121	

Source: SEWRPC.

Table 312

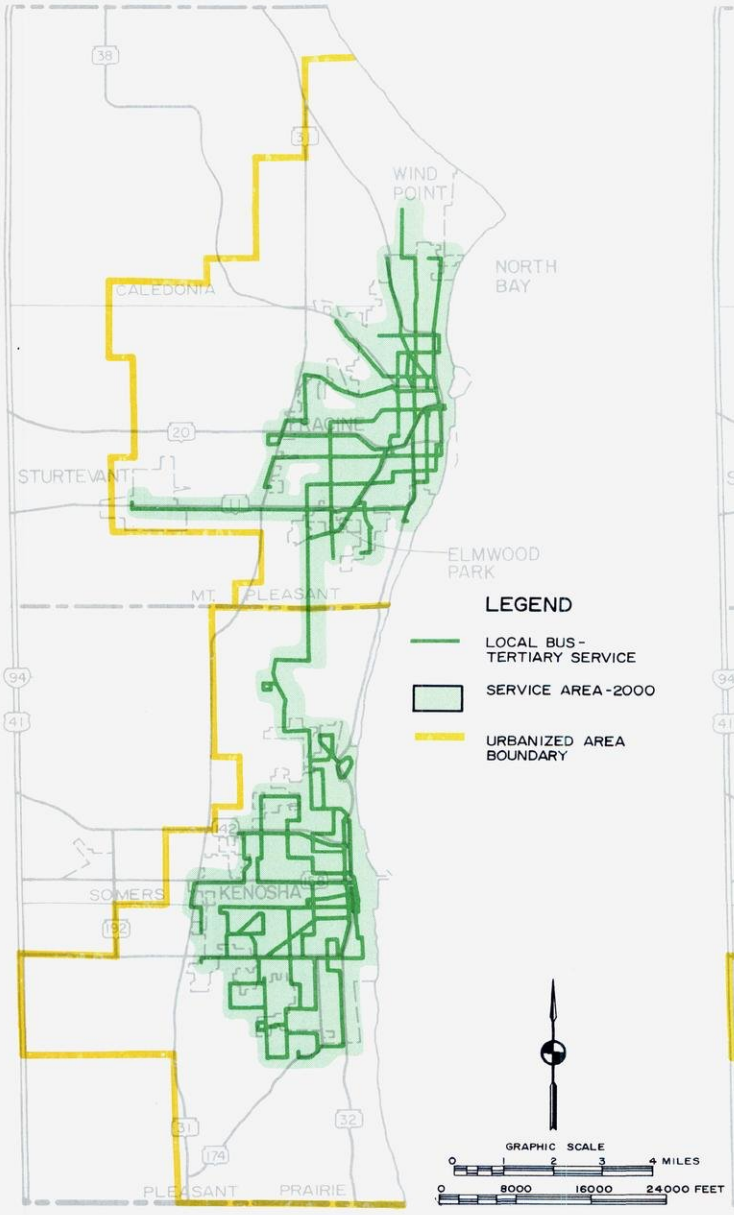
COMPARISON OF MASS TRANSIT FACILITIES IN THE MILWAUKEE URBANIZED AREA 1972 AND FINAL 2000 TRANSPORTATION PLAN ALTERNATIVES

Transit Facility Characteristic	Existing 1972	Alternative Plan Increments					Alternative Plan Totals				
		No Build	A	A'(25)	A'(50)	R	No Build	A	A'(25)	A'(50)	R
Round Trip Route Miles											
Primary	150	121	912	942	942	843	271	1,062	1,092	1,092	993
Secondary	56	- 42	295	297	297	305	14	351	353	353	361
Tertiary	855	420	798	790	790	820	1,275	1,653	1,645	1,645	1,675
Total	1,061	499	2,005	2,029	2,029	1,968	1,560	3,066	3,090	3,090	3,029
Miles of Special Facilities											
Exclusive Rights-of-Way	--	--	20.0	--	--	--	--	20.0	--	--	--
Exclusive Lanes on Streets	--	--	9.5	9.5	9.5	9.5	--	9.5	9.5	9.5	9.5
Vehicle Requirements (Number of Buses)											
Peak Period	442	- 6	651	749	643	770	436	1,093	1,191	1,085	1,212
Midday Period	220	21	440	474	437	504	241	660	694	657	724

Source: SEWRPC.

Map 75

TRANSIT SYSTEM IN THE KENOSHA AND RACINE URBANIZED AREAS 2000 "NO BUILD" TRANSPORTATION PLAN

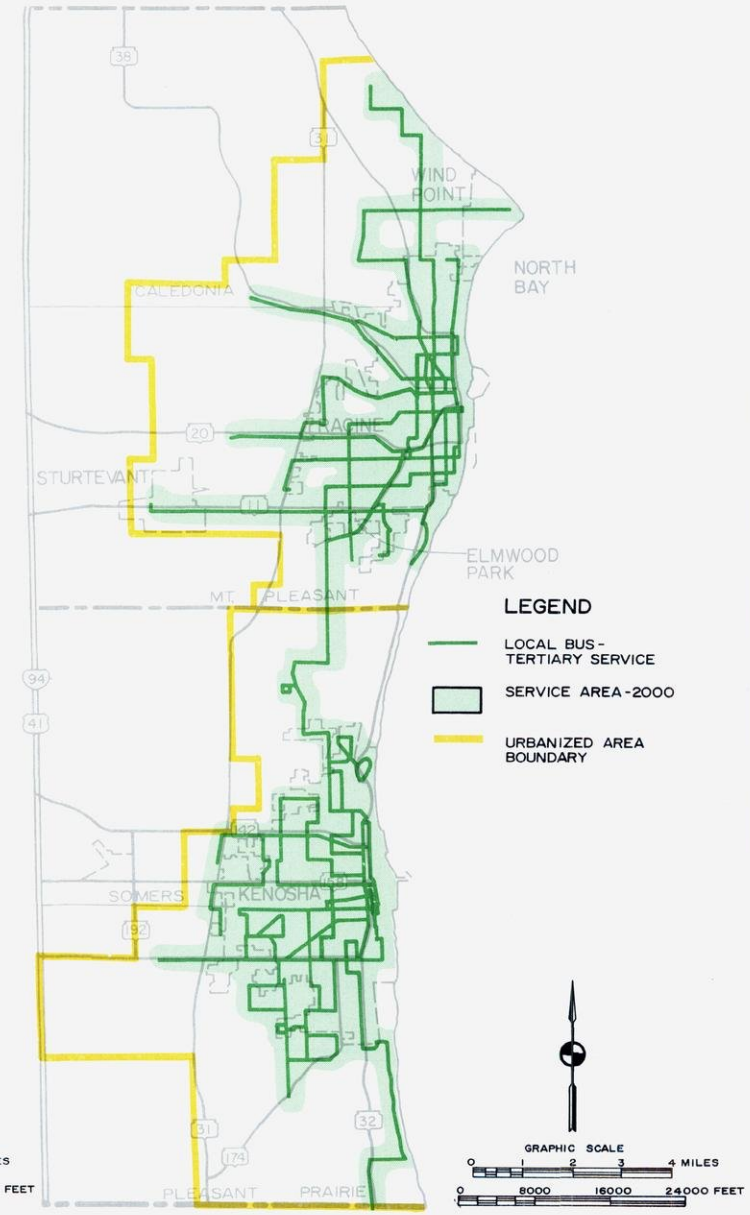


Under the "no build" alternative transportation plan, the transit systems for the Kenosha and Racine urbanized areas would consist of approximately 130 round-trip route miles of transit line in the Kenosha urbanized area, and 132 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 31 buses in the Kenosha urbanized area and 26 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 71 round-trip route miles and 19 buses in the Kenosha area and 51 route miles and 16 buses in the Racine area over 1972.

Source: SEWRPC.

Map 76

TRANSIT SYSTEM IN THE KENOSHA AND RACINE URBANIZED AREAS 2000 ALTERNATIVE TRANSPORTATION PLANS A, A'(25), A'(50), AND R



Under the alternative transportation plans A, A'(25), A'(50), and R, the transit systems for the Kenosha and Racine urbanized areas would consist of approximately 147 round-trip route miles of transit line in the Kenosha urbanized area, and 153 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 33 buses in the Kenosha urbanized area and 38 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 88 round-trip route miles and 21 buses in the Kenosha area and 72 route miles and 28 buses in the Racine area over 1972.

Source: SEWRPC.

Table 313

COMPARISON OF MASS TRANSIT FACILITIES IN THE KENOSHA AND RACINE URBANIZED AREAS
1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Transit Facility Characteristic	Existing 1972	Alternative Plan Increments				Alternative Plan Totals			
		No Build	A	A'(25) and A'(50)	R	No Build	A	A'(25) and A'(50)	R
Kenosha Urbanized Area									
Round Trip Route Miles . .	59	71	88	88	88	130	147	147	147
Vehicle Requirements (Number of Buses)									
Peak Period	12	19	21	21	21	31	33	33	33
Midday Period	6	15	16	16	16	21	22	22	22
Racine Urbanized Area									
Round Trip Route Miles . .	81	51	72	72	72	132	153	153	153
Vehicle Requirements (Number of Buses)									
Peak Period	10	16	28	28	28	26	38	38	38
Midday Period	10	16	17	17	17	26	27	27	27

Source: SEWRPC.

Table 314

COMPARISON OF AUTOMOBILES AVAILABLE IN THE REGION BY COUNTY
1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

County	Existing 1972			Estimated 2000—Alternative Plans							
				No Build		A		A'(25) and A'(50)		R	
	Population	Number of Automobiles	Persons Per Automobile	Population	Number of Automobiles	Persons Per Automobile	Number of Automobiles	Persons Per Automobile	Number of Automobiles	Persons Per Automobile	Number of Automobiles	Persons Per Automobile
Kenosha	122,700	48,700	2.5	171,500	87,100	2.0	87,000	2.0	87,000	2.0	87,000	2.0
Milwaukee . . .	1,060,500	386,600	2.7	1,024,300	517,400	2.0	418,600	2.4	419,300	2.4	423,200	2.4
Ozaukee	61,400	27,300	2.2	113,000	57,800	2.0	57,400	2.0	57,400	2.0	57,800	2.0
Racine	177,100	70,900	2.5	212,700	102,500	2.1	102,400	2.1	102,400	2.1	102,400	2.1
Walworth. . . .	72,300	32,000	2.3	91,800	49,300	1.9	49,300	1.9	49,300	1.9	49,300	1.9
Washington . .	71,400	28,900	2.5	141,500	72,800	1.9	72,500	1.9	72,600	1.9	72,700	1.9
Waukesha . . .	245,300	110,200	2.2	412,100	209,200	2.0	204,700	2.0	205,000	2.0	205,200	2.0
Total	1,810,700	704,600	2.6	2,166,900	1,096,100	2.0	991,900	2.2	993,000	2.2	997,600	2.2

Source: SEWRPC.

Table 315

COMPARISON OF THE DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY
TRIP PURPOSE: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Trip Purpose Category	Internal Person Trips Generated on an Average Weekday									
	Existing 1972		Estimated 2000—Alternative Plans							
			No Build		A		A'(25) and A'(50)		R	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Home-based Work.	1,055,500	23.7	1,395,900	23.7	1,361,000	23.7	1,361,600	23.7	1,362,700	23.7
Home-based Shopping . .	673,600	15.1	863,300	14.7	846,900	14.8	847,000	14.8	847,600	14.8
Home-based Other	1,532,600	34.3	2,003,400	34.0	1,942,100	33.9	1,943,000	33.9	1,945,000	33.9
Nonhome-based	779,800	17.5	1,034,100	17.6	997,400	17.4	998,500	17.4	999,700	17.4
School	418,900	9.4	587,700	10.0	587,700	10.2	587,700	10.2	587,700	10.2
Total	4,460,400	100.0	5,884,400	100.0	5,735,100	100.0	5,737,800	100.0	5,742,700	100.0

Source: SEWRPC.

Table 316

COMPARISON OF THE DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Mode of Travel	Internal Person Trips Generated on an Average Weekday											
	Existing 1972		Estimated 2000—Alternative Plans									
			No Build		A		A'(25)		A'(50)		R	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Automobile Driver . . .	2,884,700	64.7	3,988,700	67.8	3,746,500	65.3	3,674,200	64.0	3,746,100	65.3	3,649,000	63.6
Automobile Passenger .	1,217,900	27.3	1,446,000	24.6	1,353,300	23.6	1,326,800	23.1	1,356,000	23.6	1,321,400	23.0
Transit Passenger	184,200	4.1	160,900	2.7	346,700	6.1	448,200	7.9	347,100	6.1	483,700	8.4
School Bus Passenger. .	173,600	3.9	288,600	4.9	288,600	5.0	288,600	5.0	288,600	5.0	288,600	5.0
Total	4,460,400	100.0	5,884,200	100.0	5,735,100	100.0	5,737,800	100.0	5,737,800	100.0	5,742,700	100.0

Source: SEWRPC.

expected to approximate 448,000, or nearly 8 percent of all trips; while under Plans A'(50) and A, transit tripmaking may be expected to approximate 347,000, or about 6 percent of all trips. Under the "no build" situation, transit tripmaking may be expected to decline to about 161,000 trips, or slightly less than 3 percent of all trips. The higher levels of transit tripmaking under Plans R and A'(25) may be attributed to the proposed disincentives to automobile use in the Milwaukee urbanized area, including the downtown Milwaukee minimum all-day parking fee of $0.50 and extensive freeway ramp metering, and to the assumed $0.25 transit fare in the Milwaukee urbanized area. Under Plans A'(50) and A, then, transit ridership in the Region may be expected to not quite double, under Plan A'(25), transit ridership may be expected to approach 2½ times the current level, and under Plan R, transit ridership may be expected to be slightly greater than 2½ times the current level.

A comparison of the distribution of internal person trips by mode of travel for the three urbanized areas in the Region is set forth in Table 317. In the Kenosha urbanized area, transit trips, which totaled only about 2,900 in 1972, or about 1 percent of all trips, could be expected to increase to about 16,800 trips in 2000 under the "no build" plan, or about 4.2 percent of all trips, and to about 18,700 trips under Plans A, A'(25), A'(50), and R, or about 4.7 percent of all trips. Similarly, in the Racine urbanized area, transit trips, which averaged about 3,100 per day in 1972, or nearly 1 percent of all trips, could be expected to increase to about 19,400 trips in the year 2000 under the "no build" plan, representing nearly 5 percent of all trips, and to about 20,700 trips in the year 2000 under Plans A, A'(25), A'(50), and R, or about 5.3 percent of all trips.

In the Milwaukee urbanized area, the differences in transit tripmaking among the alternative plans reflect the regional differences noted above. Transit tripmaking in the Milwaukee urbanized area approximated 178,000 trips per day in 1972, or about 5.5 percent of all trips. Under the "no build" situation, transit trips may be expected to decline to about 124,000 in the year 2000, or about 3 percent of all trips. Under Plans A and A'(50), transit trips may be expected to approximate 307,000, or about 8 percent of all trips; under Plan A'(25), about 408,000 trips, or nearly 11 percent of all trips; and under Plan R, about 443,000 trips, or nearly 12 percent of all trips. The higher transit ridership under Plans A'(25) and R may be attributed to the reduced transit fare and to the automobile use disincentives assumed in the Milwaukee urbanized area.

A comparison of the distribution of the transit trips by trip purpose among the final regional alternative transportation system plans is set forth in Table 318. This table indicates that much of the increase in transit tripmaking under Plans A'(25) and R may be expected to occur in the nonwork-related trip categories. The reduced transit fares and headways under Plans A'(25) and R make transit more attractive for the nonwork trip purposes such as recreation, social, and personal business, thus accounting for a portion of the increased transit travel. Work-related transit trips may also be expected to increase, due in part to reduced transit vehicle headways as well as the reduced transit fare and auto use disincentives assumed under Plans A'(25) and R.

A comparison of the distribution of the internal automobile person trips by trip purpose and internal automobile driver trips by trip purpose are set forth in Tables 319 and 320 respectively. An examination of these data does not reveal any significant differences between the alternative plans.

A comparison of the distribution of total vehicle trips in the Region by vehicle class for each of the final regional transportation plan alternatives is set forth in Table 321. No significant differences in the number of external automobile and internal and external truck trips would be expected among the final alternative plans, and none appear in the data presented in this table.

Table 317

COMPARISON OF THE DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE URBANIZED AREAS OF THE REGION BY MODE OF TRAVEL: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Mode of Travel	Internal Person Trips Generated on an Average Weekday											
	Existing 1972		Estimated 2000—Alternative Plans									
			No Build		A		A'(25)		A'(50)		R	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Kenosha Urbanized Area												
Automobile Driver	208,500	66.7	256,500	63.3	248,800	62.8	248,800	62.8	248,800	62.8	248,800	62.8
Automobile Passenger	92,600	29.7	110,400	27.3	107,500	27.1	107,500	27.2	107,500	27.2	107,500	27.1
Transit Passenger	2,900	0.9	16,800	4.2	18,700	4.7	18,700	4.7	18,700	4.7	18,700	4.8
School Bus Passenger	8,300	2.7	21,200	5.2	21,200	5.4	21,200	5.3	21,200	5.3	21,200	5.3
Total	312,300	100.0	404,900	100.0	396,200	100.0	396,200	100.0	396,200	100.0	396,200	100.0
Milwaukee Urbanized Area												
Automobile Driver	2,061,700	64.2	2,677,400	67.5	2,440,300	63.7	2,367,900	61.8	2,440,700	63.7	2,343,500	6.1
Automobile Passenger	858,300	26.7	970,000	24.4	886,300	23.1	859,900	22.4	885,800	23.1	849,100	22.2
Transit Passenger	177,800	5.5	124,300	3.1	306,600	8.0	408,200	10.7	306,700	8.0	443,400	11.6
School Bus Passenger	116,900	3.6	197,400	5.0	197,400	5.2	197,400	5.1	197,400	5.2	197,400	5.1
Total	3,214,700	100.0	3,969,100	100.0	3,830,600	100.0	3,833,400	100.0	3,830,600	100.0	3,833,400	100.0
Racine Urbanized Area												
Automobile Driver	233,100	65.6	253,700	62.6	243,800	62.1	243,800	62.1	243,800	62.1	243,800	62.1
Automobile Passenger	105,100	29.6	111,700	27.5	107,800	27.4	107,800	27.4	107,800	27.4	107,800	27.4
Transit Passenger	3,100	0.9	19,400	4.8	20,700	5.3	20,700	5.3	20,700	5.3	20,700	5.3
School Bus Passenger	14,000	3.9	20,500	5.1	20,500	5.2	20,500	5.2	20,500	5.2	20,500	5.2
Total	355,300	100.0	405,300	100.0	392,800	100.0	392,800	100.0	392,800	100.0	392,800	100.0

Source: SEWRPC.

Table 318

COMPARISON OF THE DISTRIBUTION OF INTERNAL TRANSIT TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Trip Purpose Category	Internal Transit Trips Generated on an Average Weekday											
	Existing 1972		Estimated 2000—Alternative Plans									
			No Build		A		A'(25)		A'(50)		R	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Home-based Work	70,900	38.5	58,100	36.1	138,900	40.0	147,000	32.8	138,800	40.0	159,600	33.0
Home-based Shopping	18,800	10.2	15,900	9.9	43,600	12.6	66,900	14.9	43,800	12.6	73,800	15.3
Home-based Other	28,300	15.4	27,400	17.0	97,000	28.0	156,100	34.9	97,300	28.0	172,900	35.7
Nonhome-based	13,100	7.1	3,800	2.4	11,500	3.3	22,500	5.0	11,500	3.3	21,700	4.5
School	53,100	28.8	55,700	34.6	55,700	16.1	55,700	12.4	55,700	16.1	55,700	11.5
Total	184,200	100.0	160,900	100.0	346,700	100.0	448,200	100.0	347,100	100.0	483,700	100.0

Source: SEWRPC.

COMPARISON AND EVALUATION OF FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES

Overview

The most effective way to compare and evaluate the anticipated performance of regional transportation plan alternatives is to scale such plans against the standards supporting each agreed upon regional transportation system development objective. These objectives and standards are presented in full in Chapter II of this volume. The initial regional transportation plan alternatives were evaluated in terms of the extent to which they satisfied the objectives and standards, with the results presented in Chapter VI of this volume. In addition, the rank-based expected value method of plan evaluation was described in Chapter VI, together with the results of the application of that method to the initial set of regional transportation plan alternatives. In this chapter the summary results of scaling the final regional transporta-

Table 319

COMPARISON OF THE DISTRIBUTION OF AUTOMOBILE PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Trip Purpose Category	Internal Automobile Person Trips Generated on an Average Weekday											
	Existing 1972		Estimated 2000—Alternative Plans									
			No Build		A		A'(25)		A'(50)		R	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Home-based Work. . . .	984,600	24.0	1,337,800	24.6	1,222,100	24.0	1,214,600	24.3	1,222,800	24.0	1,203,100	24.2
Home-based Shopping .	654,800	16.0	847,300	15.6	803,400	15.7	780,100	15.6	803,200	15.7	773,800	15.6
Home-based Other . . .	1,504,300	36.6	1,975,900	36.4	1,845,000	36.2	1,786,900	35.7	1,845,700	36.2	1,772,100	35.6
Nonhome-based	766,700	18.7	1,030,300	18.9	985,900	19.3	976,000	19.5	987,000	19.3	978,000	19.7
School	192,200	4.7	243,400	4.5	243,400	4.8	243,400	4.9	243,400	4.8	243,400	4.9
Total	4,102,600	100.0	5,434,700	100.0	5,099,800	100.0	5,001,000	100.0	5,102,100	100.0	4,970,400	100.0

Source: SEWRPC.

Table 320

COMPARISON OF THE DISTRIBUTION OF INTERNAL AUTOMOBILE DRIVER TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Trip Purpose Category	Internal Automobile Driver Trips Generated on an Average Weekday											
	Existing 1972		Estimated 2000—Alternative Plans									
			No Build		A		A'(25)		A'(50)		R	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Home-based Work. . . .	848,800	29.2	1,188,900	29.8	1,092,900	29.2	1,086,800	29.6	1,093,200	29.2	1,076,100	29.5
Home-based Shopping .	444,500	15.4	598,000	15.0	569,400	15.2	552,900	15.0	569,200	15.2	548,600	15.0
Home-based Other . . .	976,300	33.8	1,331,400	33.4	1,245,600	33.2	1,203,700	32.8	1,245,100	33.2	1,193,500	32.7
Nonhome-based	555,700	19.3	780,400	19.6	748,600	20.0	740,800	20.2	748,600	20.0	740,800	20.3
School	67,400	2.3	90,000	2.2	90,000	2.4	90,000	2.4	90,000	2.4	90,000	2.5
Total	2,884,700	100.0	3,988,700	100.0	3,746,500	100.0	3,674,200	100.0	3,746,100	100.0	3,649,000	100.0

Source: SEWRPC.

tion plan alternatives against the objectives and standards and the summary results of applying the rank-based expected value method of plan evaluation are presented.

Objective No. 1—Effectively Serve Regional Land Use Pattern

The first transportation objective relates to the achievement of an integrated transportation system which through its location, capacity, and design will effectively serve the existing regional land use pattern and promote implementation of the recommended regional land use plan, meeting the anticipated travel demand generated by the existing and proposed land uses. This objective is supported by two specific standards, one relating to travel time and the other relating to accessibility.

Standard No. 1 indicates that the regional transportation system should provide service within each urbanized area of the Region so that all residents of each urbanized area are within specified overall travel times of employment opportunities, major retail and service centers, medical centers and clinics, regional parks, higher educational facilities, and scheduled air transport airports. Overall travel time is defined as the total door-to-door time of travel from origin to destination. The results of these analyses with respect to the arterial street and highway components of the final alternative regional transportation system plans are shown in Table 322, while similar results with respect to the transit components of the final alternative plans are set forth in Table 323.

As shown in Table 322, this particular transportation standard is almost fully met with respect to the automobile mode in each of the urbanized areas of the Region for all transportation plans and all land uses except the employment-related standard. The employment-related standard is met in the Racine and Kenosha urbanized areas, while in the Milwaukee urbanized area, this stan-

Table 321

COMPARISON OF THE DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Vehicle Class	Total Vehicle Trips Generated on an Average Weekday											
	Existing 1972		Estimated 2000—Alternative Plans									
			No Build		A		A'(25)		A'(50)		R	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Automobile												
Internal . . .	2,884,700	84.0	3,988,700	84.8	3,746,500	83.9	3,674,200	83.7	3,746,100	83.9	3,649,000	83.6
External[a] . .	100,800	2.9	153,000	3.3	159,300	3.6	159,300	3.6	159,300	3.6	159,300	3.6
Other[b]	34,200	1.0	40,400	0.9	40,400	0.9	40,400	0.9	40,400	0.9	40,400	0.9
Subtotal	3,019,600	87.9	4,182,100	89.0	3,946,200	88.4	3,873,900	88.2	3,945,800	88.4	3,848,700	88.1
Truck												
Internal . . .	383,600	11.2	472,600	10.1	472,600	10.6	472,600	10.8	472,600	10.6	472,600	10.9
External. . .	25,000	0.7	38,100	0.8	40,800	0.9	40,800	0.9	40,800	0.9	40,800	0.9
Other[b]	6,000	0.2	6,000	0.1	6,000	0.1	6,000	0.1	6,000	0.1	6,000	0.1
Subtotal	414,600	12.1	516,700	11.0	519,400	11.6	519,400	11.8	519,400	11.6	519,400	11.9
Total	3,434,200	100.0	4,698,800	100.0	4,465,600	100.0	4,393,300	100.0	4,465,200	100.0	4,368,100	100.0

[a] *Includes light trucks, i.e., those under 6,000 pounds gross weight.*

[b] *Includes vehicle trips made by persons residing in group quarters and by nonresidents of the Region.*

Source: SEWRPC.

dard is nearly fully met, ranging from about 94 percent of the population under the "no build" plan and Plan R to about 95 percent of the population under Plan A, A'(25), and A'(50). In general, it may be concluded that this travel time standard is met relatively well for the arterial street and highway system with respect to all of the final alternative plans considered.

The results are quite different, however, with respect to the transit component of the alternative transportation plans, as shown in Table 323. The standard is not fully met in any of the plans in any of the urbanized areas for any of the land use activities considered. This illustrates the difficulty of designing a transit system which is fully competitive with the automobile for a region having a generally diffused, relatively low-density population distribution and a highly dispersed pattern of major traffic generators including major employment centers. Table 323 indicates that in the Milwaukee urbanized area only about 2 percent of the population lived within 30 minutes overall transit travel time (door-to-door) of 40 percent of the urbanized area employment opportunities in 1972. Under the "no build" plan, this would increase to about 4 percent, while under Plans A, A'(25), A'(50), and R, this would increase significantly to about 50 percent. Thus, as between the four final plan alternatives that include transportation facility construction it may be concluded that all four meet this standard equally well.

Standard No. 2 indicates that the relative accessibility provided by the regional transportation system should be adjusted to the land use plan by providing areas in which development is to be induced a higher relative accessibility than that provided to areas which should be protected from urban development. In order to determine the relative accessibility of the various subareas within the Region under the conditions envisioned in the final regional transportation plan alternatives, combined accessibility indices were computed for all zones within the Region.[1] The combined accessibility index measures the ease with which any land use activity can be reached from any other land use activity within the Region, with the higher the index, the greater the accessibility. These combined indices were plotted as iso-accessibility lines for each of the five final alternative transportation plans (see Map 77).

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[1] *For an explanation of the accessibility index, see footnote 3, Chapter VI, page 338 of this volume.*

Table 322

COMPARISON OF URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO SELECTED SUBAREAS THROUGH TRAVEL ON ARTERIAL STREETS AND HIGHWAYS 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Urbanized Area	Urbanized Area Population		Urbanized Area Population Meeting Travel Time Standard on Arterial Streets and Highways (in hundreds)									
			Existing 1972		Proposed 2000							
					No Build		Plan A		Plans A'(25) and A'(50)		Plan R	
	Existing 1972	Proposed 2000	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Kenosha	890	1,333	--	--	--	--	--	--	--	--	--	--
Employment Related[a]	--	--	890	100.0	1,333	100.0	1,333	100.0	1,333	100.0	1,333	100.0
Major Retail Service[b]	--	--	--	--	1,191	89.3	1,300	97.5	1,300	97.5	1,310	98.3
Medical Facility[c]	--	--	890	100.0	1,333	100.0	1,333	100.0	1,333	100.0	1,333	100.0
Major Park[d]	--	--	890	100.0	1,333	100.0	1,333	100.0	1,333	100.0	1,333	100.0
Higher Education Facility[e]	--	--	890	100.0	1,333	100.0	1,333	100.0	1,333	100.0	1,333	100.0
Scheduled Air Transport Airport[f]	--	--	890	100.0	1,333	100.0	1,333	100.0	1,333	100.0	1,333	100.0
Milwaukee	12,796	14,721	--	--	--	--	--	--	--	--	--	--
Employment Related	--	--	12,333	96.4	13,760	93.5	13,920	94.6	13,920	94.6	13,801	93.8
Major Retail Service	--	--	12,976	100.0	14,721	100.0	14,721	100.0	14,721	100.0	14,721	100.0
Medical Facility	--	--	12,796	100.0	14,721	100.0	14,721	100.0	14,721	100.0	14,721	100.0
Major Park	--	--	12,796	100.0	14,721	100.0	14,721	100.0	14,721	100.0	14,721	100.0
Higher Education Facility	--	--	12,796	100.0	14,721	100.0	14,721	100.0	14,721	100.0	14,721	100.0
Scheduled Air Transport Airport	--	--	12,796	100.0	14,721	100.0	14,721	100.0	14,721	100.0	14,721	100.0
Racine	1,213	1,509	--	--	--	--	--	--	--	--	--	--
Employment Related	--	--	1,190	98.1	1,509	100.0	1,509	100.0	1,509	100.0	1,509	100.0
Major Retail Service	--	--	91	7.5	1,509	100.0	1,509	100.0	1,509	100.0	1,509	100.0
Medical Facility	--	--	1,213	100.0	1,509	100.0	1,509	100.0	1,509	100.0	1,509	100.0
Major Park	--	--	1,213	100.0	1,509	100.0	1,509	100.0	1,509	100.0	1,509	100.0
Higher Education Facility	--	--	1,213	100.0	1,509	100.0	1,509	100.0	1,509	100.0	1,509	100.0
Scheduled Air Transport Airport	--	--	1,213	100.0	1,509	100.0	1,509	100.0	1,509	100.0	1,509	100.0

[a] *Standard: 30 minutes overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes overall travel time of a major regional medical center and/or 30 minutes overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes overall travel time of a scheduled air transport airport.*

Source: SEWRPC.

From a comparison of the accessiblity indices identified on these maps, it can be seen that the rural areas of the Region generally have lower accessibility than the urbanized areas. The areas of highest relative accessibility within the Region under all final alternative plan conditions are located in the western part of Milwaukee County. From these locations of relatively high accessibility, accessibility levels decrease in irregular concentric circle fashion to the fringe areas of the Region, with certain exceptions of high relative accessibility in the Cities of Kenosha and Racine.

In order to quantify the total relative accessibility associated with each alternative, the combined accessibility indices for each traffic analysis zone within the Region were aggregated. This resulted in the "no build" plan having 148,050 x 10^6 units of accessibility; Plans A, A'(25), and A'(50) having 148,890 x 10^6 units of accessibility, and Plan R having 148,630 x 10^6 units of accessibility.

Objective No. 2—Minimize Costs and Energy Utilization

The second transportation objective relates to the achievement of a transportation system which is economical and efficient, satisfying all other objectives at the lowest possible cost. This objective is supported by four specific standards relating to transportation system costs and benefits, utilization of existing transportation facilities, and utilization of energy.

Table 323

COMPARISON OF URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO SELECTED SUBAREAS THROUGH TRAVEL ON TRANSIT 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Urbanized Area	Urbanized Area Population		Urbanized Area Population Meeting Travel Time Standard on Transit Systems (in hundreds)									
			Existing 1972		Proposed 2000							
					No Build		Plan A		Plans A'(25) and A'(50)		Plan R	
	Existing 1972	Proposed 2000	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Kenosha	890	1,333	--	--	--	--	--	--	--	--	--	--
Employment Related[a]	--	--	408	45.8	965	72.4	1,021	76.6	1,021	76.1	1,021	76.1
Major Retail Service[b]	--	--	--	--	--	--	--	--	--	--	--	--
Medical Facility[c]	--	--	709	79.6	838	62.9	863	64.7	863	64.7	863	64.7
Major Park[d]	--	--	201	22.6	253	19.0	253	19.0	253	19.0	253	19.0
Higher Education Facility[e]	--	--	341	38.3	734	55.1	745	55.9	745	55.9	745	55.9
Scheduled Air Transport Airport[f]	--	--	--	--	--	--	--	--	--	--	--	--
Milwaukee	12,796	14,721	--	--	--	--	--	--	--	--	--	--
Employment Related	--	--	233	1.8	562	3.8	7,367	50.0	7,135	48.5	7,120	48.4
Major Retail Service	--	--	2,796	21.8	884	6.0	8,418	57.2	8,372	56.9	8,438	57.3
Medical Facility	--	--	9,508	74.3	6,577	44.7	11,410	77.5	11,305	76.7	11,375	77.2
Major Park	--	--	7,998	62.5	5,906	40.1	12,235	83.1	11,611	78.9	11,702	79.4
Higher Education Facility	--	--	11,555	90.3	8,218	55.8	12,151	82.5	12,131	82.4	12,138	82.4
Scheduled Air Transport Airport	--	--	2,565	20.0	1,886	12.8	8,666	58.9	8,966	60.9	8,152	55.4
Racine	1,213	1,509	--	--	--	--	--	--	--	--	--	--
Employment Related	--	--	239	20.0	941	62.4	1,061	70.3	1,061	70.3	1,061	70.3
Major Retail Service	--	--	--	--	--	--	--	--	--	--	--	--
Medical Facility	--	--	455	37.5	559	37.0	559	37.0	559	37.0	559	37.0
Major Park	--	--	262	21.6	248	16.4	482	31.9	482	31.9	482	31.9
Higher Education Facility	--	--	1,012	83.4	1,176	77.9	1,290	85.5	1,290	85.5	1,290	85.5
Scheduled Air Transport Airport	--	--	--	--	--	--	--	--	--	--	--	--

[a] *Standard: 30 minutes overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes overall travel time of a major regional medical center and/or 30 minutes overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes overall travel time of a vocational school, college, or university.*

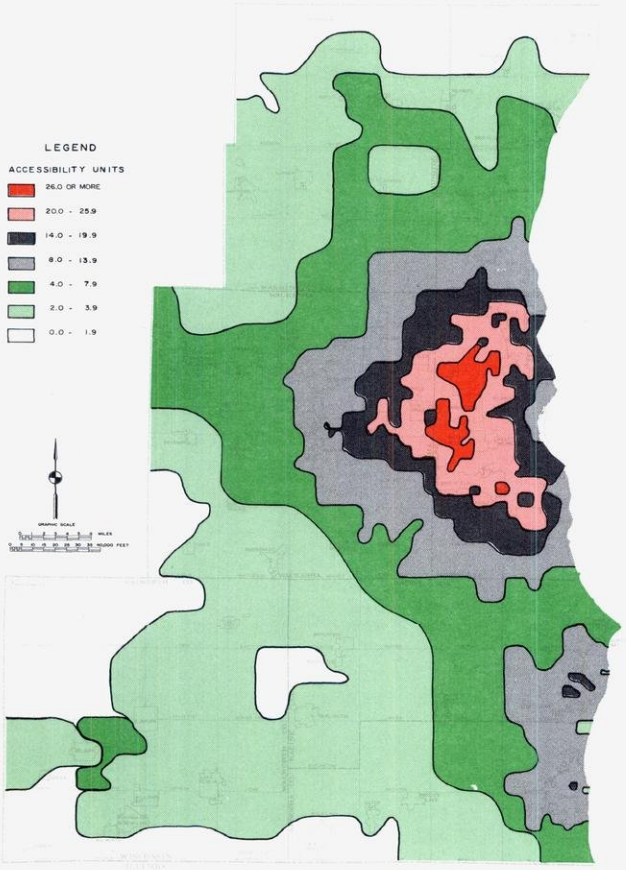
[f] *Standard: 60 minutes overall travel time of a scheduled air transport airport.*

Source: SEWRPC.

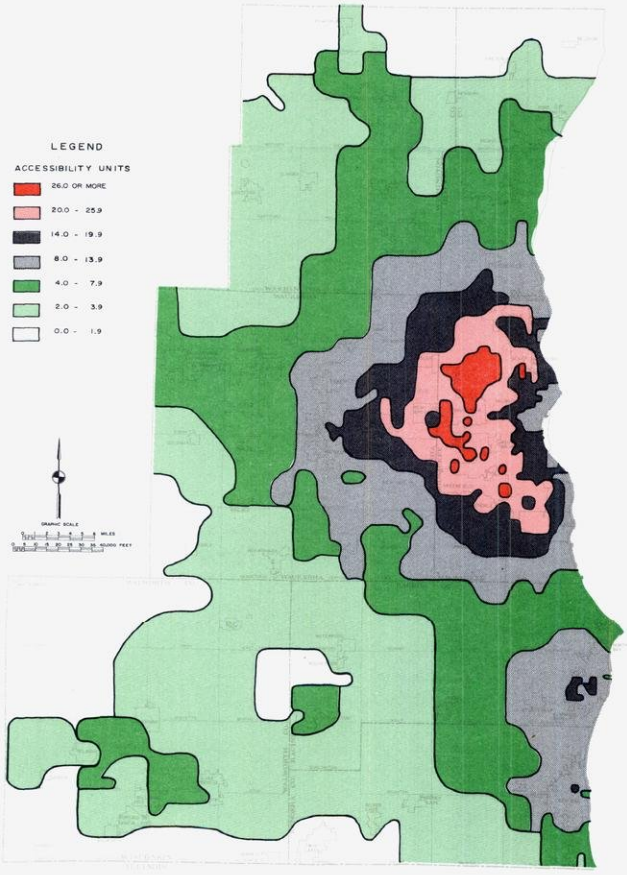
Standard No. 1 indicates that the sum of the transportation system operating and capital investment costs should be minimized. Accordingly, an analysis was made to determine the estimated total cost in constant 1975 dollars of implementing each alternative plan. Cost elements are identified in Table 324, and include the costs of construction and operation and maintenance of the arterial street and highway system; the nonarterial street system, excepting the initial cost of developing new local streets, which is recommended to be borne by the private sector; and the mass transit system; as well as user costs associated with the street and highway and transit systems. As shown in Table 324, the lowest cost plan is Plan A'(25), with an estimated total cost of $72.3 billion. Of this total, about $4.9 billion is required to construct, operate, and maintain the arterial street and highway system, the nonarterial street system, and the mass transit system, with the remaining $67.4 billion representing user costs associated with the street and highway and transit systems. Plans A and R would have total costs of about $72.8 billion each. In Plan A the total cost of constructing, operating, and maintaining the arterial street system, the nonarterial street system, and the mass transit system is estimated at nearly $5.0 billion, with total user costs at $67.8 billion. Under Plan A'(50), the estimated total cost of constructing, operating, and maintaining the arterial street system, the nonarterial system, and the mass transit system is estimated at about $4.9 billion, with total user costs at $67.8 billion. Under Plan R, the estimated total cost of

ACCESSIBILITY TO LAND USE ACTIVITY IN THE REGION: 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

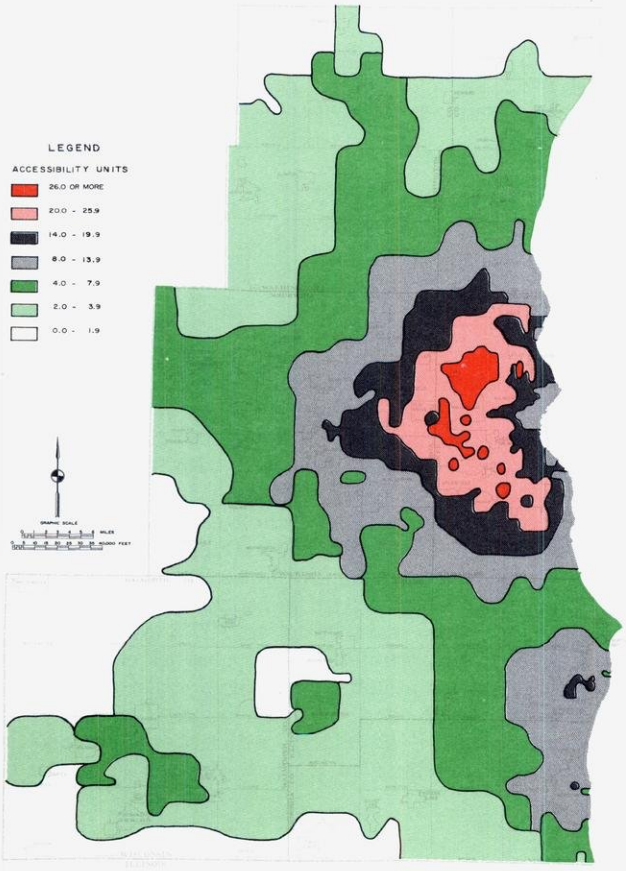
"NO BUILD" TRANSPORTATION PLAN



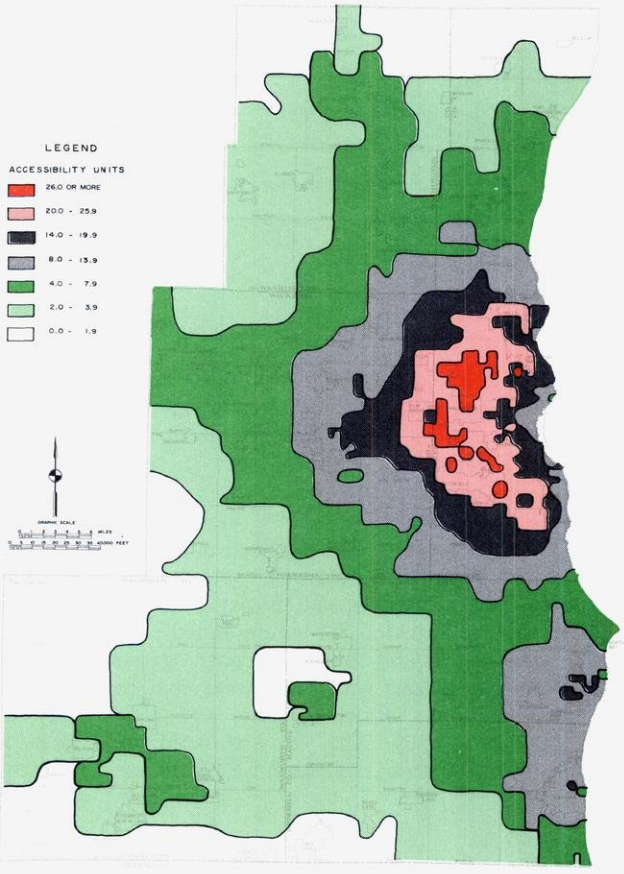
TRANSPORTATION PLAN A



TRANSPORTATION PLANS A'(25) AND A'(50)

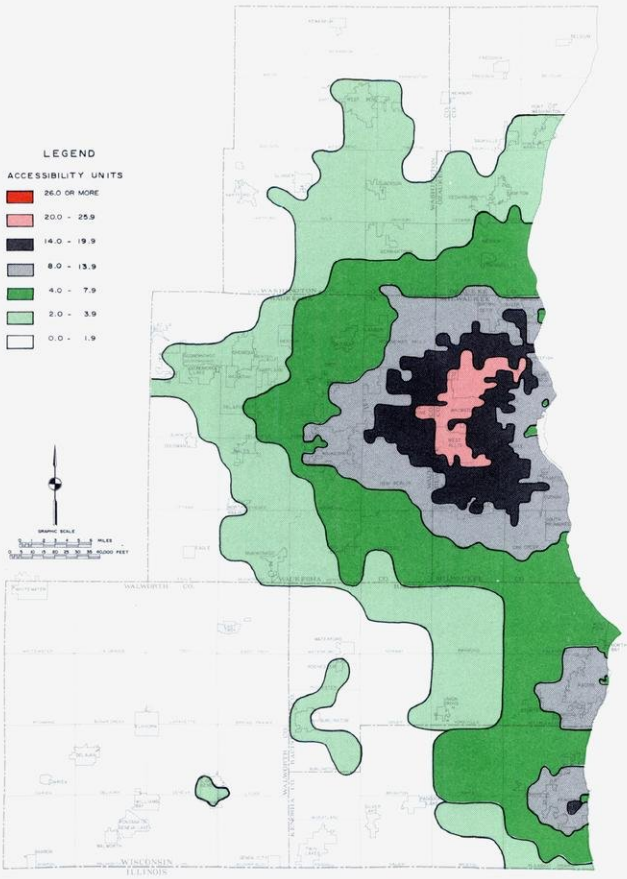


TRANSPORTATION PLAN R



Map 77 (continued)

EXISTING CONDITIONS—1972



Accessibility is an important determinant of land use development patterns. The series of five maps on these two facing pages illustrate the relative accessibility in the Region determined by location and intensity of land use and the level of transportation service providing the interconnection of the various land uses, under existing 1972 land use and transportation system conditions and under proposed future land use and transportation system development conditions as set forth in the "no build" alternative plan and alternative transportation Plans A, A'(25), A'(50), and R. Under both existing and alternative plan conditions, the areas of highest relative accessibility in the Region are located in western and northwestern Milwaukee County and eastern Waukesha County. From these locations the accessibility levels generally decrease in irregular concentric circle fashion to the fringe areas of the Region. A comparison of the "no build" plan with the four plans that involve construction of additional transportation facilities indicates relatively little change in accessibility. The changes in accessibility patterns under all future conditions as compared to 1972 conditions would be due largely to population and land use changes rather than to transportation system improvements.

Source: SEWRPC.

constructing, operating, and maintaining the arterial street system, the nonarterial system, and the mass transit system is $4.4 billion, with user costs estimated at $68.5 billion. The "no build" plan has a total estimated cost of $72.6 billion, with about $2.9 billion required to construct, operate, and maintain the arterial street and highway system, the nonarterial street system, and the mass transit system, and about $69.6 billion required as user costs. Additional, more-detailed cost estimates are provided in Tables 325, 326, 327, and 328.

The capital costs required to implement the final alternative regional transportation plans are identified in Table 329 by the three categories of system preservation, system improvement, and system expansion previously discussed in this chapter. As among the four final alternative plans that involve significant changes in the regional transportation system, Plan R, as expected, would require expenditure of the greatest amount of capital for preserving the existing transportation system, with about $739 million, or nearly 45 percent of the total to be expended, in that category. Another $718 million, or about 44 percent, falls into the system improvement category, with the remaining $191 million, or about 11 percent, in the system expansion category. Plans A, A'(25), and A'(50) involve significant transitway and/or freeway construction. System expansion expenditures are accordingly greater under those plans than under Plan R. About 31 percent of the total capital expenditures required to implement Plan A, or about $702 million, falls into the preservation category; about $792 million, or 34 percent, in the improvement category; and about $802 million, or about 35 percent, in the expansion category. Under Plan A'(25), about $703 million, or about 32 percent, would be expended on projects in the preservation category; about $735 million, or about 34 percent, in the improvement category; and about $758 million, or about 34 percent, in the expansion category. Comparable figures for Plan A'(50) are: $702 million, or 32 percent; $728 million, or 33 percent; and $750 million, or 35 percent.

An examination of the transportation system capital costs for the final plan alternatives set forth in Table 329 indicates that the most significant difference in costs between Plans A'(25) and A'(50) and Plan R occurs in the arterial streets and highways subcategory. The total cost of preserving, improving, and expanding the arterial street system under Plans A'(25) and A'(50) is estimated at about $1.99 billion, whereas such costs total about $1.45 billion under Plan R. Thus, the basic difference between these plans is about $500 million. Further examination of the data in Table 329 indicates that the capital costs for the transit components for Plans A'(25) and R are quite similar, with the additional cost for buses under Plan R more than offset by the additional costs for transit station construction under Plan A'(25).

The net difference of about $500 million in plan capital costs between Plans A'(25) and R is due almost entirely to the additional freeways to be constructed under Plan A'(25). Taken as a whole, these additional freeways have a cost approximating $600 million, whereas the cost

Table 324

TRANSPORTATION SYSTEM CAPITAL, OPERATION AND MAINTENANCE, AND USER COSTS IN THE REGION OVER THE PERIOD 1976-2000: FINAL TRANSPORTATION PLAN ALTERNATIVES

Cost Element	Alternative Transportation System Plans				
	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
System Element Costs					
Arterial Streets and Highways					
Construction	$ 780,197,900	$ 2,004,495,600	$ 1,993,099,500	$ 1,993,099,500	$ 1,450,126,000
Operation and Maintenance	442,068,800	499,078,800	498,907,500	498,907,500	488,604,400
Subtotal	1,222,266,700	2,503,574,400	2,492,007,000	2,492,007,000	1,938,730,400
Nonarterial Streets					
Construction	473,929,300	473,929,300	473,929,300	473,929,300	473,929,300
Operation and Maintenance	580,209,600	580,209,600	580,209,600	580,209,600	580,209,600
Subtotal	1,054,138,900	1,054,138,900	1,054,138,900	1,054,138,900	1,054,138,900
Mass Transit					
Construction	91,300,000	292,450,000	202,834,000	202,834,000	198,289,000
Operation and Maintenance	577,101,000	1,129,152,000	1,162,864,000	1,162,864,000	1,197,664,000
Subtotal	668,401,000	1,421,602,000	1,365,698,000	1,365,698,000	1,395,953,000
Total—System Element Costs	$ 2,944,806,600	$ 4,979,315,300	$ 4,911,843,900	$ 4,911,843,900	$ 4,388,822,300
User Costs					
Street and Highway					
Time	$38,800,473,000	$36,845,909,000	$36,374,889,000	$36,711,162,000	$36,754,160,000
Out-of-Pocket	23,408,888,000	22,722,757,000	22,397,574,000	22,633,753,000	22,353,258,000
Accident	5,026,670,000	4,573,498,000	4,567,990,000	4,653,140,000	4,941,380,000
Subtotal	67,236,031,000	64,142,164,000	63,340,453,000	64,058,055,000	64,048,798,000
Transit					
Time	2,394,697,000	3,621,736,000	4,029,444,000	3,726,578,000	4,371,132,000
Accident	15,351,000	31,257,000	34,846,000	31,115,000	35,396,000
Subtotal	2,410,048,000	3,652,993,000	4,064,290,000	3,757,693,000	4,406,528,000
Total—User Costs	$69,646,079,000	$67,795,157,000	$67,404,743,000	$67,815,748,000	$68,455,326,000
Total	$72,590,885,600	$72,774,472,300	$72,316,586,900	$72,727,591,000	$72,844,148,000

Source: SEWRPC.

of the substitute facilities for these freeways under Plan R approximates $85 million. Despite this significant aggregate difference, there are some cases where the costs of building a freeway or a surface arterial in the same corridor are quite similar. For example, the cost of completing the construction of the USH 45 freeway in Washington County under Plan A'(25) is estimated at about $15.5 million, with nearly all right-of-way and dislocation costs already having been incurred. The cost of constructing the replacement surface arterial on the new right-of-way under Plan R is estimated at about $14 million. Similarly, the cost in Plan A'(25) of converting USH 41 in Washington County to a freeway is estimated at about $19 million. This may be compared against the cost in Plan R of reconstructing USH 41 as an expressway of about $17 million. On the other hand, there are, as expected, also significant differences in the costs of freeways as proposed in Plan A'(25) and replacement surface facilities as proposed in Plan R. For example, in the Lake Freeway corridor in Milwaukee, Racine, and Kenosha Counties, the cost of constructing the freeway under Plan A'(25) is estimated at about $230 million. The costs of constructing the surface arterial improvements in this corridor under Plan R are estimated at about $22 million. In the Park Freeway-West corridor, the cost of constructing the freeway under Plan A'(25) is estimated at about $54 million, whereas the cost of constructing the surface arterial on the cleared right-of-way is estimated at about $3 million. Finally, in the Stadium Freeway-North corridor, there are no costs included in Plan R as compared to the cost of constructing this freeway in Plan A'(25) of about $125 million.

Table 325

TRANSPORTATION SYSTEM CAPITAL COSTS IN THE REGION OVER THE PERIOD 1976-2000
FINAL TRANSPORTATION PLAN ALTERNATIVES

Transportation System Improvement	Alternative Transportation System Plans				
	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Street and Highway System					
Right-of-Way					
Freeways	$ 3,239,000	$ 113,335,500	$ 113,335,500	$ 113,335,500	$ 4,139,000
Surface Arterials	--	62,501,700	55,238,700	55,238,700	62,675,600
Subtotal	3,239,000	176,037,200	168,574,200	168,574,200	66,814,600
Construction					
Freeways	42,960,000	568,708,000	568,708,000	568,708,000	73,560,000
Surface Arterials	455,144,300	1,057,095,800	1,053,162,700	1,053,162,700	1,105,929,800
Subtotal	499,804,300	1,625,803,800	1,621,870,700	1,621,870,700	1,179,489,800
Nonarterials	176,474,500	176,474,500	176,474,500	176,474,500	176,474,500
Subtotal	676,278,800	1,802,278,300	1,798,345,200	1,798,345,200	1,355,964,300
Resurfacing					
Arterials	278,854,600	202,654,600	202,654,600	202,654,600	203,821,600
Nonarterials	297,454,800	297,454,800	297,454,800	297,454,800	297,454,800
Subtotal	576,309,400	500,109,400	500,109,400	500,109,400	501,276,400
Subtotal—Arterial Streets and Highways	780,197,900	2,004,495,600	1,993,099,500	1,993,099,500	1,450,126,000
Subtotal—Nonarterial Streets and Highways	473,929,300	473,929,300	473,929,300	473,929,300	473,929,300
Total—Arterial and Nonarterial Streets and Highways	$1,254,127,200	$2,478,424,900	$2,467,028,800	$2,467,028,800	$1,924,055,300
Transit System					
Right-of-Way Acquisition	$ --	$15,017,000	$4,128,000	$ 3,078,000	$ 3,114,000
Construction					
Transitway	--	86,010,000	--	--	--
Exclusive Lanes	--	100,000	100,000	100,000	100,000
Stations and Terminals	800,000	21,302,000	17,050,000	14,889,000	11,022,000
Offices, Maintenance, and Storage Buildings	5,800,000	13,196,000	14,006,000	13,128,000	14,178,000
Subtotal	6,600,000	120,608,000	31,156,000	28,117,000	25,300,000
Operating Equipment					
Buses	83,700,000	153,825,000	164,550,000	152,775,000	166,875,000
Supervisory and Maintenance Vehicles, Shelters and Signs, Tools, and Spare Parts	1,000,000	3,000,000	3,000,000	3,000,000	3,000,000
Subtotal	84,700,000	156,825,000	167,550,000	155,775,000	169,875,000
Total—Transit System	91,300,000	292,450,000	202,834,000	186,970,000	198,289,000
Total—Transportation System	$1,345,427,200	$2,770,874,900	$2,669,862,800	$2,635,998,800	$2,122,344,300

Source: SEWRPC.

Standard No. 2 indicates that the direct benefits derived from transportation system improvements should exceed the direct costs of such improvements. Application of this standard permits a comparative analysis of both alternatives that include transportation system improvements with the "no build" alternative. The direct benefits derived from transportation system improvements include a reduction in the cost of travel time, of vehicle operation, and of accidents that are achieved through improvements to the transportation system. The direct costs of such improvements are the capital investments relating to the provision of improvements and the public agency costs of operating and maintaining the physical facilities used in providing the transportation services.

Table 326

TRANSIT SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION BY URBANIZED AREA OVER THE PERIOD 1976-2000: FINAL TRANSPORTATION PLAN ALTERNATIVES

Urbanized Area and Cost Item	Alternative Transportation System Plans				
	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Kenosha Urbanized Area					
Capital Cost	$ 2,850,000	$ 3,128,000	$ 3,128,000	$ 3,128,000	$ 3,128,000
Operation and Maintenance Cost	23,490,000	33,096,000	33,096,000	33,096,000	33,096,000
Average Annual Cost	1,054,000	1,449,000	1,449,000	1,449,000	1,449,000
Milwaukee Urbanized Area					
Capital Cost	86,275,000	285,677,000	196,061,000	180,197,000	191,516,000
Operation and Maintenance Cost	532,513,000	1,061,038,000	1,094,750,000	1,055,238,000	1,129,550,000
Average Annual Cost	24,752,000	53,869,000	51,632,000	49,217,000	52,843,000
Racine Urbanized Area					
Capital Cost	2,175,000	3,645,000	3,645,000	3,645,000	3,645,000
Operation and Maintenance Cost	21,098,000	35,018,000	35,018,000	35,018,000	35,018,000
Average Annual Cost	931,000	1,547,000	1,547,000	1,547,000	1,547,000
Southeastern Wisconsin Region					
Capital Cost	$ 91,300,000	$ 292,450,000	$ 202,834,000	$ 186,970,000	$ 198,289,000
Operation and Maintenance Cost	$577,101,000	$1,129,152,000	$1,162,864,000	$1,123,352,000	$1,197,664,000
Average Annual Cost	$ 26,736,000	$ 56,864,000	$ 54,628,000	$ 52,413,000	$ 55,838,000

Source: SEWRPC.

Accordingly, the total cost estimates prepared for Standard No. 1 and discussed above were supplemented by a benefit-cost analysis in order to evaluate the economic value of the transportation system plan proposals. In preparing the benefit-cost analysis, it should be noted that the benefits and costs were calculated as accruing over a period of time extending from 1976 through 2025 in order to bring the salvage value of each staged facility recommended in the plan to zero. It should also be noted that the benefit-cost ratios set forth in Table 330 apply to the aggregations of system improvements proposed in the alternative transportation plans, and do not imply that individual projects within an aggregation will have a similar benefit-cost ratio.

The method of conducting this economic analysis is described in Appendix H. The present worth values of the road user, construction, and operating and maintenance costs related to the final alternative transportation system plans are summarized in Table 330. Each alternative plan that includes improvements is compared against the "no build" plan to determine the benefits, represented by the reduction in user costs, and the increase in capital, operating, and maintenance costs associated with the planned improvements. In this analysis it can be seen that three of the four plans considered—Plan A, Plan A'(25), and Plan A'(50)—have benefits which exceed the additional costs, thus resulting in benefit-cost ratios greater than 1.00. Plan A'(25) has a benefit-cost ratio of 1.26, Plan A has a benefit-cost ratio of 1.09, and Plan A'(50) has a benefit-cost ratio of 1.07. Plan R has a benefit-cost ratio of 0.89. Of the four plans including significant transportation system improvements, then, Plan A'(25) meets this standard best, with Plan A second, Plan A'(50) third, and Plan R fourth.

Standard No. 3 indicates that full use should be made of all existing transportation facilities. This standard was used to constrain the plan design and test process. For example, in the computation of system capacity, on street parking was assumed to have been eliminated in the peak traffic direction during the peak traffic demand hours on all arterial streets in order to minimize the need for the additional capital investment required to reconstruct existing or build new arterial facilities. By design, Plans A'(25), A'(50), and R are deemed to have met this standard somewhat better than Plan A because of the proposed use of extensive ramp metering to reduce traffic flow on the freeway system. This enables the provision of primary transit service on the freeway system and avoids the construction of exclusive transitways as in Plan A. The results of this assumption indicate that Plans A'(25), A'(50), and R tend to make better utilization of existing available arterial street and highway capacity through redirection of freeway traffic to paralleling arterial facilities in major travel corridors. No significant increases in arterial traffic congestion are indicated by the traffic simulation studies between Plans A'(25), A'(50), and R, on the one hand and Plan A on the other, thus indicating that the proposed ramp metering included in these two

Table 327

ARTERIAL STREET AND HIGHWAY SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION BY COUNTY OVER THE PERIOD 1976-2000: FINAL TRANSPORTATION PLAN ALTERNATIVES

County and Cost Item	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Kenosha County				
Capital Cost				
Arterial	$ 49,107,500	$ 176,036,500	$ 176,036,500	$ 129,131,100
Nonarterial	5,879,900	5,879,900	5,879,900	5,879,900
Operation and Maintenance Cost				
Arterial	26,283,800	32,016,300	32,016,300	31,792,500
Nonarterial	42,993,400	42,993,400	42,993,400	42,993,400
Resurfacing Cost				
Arterial	19,768,100	13,758,700	13,758,700	13,664,500
Nonarterial	39,830,900	39,830,900	39,830,900	39,830,900
Total	$ 183,863,600	$ 310,515,700	$ 310,515,700	$ 263,292,300
Average Annual Cost	$ 7,354,500	$ 12,420,600	$ 12,420,600	$ 10,531,700
Milwaukee County				
Capital Cost				
Arterial	$ 104,547,300	$ 812,591,800	$ 801,195,700	$ 382,280,900
Nonarterial	92,938,600	92,938,600	92,938,600	92,938,600
Operation and Maintenance Cost				
Arterial	241,396,300	262,013,800	261,842,500	254,738,100
Nonarterial	290,528,800	290,528,800	290,528,800	290,528,800
Resurfacing Cost				
Arterial	123,722,300	92,553,300	92,553,300	92,447,200
Nonarterial	115,068,600	115,068,600	115,068,600	115,068,600
Total	$ 968,201,900	$1,665,694,900	$1,654,127,500	$1,228,002,200
Average Annual Cost	$ 38,728,100	$ 66,627,800	$ 66,165,100	$ 49,120,100
Ozaukee County				
Capital Cost				
Arterial	$ 26,949,600	$ 63,120,000	$ 63,120,000	$ 63,120,000
Nonarterial	11,265,500	11,265,500	11,265,500	11,265,500
Operation and Maintenance Cost				
Arterial	20,300,000	22,657,500	22,657,500	22,657,500
Nonarterial	28,251,200	28,251,200	28,251,200	28,251,200
Resurfacing Cost				
Arterial	18,012,900	15,027,600	15,027,600	15,027,600
Nonarterial	26,095,500	26,095,500	26,095,500	26,095,500
Total	$ 130,874,700	$ 166,417,300	$ 166,417,300	$ 166,417,300
Average Annual Cost	$ 5,235,000	$ 6,656,700	$ 6,656,700	$ 6,656,700
Racine County				
Capital Cost				
Arterial	$ 75,360,300	$ 211,154,900	$ 211,154,900	$ 163,709,900
Nonarterial	23,706,100	23,706,100	23,706,100	23,706,100
Operation and Maintenance Cost				
Arterial	32,978,800	41,305,000	41,305,000	38,910,000
Nonarterial	48,013,100	48,013,100	48,013,100	48,013,100
Resurfacing Cost				
Arterial	20,881,000	13,074,100	13,074,100	12,969,100
Nonarterial	25,133,200	25,133,200	25,133,200	25,133,200
Total	$ 226,072,500	$ 362,386,400	$ 362,386,400	$ 312,441,400
Average Annual Cost	$ 9,042,900	$ 14,495,400	$ 14,495,400	$ 12,497,600

Table 327 (continued)

County and Cost Item	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Walworth County				
Capital Cost				
Arterial	$ 48,716,300	$ 96,949,100	$ 96,949,100	$ 90,467,900
Nonarterial	10,054,000	10,054,000	10,054,000	10,054,000
Operation and Maintenance Cost				
Arterial	29,707,500	32,467,500	32,467,500	32,106,300
Nonarterial	36,023,100	36,023,100	36,023,100	36,023,100
Resurfacing Cost				
Arterial	27,110,100	21,327,900	21,327,900	20,498,800
Nonarterial	19,161,500	19,161,500	19,161,500	19,161,500
Total	$ 170,772,500	$ 215,983,100	$ 215,983,100	$ 208,311,600
Average Annual Cost	$ 6,830,900	$ 8,639,300	$ 8,639,300	$ 8,332,500
Washington County				
Capital Cost				
Arterial	$ 57,966,100	$ 137,542,900	$ 137,542,900	$ 117,406,900
Nonarterial	9,534,600	9,534,600	9,534,600	9,534,600
Operation and Maintenance Cost				
Arterial	27,318,700	32,675,000	32,675,000	32,541,300
Nonarterial	34,379,600	34,379,600	34,379,600	34,379,600
Resurfacing Cost				
Arterial	22,877,500	17,214,800	17,214,800	19,525,600
Nonarterial	15,864,900	15,864,900	15,864,900	15,864,900
Total	$ 167,941,400	$ 247,211,800	$ 247,211,800	$ 229,252,900
Average Annual Cost	$ 6,717,600	$ 9,888,500	$ 9,888,500	$ 9,170,100
Waukesha County				
Capital Cost				
Arterial	$ 138,696,200	$ 304,445,800	$ 304,445,800	$ 300,187,700
Nonarterial	23,095,800	23,095,800	23,095,800	23,095,800
Operation and Maintenance Cost				
Arterial	64,083,700	75,943,700	75,943,700	75,858,700
Nonarterial	100,020,400	100,020,400	100,020,400	100,020,400
Resurfacing Cost				
Arterial	46,482,700	29,698,200	29,698,200	29,688,800
Nonarterial	56,300,200	56,300,200	56,300,200	56,300,200
Total	$ 428,679,000	$ 589,504,100	$ 589,504,100	$ 585,151,600
Average Annual Cost	$ 17,147,200	$ 23,580,200	$ 23,580,200	$ 23,406,100
Southeastern Wisconsin Region				
Capital Cost				
Arterial	$ 501,343,300	$1,801,841,000	$1,790,444,900	$1,246,304,400
Nonarterial	176,474,500	176,474,500	176,474,500	176,474,500
Operation and Maintenance Cost				
Arterial	442,068,800	499,078,800	498,907,500	488,604,400
Nonarterial	580,209,600	580,209,600	580,209,600	580,209,600
Resurfacing Cost				
Arterial	278,854,600	202,654,600	202,654,600	203,821,600
Nonarterial	297,454,800	297,454,800	297,454,800	297,454,800
Total	$2,276,405,600	$3,557,713,300	$3,546,145,900	$2,992,869,300
Average Annual Cost	$ 91,056,200	$ 142,308,500	$ 141,845,800	$ 119,714,800

Source: SEWRPC.

Table 328

DETAILED COST ESTIMATES OF STREET AND HIGHWAY CONSTRUCTION AND MAINTENANCE FINAL TRANSPORTATION PLAN ALTERNATIVES

Kenosha County

Cost Element	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Right-of-Way				
Standard Arterial				
Rural	$ --	$ 5,802,800	$ 5,802,800	$ 7,463,000
Urban Acquisition	--	3,330,600	3,330,600	3,330,600
Urban Relocation	--	194,400	194,400	194,400
Subtotal	$ --	$ 9,327,800	$ 9,327,800	$ 10,988,000
Freeway				
Acquisition	--	5,010,000	5,010,000	--
Relocation	--	289,800	289,800	--
Subtotal	$ --	$ 5,299,800	$ 5,299,800	$ --
Total	$ --	$ 14,627,600	$ 14,627,600	$ 10,988,000
Number of Families Relocated				
Arterials	--	17	17	20
Freeways	--	34	34	--
Number of Businesses Relocated				
Arterials	--	4	4	9
Freeways	--	1	1	--
Road Construction				
Arterial				
Standard	$ 49,107,500	$ 109,408,900	$ 109,408,900	$ 118,143,100
Freeway	--	52,000,000	52,000,000	--
Subtotal	$ 49,107,500	$ 161,408,900	$ 161,408,900	$ 118,143,100
Nonarterial	5,879,900	5,879,900	5,879,900	5,879,900
Total	$ 54,987,400	$ 167,288,800	$ 167,288,800	$ 124,023,000
Resurfacing				
Arterial	$ 19,768,100	$ 13,758,700	$ 13,758,700	$ 13,664,500
Nonarterial	39,830,900	39,830,900	39,830,900	39,830,900
Total	$ 59,599,000	$ 53,589,600	$ 53,589,600	$ 53,495,400
Road Maintenance				
Arterial	$ 26,283,800	$ 32,016,300	$ 32,016,300	$ 31,792,500
Nonarterial	42,993,400	42,993,400	42,993,400	42,993,400
Total	$ 69,277,200	$ 75,009,700	$ 75,009,700	$ 74,785,900
Year 2000 Annual				
Arterial	$ 1,076,000	$ 1,534,600	$ 1,534,600	$ 1,516,700
Nonarterial	1,943,200	1,943,200	1,943,200	1,943,200
Total Cost	$ 183,863,600	$ 310,515,700	$ 310,515,700	$ 263,292,300

Table 328 (continued)

Milwaukee County

Cost Element	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Right-of-Way				
Standard Arterial				
Rural	$ --	$ --	$ --	$ --
Urban Acquisition	--	10,014,700	4,050,100	4,050,100
Urban Relocation	--	1,540,800	242,400	242,400
Subtotal	$ --	$ 11,555,500	$ 4,292,500	$ 4,292,500
Freeway				
Acquisition	$ 3,064,000	$ 88,080,000	$ 88,080,000	$ 3,514,000
Relocation	75,000	10,605,500	10,605,500	125,000
Subtotal	$ 3,139,000	$ 98,685,500	$ 98,685,500	$ 3,639,000
Total	$ 3,139,000	$ 110,441,000	$ 102,978,000	$ 7,931,500
Number of Families Relocated				
Arterials	--	144	11	11
Freeways	9	1,656	1,656	16
Number of Businesses Relocated				
Arterials	--	20	3	3
Freeways	4	137	137	4
Road Construction				
Arterial				
Standard	$ 81,948,300	$ 330,442,800	$ 326,509,700	$ 331,039,400
Freeway	19,460,000	371,708,000	371,708,000	43,310,000
Subtotal	$ 101,408,300	$ 702,150,800	$ 698,217,700	$ 374,349,400
Nonarterial	$ 92,938,600	$ 92,938,600	$ 92,938,600	$ 92,938,600
Total	$ 194,346,900	$ 795,089,400	$ 791,156,300	$ 467,288,000
Resurfacing				
Arterial	$ 123,722,300	$ 92,553,300	$ 92,553,300	$ 92,447,200
Nonarterial	115,068,600	115,068,600	115,068,600	115,068,600
Total	$ 238,790,900	$ 207,621,900	$ 207,621,900	$ 207,515,800
Road Maintenance				
Arterial	$ 241,396,300	$ 262,013,800	$ 261,842,500	$ 254,738,100
Nonarterial	290,528,800	290,528,800	290,528,800	290,528,800
Total	$ 531,925,100	$ 552,542,600	$ 552,371,300	$ 545,266,900
Year 2000 Annual				
Arterial	$ 9,835,600	$ 11,485,000	$ 11,471,300	$ 10,902,950
Nonarterial	12,387,000	12,387,000	12,387,000	12,387,000
Total Cost	$ 968,201,900	$1,665,694,900	$1,654,127,500	$1,228,002,200

Table 328 (continued)

Ozaukee County

Cost Element	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Right-of-Way				
Standard Arterial				
Rural	$ --	$ 1,280,700	$ 1,280,700	$ 1,280,700
Urban Acquisition	--	3,075,000	3,075,000	3,075,000
Urban Relocation	--	249,600	249,600	249,600
Subtotal	$ --	$ 4,605,300	$ 4,605,300	$ 4,605,300
Freeway				
Acquisition	--	--	--	--
Relocation	--	--	--	--
Subtotal	$ --	$ --	$ --	$ --
Total	$ --	$ 4,605,300	$ 4,605,300	$ 4,605,300
Number of Families Relocated				
Arterials	--	16	16	16
Freeways	--	--	--	--
Number of Businesses Relocated				
Arterials	--	5	5	5
Freeways	--	--	--	--
Road Construction				
Arterial				
Standard	$ 26,949,600	$ 58,014,700	$ 58,014,700	$ 58,014,700
Freeway	--	500,000	500,000	500,000
Subtotal	$ 26,949,600	$ 58,514,700	$ 58,514,700	$ 58,514,700
Nonarterial	11,265,500	11,265,500	11,265,500	11,265,500
Total	$ 38,215,100	$ 69,780,200	$ 69,780,200	$ 69,780,200
Resurfacing				
Arterial	$ 18,012,900	$ 15,027,600	$ 15,027,600	$ 15,027,600
Nonarterial	26,095,500	26,095,500	26,095,500	26,095,500
Total	$ 44,108,400	$ 41,123,100	$ 41,123,100	$ 41,123,100
Road Maintenance				
Arterial	$ 20,300,000	$ 22,657,500	$ 22,657,500	$ 22,657,500
Nonarterial	28,251,200	28,251,200	28,251,200	28,251,200
Total	$ 48,551,200	$ 50,908,700	$ 50,908,700	$ 50,908,700
Year 2000 Annual				
Arterial	$ 825,500	$ 1,014,100	$ 1,014,100	$ 1,014,100
Nonarterial	1,358,900	1,358,900	1,358,900	1,358,900
Total Cost	$ 130,874,700	$ 166,417,300	$ 166,417,300	$ 166,417,300

Table 328 (continued)

Racine County

Cost Element	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Right-of-Way				
Standard Arterial				
Rural	$ --	$ 4,966,600	$ 4,966,600	$ 6,625,000
Urban Acquisition	--	4,442,700	4,442,700	4,442,700
Urban Relocation	--	429,600	429,600	429,600
Subtotal	$ --	$ 9,838,900	$ 9,838,900	$ 11,497,300
Freeway				
Acquisition	--	$ 5,010,000	$ 5,010,000	$ --
Relocation	--	840,200	840,200	--
Subtotal	$ --	$ 5,850,200	$ 5,850,200	$ --
Total	$ --	$ 15,689,100	$ 15,689,100	$ 11,497,300
Number of Families Relocated				
Arterials	--	39	39	46
Freeways	--	72	72	--
Number of Businesses Relocated				
Arterials	--	9	9	13
Freeways	--	7	7	--
Road Construction				
Arterial				
Standard	$ 75,360,300	$ 143,465,800	$ 143,465,800	$ 152,212,600
Freeway	--	52,000,000	52,000,000	--
Subtotal	$ 75,360,300	$ 195,465,800	$ 195,465,800	$ 152,212,600
Nonarterial	23,706,100	23,706,100	23,706,100	23,706,100
Total	$ 99,066,400	$ 219,171,900	$ 219,171,900	$ 175,918,700
Resurfacing				
Arterial	$ 20,881,000	$ 13,074,100	$ 13,074,100	$ 12,969,100
Nonarterial	25,133,200	25,133,200	25,133,200	25,133,200
Total	$ 46,014,200	$ 38,207,300	$ 38,207,300	$ 38,102,300
Road Maintenance				
Arterial	$ 32,978,800	$ 41,305,000	$ 41,305,000	$ 38,910,000
Nonarterial	48,013,100	48,013,100	48,013,100	48,013,100
Total	$ 80,991,900	$ 89,318,100	$ 89,318,100	$ 86,923,100
Year 2000 Annual				
Arterial	1,329,200	1,995,300	1,995,300	1,803,700
Nonarterial	2,110,400	2,110,400	2,110,400	2,110,400
Total Cost	$ 226,072,500	$ 362,386,400	$ 362,386,400	$ 312,441,400

Table 328 (continued)

Walworth County

Cost Element	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Right-of-Way				
Standard Arterial				
Rural	$ --	$ 3,526,000	$ 3,526,000	$ 6,658,800
Urban Acquisition	--	964,400	964,400	964,400
Urban Relocation	--	7,200	7,200	7,200
Subtotal	$ --	$ 4,497,600	$ 4,497,600	$ 7,630,400
Freeway				
Acquisition	--	1,100,000	1,100,000	--
Relocation	--	100,000	100,000	--
Subtotal	$ --	$ 1,200,000	$ 1,200,000	$ --
Total	$ --	$ 5,697,600	$ 5,697,600	$ 7,630,400
Number of Families Relocated				
Arterials	--	1	1	11
Freeways	--	2	2	--
Number of Businesses Relocated				
Arterials	--	--	--	10
Freeways	--	2	2	--
Road Construction				
Arterial				
Standard	$ 48,716,300	$ 70,251,500	$ 70,251,500	$ 82,837,500
Freeway	--	21,000,000	21,000,000	--
Subtotal	$ 48,716,300	$ 91,251,500	$ 91,251,500	$ 82,837,500
Nonarterial	10,054,000	10,054,000	10,054,000	10,054,000
Total	$ 58,770,300	$ 101,305,500	$ 101,305,500	$ 92,891,500
Resurfacing				
Arterial	$ 27,110,100	$ 21,327,900	$ 21,327,900	$ 20,498,800
Nonarterial	19,161,500	19,161,500	19,161,500	19,161,500
Total	$ 46,271,600	$ 40,489,400	$ 40,489,400	$ 39,660,300
Road Maintenance				
Arterial	$ 29,707,500	$ 32,467,500	$ 32,467,500	$ 32,106,300
Nonarterial	36,023,100	36,023,100	36,023,100	36,023,100
Total	$ 65,730,600	$ 68,490,600	$ 68,490,600	$ 68,129,400
Year 2000 Annual				
Arterial	!,208,100	1,428,900	1,428,900	1,400,000
Nonarterial	1,580,900	1,580,900	1,580,900	1,580,900
Total Cost	$ 170,772,500	$ 215,983,100	$ 215,983,100	$ 208,311,600

Table 328 (continued)

Washington County

Cost Element	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Right-of-Way				
Standard Arterial				
Rural	$ --	$ 3,624,700	$ 3,624,700	$ 3,875,200
Urban Acquisition	--	3,807,400	3,807,400	3,807,400
Urban Relocation	--	148,800	148,800	148,800
Subtotal	$ --	$ 7,580,900	$ 7,580,900	$ 7,831,400
Freeway				
Acquisition	--	725,000	725,000	--
Relocation	--	175,000	175,000	--
Subtotal	$ --	$ 900,000	$ 900,000	$ --
Total	$ --	$ 8,480,900	$ 8,480,900	$ 7,831,400
Number of Families Relocated				
Arterials	--	4	4	11
Freeways	--	8	8	--
Number of Businesses Relocated				
Arterials	--	5	5	10
Freeways	--	7	7	--
Road Construction				
Arterial				
Standard	$ 57,966,100	$ 95,162,000	$ 95,162,000	$ 109,575,500
Freeway	--	33,900,000	33,900,000	--
Subtotal	$ 57,966,100	$ 129,062,000	$ 129,062,000	$ 109,575,500
Nonarterial	9,534,600	9,534,600	9,534,600	9,534,600
Total	$ 67,500,700	$ 138,596,600	$ 138,596,600	$ 119,110,100
Resurfacing				
Arterial	$ 22,877,500	$ 17,214,800	$ 17,214,800	$ 19,525,600
Nonarterial	15,864,900	15,864,900	15,864,900	15,864,900
Total	$ 38,742,400	$ 33,079,700	$ 33,079,700	$ 35,390,500
Road Maintenance				
Arterial	$ 27,318,700	$ 32,675,000	$ 32,675,000	$ 32,541,300
Nonarterial	34,379,600	34,379,600	34,379,600	34,379,600
Total	$ 61,598,300	$ 67,054,600	$ 67,054,600	$ 66,920,900
Year 2000 Annual				
Arterial	1,112,100	1,540,600	1,540,600	1,529,900
Nonarterial	1,773,100	1,773,100	1,773,100	1,773,100
Total Cost	$ 167,941,400	$ 247,211,800	$ 247,211,800	$ 229,252,900

Table 328 (continued)

Waukesha County

Cost Element	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Right-of-Way				
Standard Arterial				
Rural	$ --	$ 7,824,000	$ 7,824,000	$ 8,559,000
Urban Acquisition	--	6,812,100	6,812,100	6,812,100
Urban Relocation	--	459,600	459,600	459,600
Subtotal	$ --	$ 15,095,700	$ 15,095,700	$ 15,830,700
Freeway				
Acquisition	100,000	1,300,000	1,300,000	470,000
Relocation	--	100,000	100,000	30,000
Subtotal	$ 100,000	$ 1,400,000	$ 1,400,000	$ 500,000
Total	$ 100,000	$ 16,495,700	$ 16,495,700	$ 16,330,700
Number of Families Relocated				
Arterials	--	58	58	58
Freeways	--	18	18	4
Number of Businesses Relocated				
Arterials	--	2	2	2
Freeways	--	8	8	3
Road Construction				
Arterial				
Standard	$ 115,096,200	$ 250,350,100	$ 250,350,100	$ 254,107,000
Freeway	23,500,000	37,600,000	37,600,000	29,750,000
Subtotal	$ 138,596,200	$ 287,950,100	$ 287,950,100	$ 283,857,000
Nonarterial	23,095,800	23,095,800	23,095,800	23,095,800
Total	$ 161,692,000	$ 311,045,900	$ 311,045,900	$ 306,952,800
Resurfacing				
Arterial	$ 46,482,700	$ 29,698,200	$ 29,698,200	$ 29,688,800
Nonarterial	56,300,200	56,300,200	56,300,200	56,300,200
Total	$ 102,782,900	$ 85,998,400	$ 85,998,400	$ 85,989,000
Road Maintenance				
Arterial	$ 64,083,700	$ 75,943,700	$ 75,943,700	$ 75,858,700
Nonarterial	100,020,400	100,020,400	100,020,400	100,020,400
Total	$ 164,104,100	$ 175,964,100	$ 175,964,100	$ 175,879,100
Year 2000 Annual				
Arterial	2,607,000	3,555,800	3,555,800	3,549,000
Nonarterial	4,806,100	4,806,100	4,806,100	4,806,100
Total Cost	$ 428,679,000	$ 589,504,100	$ 589,504,100	$ 585,151,600

Table 328 (continued)

Southeastern Wisconsin Region

Cost Element	Alternative Transportation System Plans			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Right-of-Way				
Standard Arterial				
Rural	$ --	$ 27,024,800	$ 27,024,800	$ 34,461,700
Urban Acquisition	--	32,446,900	26,482,300	26,482,300
Urban Relocation	--	3,030,000	1,731,600	1,731,600
Subtotal	$ --	$ 62,501,700	$ 55,238,700	$ 62,675,600
Freeway				
Acquisition	3,164,000	101,225,000	101,225,000	3,984,000
Relocation	75,000	12,110,500	12,110,500	155,000
Subtotal	$ 3,239,000	$ 113,335,500	$ 113,335,500	$ 4,139,000
Total	$ 3,239,000	$ 176,037,200	$ 168,574,200	$ 66,814,600
Number of Families Relocated				
Arterials	--	279	146	173
Freeways	9	1,790	1,790	20
Number of Businesses Relocated				
Arterials	--	45	28	52
Freeways	4	162	162	7
Road Construction				
Arterial				
Standard	$ 455,144,300	$1,057,095,800	$1,053,162,700	$1,105,929,800
Freeway	42,960,000	568,708,000	568,708,000	73,560,000
Subtotal	$ 498,104,300	$1,625,803,800	$1,621,870,700	$1,179,489,800
Nonarterial	$ 176,474,500	$ 176,474,500	$ 176,474,500	$ 176,474,500
Total	$ 674,578,800	$1,802,278,300	$1,798,345,200	$1,355,964,300
Resurfacing				
Arterial	$ 278,854,600	$ 202,654,600	$ 202,654,600	$ 203,821,600
Nonarterial	297,454,800	297,454,800	297,454,800	297,454,800
Total	$ 576,309,400	$ 500,109,400	$ 500,109,400	$ 501,276,400
Road Maintenance				
Arterial	$ 442,068,800	$ 499,078,800	$ 498,907,500	$ 488,604,400
Nonarterial	580,209,600	580,209,600	580,209,600	580,209,600
Total	$1,022,278,400	$1,079,288,400	$1,079,117,100	$1,068,814,000
Year 2000 Annual				
Arterial	17,993,500	22,554,300	22,540,600	21,716,350
Nonarterial	25,959,600	25,959,600	25,959,600	25,959,600
Total Cost	$2,276,405,600	$3,557,713,300	$3,546,145,900	$2,992,869,300

Source: SEWRPC.

Table 329

COMPARISON OF FINAL ALTERNATIVE TRANSPORTATION PLAN CAPITAL COSTS BY CATEGORY OF CAPITAL IMPROVEMENT: 1976-2000

Capital Cost Category	Final Alternative Transportation Plan									
	No Build		A		A'(25)		A'(50)		R	
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
Arterial Street and Highway System										
Preservation. . . .	$687,360,000	88.1	$ 603,666,000	30.1	$ 603,666,000	30.3	$ 603,666,000	30.3	$ 635,766,000	43.9
Improvement. . .	68,909,000	8.8	719,857,000	35.9	711,936,000	35.7	711,936,000	35.7	692,025,000	47.7
Expansion.	23,928,000	3.1	680,974,000	34.0	677,498,000	34.0	677,498,000	34.0	122,335,000	8.4
Subtotal	$780,197,000	100.0	$2,004,497,000	100.0	$1,993,100,000	100.0	$1,993,100,000	100.0	$1,450,126,000	100.0
Transit System										
Preservation. . . .	$ 91,300,000	100.0	$ 98,797,000	33.8	$ 99,572,000	49.1	$ 98,198,000	52.5	$ 103,495,000	52.2
Improvement. . .	--	--	72,278,000	24.7	22,967,000	11.3	16,450,000	8.8	26,214,000	13.2
Expansion.	--	--	121,375,000	41.5	80,295,000	39.6	72,322,000	38.7	68,580,000	34.6
Subtotal	$ 91,300,000	100.0	$ 292,450,000	100.0	$ 202,834,000	100.0	$ 186,970,000	100.0	$ 198,289,000	100.0
Total Transportation System										
Preservation. . . .	$778,660,000	89.4	$ 702,463,000	30.6	$ 703,238,000	32.0	$ 701,864,000	32.2	$ 739,261,000	44.8
Improvement. . .	68,909,000	7.9	792,135,000	34.5	734,903,000	33.5	728,386,000	33.4	718,239,000	43.6
Expansion.	23,928,000	2.7	802,349,000	34.9	757,793,000	34.5	749,820,000	34.4	190,915,000	11.6
Total	$871,497,000	100.0	$2,296,947,000	100.0	$2,195,934,000	100.0	$2,180,070,000	100.0	$1,648,415,000	100.0

Source: SEWRPC.

Table 330

COMPARISON OF USER AND SYSTEM COSTS AND BENEFIT/COST RATIOS: FINAL TRANSPORTATION PLAN ALTERNATIVES

Alternative Transportation Systems Plan	Costs: 1976-2025		Benefits	Costs	Benefit/Cost Ratio
	Road User	Capital and Operating and Maintenance			
No Build	$43,355,181,000	$1,685,667,000	$ --	$ --	--
A	42,179,393,000	2,765,231,000	1,175,788,000	1,079,564,000	1.09
A'(25)	42,033,842,000	2,733,297,000	1,321,339,000	1,047,630,000	1.26
A'(50)	42,265,177,000	2,707,536,000	1,090,004,000	1,021,869,000	1.07
R	42,655,654,000	2,467,371,000	699,527,000	781,704,000	0.89

Source: SEWRPC.

plans makes better use of the arterial street capacity than does Plan A. The measurement of each alternative plan against this standard is accomplished by comparing the total costs incurred in transportation system expansion and improvement, as shown in Table 329. On this basis the "no build" plan meets this standard the best, with Plans R, A'(50), A'(25), and A second, third, fourth, and fifth, respectively.

Standard No. 4 indicates that the amount of energy utilized in operating the transportation system, particularly the petroleum-based motor fuels, should be minimized. In order to determine the relative degree to which each of the five final regional transportation plan alternatives met this standard, analyses were made of the estimated total consumption of motor vehicle fuel in the year 2000 based on two differing assumptions. The first

assumption is that by the year 2000, the automobile fleet in the Region will meet the 1980 federally mandated average of about 19 miles per gallon. The second assumes that by the year 2000 the auto fleet will meet the 1985 mandated average of about 27 miles per gallon. The results of these analyses are summarized in Table 331.

As indicated in this table, total annual motor fuel consumption in 1972 in the Region approximated 576 million gallons. The smallest increase in fuel consumption over the 1972 level under the first assumption is associated with Plan A'(25). Fuel consumption under this alternative could be expected to increase by about 151 million gallons per year, or about 26 percent. Fuel consumption under Plan A'(50) could be expected to increase by about 161 million gallons per year, or about 28 percent, to a total of 737 million gallons per year; fuel consumption under Plan R could be expected to increase by about 160 million gallons per year, or about 28 percent, to a total of 736 million gallons per year; fuel consumption under Plan A could be expected to increase by about 159 million gallons per year, or about 28 percent, to a total of 735 million gallons per year; and fuel consumption under the "no build" plan could be expected to increase by about 182 million gallons per year, or 32 percent, to a total of 758 million gallons per year. Thus, it may be concluded that Plan A'(25) best meets this standard, with Plan A second, Plan R third, and Plan A'(50) fourth, although the differences between Plans A, R, and A'(50) are relatively small.

Under the second assumption, annual motor fuel consumption in the Region would decrease from the 1972 level under all of the alternative plans considered. In Plan A'(25) the decrease would be from 576 million gallons per year in 1972 to 517 million gallons per year in the year 2000, a decrease of 59 million gallons, or 10.2 percent. Under Plan A the decrease would amount to about 51 million gallons per year in the year 2000, or about an 8.9 percent reduction over the 1972 level;

Table 331

COMPARISON OF MOTOR FUEL CONSUMPTION BY VEHICLES TRAVELLING IN THE REGION BY FUEL TYPE: 1972 AND 2000

Vehicle Type	Annual Motor Fuel Consumption (millions of gallons)					
	Existing 1972	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Assuming 1980 Vehicle Efficiency Standards (19 mpg)						
Street and Highway						
Gasoline	546	721	688	680	690	689
Diesel	22	33	35	35	35	35
Subtotal	568	754	723	715	725	724
Transit (Diesel)	8	4	12	12	12	12
Total	576	758	735	727	737	736
Percent Increase Over 1972	--	31.6	27.6	26.2	28.0	27.8
Assuming 1985 Vehicle Efficiency Standards (27 mpg)						
Street and Highway						
Gasoline	546	500	480	470	481	480
Diesel	22	33	35	35	35	35
Subtotal	568	533	513	505	516	515
Transit (Diesel)	- 8	4	12	12	12	12
Total	576	537	525	517	528	527
Percent Decrease from 1972	--	6.8	8.9	10.2	8.3	8.5

Source: SEWRPC.

under Plan R the decrease would be about 49 million gallons per year, or 8.5 percent; and under Plan A'(50) the decrease would be about 48 million gallons per year, or 8.3 percent.

Objective No. 3—Provide a Flexible, Balanced Transportation System

The third transportation objective relates to the achievement of a flexible, balanced transportation system which will provide the appropriate types of transportation needed by all residents of the various subareas of the Region at an adequate level of service and which will permit ready adaptation to both changes in travel demand and in transportation technology and traffic management. This objective is supported by 18 specific standards, two of which relate to the arterial street and highway system, 12 of which relate to the mass transit system, three of which relate to off-street parking, and one of which relates to transportation system adaptability.

Standard No. 1 indicates that arterial streets and highways should be provided at intervals of no more than one-half mile in each direction in urban high-density areas, at intervals of no more than one mile in each direction in urban medium-density areas, at intervals of no more than two miles in each direction in urban low-density and suburban residential areas, and at intervals of no less than two miles in each direction in rural areas. This standard has been essentially met under each of the alternative transportation plans because it served as an input to the plan design process.

Standard No. 2 indicates that freeways or expressways should be considered for those travel corridors in the Region which provide intercommunity service and where the potential average weekday traffic exceeds 30,000 vehicles per day in urban areas and 15,000 vehicles per day in rural areas. This standard served as an input to the plan design process. Freeways and/or expressways were considered in the plan design process for all plans except, of course, the "no build" plan, even though Plans A, A'(25), A'(50), and R as designed differ significantly in the number of miles of new freeways and/or expressways proposed. Accordingly, Plans A, A'(25), A'(50), and R are deemed to have met this standard.

Standard No. 3 indicates that intraregional mass transit facilities should be provided within urban areas where each service can meet at least 50 percent of the associated operating costs, with the remaining operating costs to be provided for through public subsidy. In addition, the standard provides that such service should be considered if the provision of the service can be identified as significantly contributing to the revenue of other routes or to the total system. This standard further assumes that all of the capital costs would be provided for through public subsidy.

Analysis of the costs associated with the provision of mass transit facilities and services within the three urbanized areas of the Region under all four final alternative transportation plans and of the equivalent fare box revenue obtained through the operation of the transit service indicates that the standard would be met for the "no build" plan and for Plans A and A'(50), but would not quite be met for Plan A'(25) and Plan R. The percent of total cost covered by equivalent fare box revenue would approximate 89 percent under the "no build" plan, 70 percent for Plan A, 71 percent for Plan A'(50), 46 percent for Plan A'(25), and 48 percent for Plan R. Plans A'(25) and R do not quite meet the standard because of the assumed $0.25 base transit fare in Milwaukee under those plans.

Standard No. 4 provides that the public subsidy required per transit ride should be minimized. The "no build" plan best meets this standard, requiring a subsidy per ride of $0.16. Plan A would require a subsidy per ride of $0.34, Plan A'(25) $0.35, Plan A'(50) $0.33, and Plan R $0.33.

Standard No. 5 indicates that the provision of primary—that is, rapid—transit service should be considered in all travel corridors within the urbanized area of the Region where the equivalent fare box revenues from such service can meet at least 50 percent of the associated operating costs, with the remaining operating costs provided by public subsidy. This standard further assumes that all capital costs would be provided through public subsidy. As indicated earlier in Chapter VI, in order to apply this standard to the alternative transportation plans, two warrant curves were developed, one assuming a $0.25/basic transit fare and the other a $0.50/basis transit fare. The standard further provides that transitways should be considered only when transit vehicles utilizing the transitway would save, at a minimum, 10 minutes over alternative routings.

One of the final alternative regional transportation plans—Plan A—included exclusive transitways. Analyses indicated that all three transitways—the East-West, North-West, and the East Side—met the required warrants. Transitways were not included in Plans A'(25), A'(50), or R due to the assumption that the freeway system would be constrained in operation so as to ensure that vehicles utilizing the freeway would travel at high enough speeds so as to compete favorably with transitway speeds in the same travel corridors.

Standard No. 6 indicates that primary or secondary intraregional mass transit service should be provided as necessary to reduce peak loadings on arterial streets and highways in order to maintain a desirable level of transportation service between component parts of the Region. This standard has been met under Plans A, A'(25), A'(50), and R because it served as an input to the plan design process. This standard would not be met under the "no build" alternative.

Standard No. 7 indicates that primary and secondary mass transit service should be extended as warranted to perform a collection and distribution function in order to maximize the convenience of the transit service. This standard has also been met under Plans A, A'(25), A'(50), and R because it served as an input to the plan design process. This standard has not been met under the "no build" plan.

Standard No. 8 indicates that urban residential land shall be considered as served by mass transit when such land is within specified distances of primary, secondary, and tertiary mass transit service. The number of square miles served by transit in the Kenosha, Milwaukee, and Racine urbanized areas under each of the five final alternative transportation plans considered is identified in Tables 332, 333, and 334. In the Kenosha urbanized area, the "no build" plan would serve about 28 square miles and about 85 percent of the urbanized area population, and Plans A, A'(25), A'(50), and R all would serve about 39 square miles and nearly 91 percent of the urbanized area population. In the Racine urbanized area the "no build" plan would serve about 32 square miles and about 83 percent of the urbanized area population, and Plans A, A'(25), A'(50), and R all would serve about 43 square miles and about 93 percent of the urbanized area population. In the Milwaukee urbanized area, the "no build" plan would serve about 222 square miles and about 71 percent of the urbanized area population, and Plans A, A'(25), A'(50), and R would serve about 436 square miles and about 94 percent of the urbanized area population.

Tables 332, 333, and 334 also present comparative data pertaining to the characteristics and utilization of the transit systems proposed under the final alternative transportation system plans. Of particular interest are the data relating to total estimated daily revenue passengers on each system. In the Kenosha urbanized area, the estimated number of revenue passengers per average

Table 332

TRANSIT SERVICE, SYSTEM UTILIZATION, AND PERFORMANCE CHARACTERISTICS IN THE KENOSHA URBANIZED AREA: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Characteristic	Existing 1972	Alternative Transportation Plans: 2000			
		No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Service Area					
Square Miles	20.2	27.9	38.7	38.7	38.7
Population	83,900	113,200	121,000	121,000	121,000
Percent of Urbanized Area Population	97.0	84.9	90.8	90.8	90.8
System Characteristics					
Daily Vehicle Miles					
Primary	--	--	--	--	--
Secondary	--	--	--	--	--
Tertiary	1,140	3,950	6,160	6,160	6,160
Total	1,140	3,950	6,160	6,160	6,160
Vehicle Requirements (buses)					
Peak Period	12	31	33	33	33
Midday	6	21	22	22	22
Daily Seat Miles	43,300	177,800	277,200	277,200	277,200
Median Headway (minutes)					
Peak Period	60	20	20	20	20
Midday	60	30	30	30	30
Daily Operating Cost	$1,370	$4,750	$7,400	$7,400	$7,400
Operating Cost per Vehicle Mile	$1.20	$1.20	$1.20	$1.20	$1.20
Basic Fare	$0.25	$0.25	$0.25	$0.25	$0.25
System Utilization					
Daily Revenue Passengers	2,800	16,800	18,700	18,700	18,700
Percent Utilization—Passenger Miles Used Per Seat Miles Available	22.2	19.9	15.1	15.1	15.1
Average Number of Transfers per Trip	0.6	0.0	0.0	0.0	0.0
Passengers per Vehicle Mile	2.5	4.3	3.0	3.0	3.0
Passenger Miles per Vehicle Hours	50.6	105.4	85.2	85.2	85.2
Passenger Miles per Daily Operating Cost	7.0	7.5	5.7	5.7	5.7
Operating Cost per Passenger	$0.49	$0.28	$0.40	$0.40	$0.40
Rides per Capita	6.0	43.0	44.8	44.8	44.8

weekday, which approximated 2,800 in 1972, could be expected to increase to about 16,800 under the "no build" plan and to about 18,700 under Plans A, A'(25), A'(50), and R. In the Racine urbanized area, the estimated number of revenue passengers per average weekday, which approximated 3,100 in 1972, could be expected to increase to about 19,400 under the "no build" plan and to about 20,700 under Plans A, A'(25), A'(50), and R. In the Milwaukee urbanized area, the estimated number of revenue passengers per average weekday, which approximated 177,800 in 1972, could be expected to decrease to about 124,300 under the "no build" plan and to increase under Plans A, A'(25), A'(50), and R. Under Plan A the increase would be to about 306,600, under Plan A'(25) to about 408,200, under Plan A'(50) to about 306,700, and under Plan R to about 443,400.

Standard No. 9 indicates that mass transit routes should be direct in alignment with a minimum number of turning movements, and that the route configuration should be such as to minimize duplication of service and to minimize transfers which would discourage transit use. This standard has been met, to the degree practicable, under each of the final alternative regional transportation plans because it served as an input to the plan design process. Some differences do exist, however, in the estimate of the total number of transfers which would be required under each plan in each urbanized area.

Table 333

TRANSIT SERVICE, SYSTEM UTILIZATION, AND PERFORMANCE CHARACTERISTICS IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Characteristic	Existing 1972	Alternative Transportation Plans: 2000				
		No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Service Area						
Square Miles	164.8	221.7	436.4	436.4	436.4	436.4
Population	1,043,600	1,045,800	1,380,600	1,380,600	1,380,600	1,380,600
Percent of Urbanized Area Population	82.3	71.0	93.8	93.8	93.8	93.8
System Characteristics						
Daily Vehicle Miles						
Primary	1,410	5,470	46,980	48,350	43,280	40,760
Secondary	--	--	49,170	56,110	50,640	67,980
Tertiary	60,670	56,010	100,670	100,550	100,380	101,740
Total	62,080	61,480	196,820	205,010	194,300	210,480
Vehicle Requirements (buses)						
Peak Period	442	436	1,093	1,191	1,085	1,212
Midday	220	241	660	694	659	724
Daily Seat Miles	3,220,640	3,074,000	9,841,000	10,250,500	9,715,000	10,524,000
Median Headway (minutes)						
Peak Period	24.0	20.0	15.0	14.5	15.0	14.5
Midday	28.0	24.0	20.0	19.5	20.0	19.5
Daily Operating Cost	$75,700	$71,600	$217,400	$226,700	$215,800	$236,300
Operating Cost per Vehicle Mile	$1.22	$1.16	$1.10	$1.11	$1.11	$1.12
Basic Fare	$0.40	$0.50	$0.50	$0.25	$0.50	$0.25
System Utilization						
Daily Revenue Passengers	177,800	124,300	306,600	408,200	306,700	443,400
Percent Utilization—Passenger Miles Used per Seat Miles Available	36.5	13.8	17.5	23.1	17.8	24.2
Average Number of Transfers per Trip	0.4	0.4	0.5	0.6	0.5	0.6
Passengers per Vehicle Mile	2.9	2.0	1.6	2.0	1.6	2.1
Passenger Miles per Vehicle Hours	210.1	91.7	135.6	178.2	136.7	187.9
Passenger Miles per Daily Operating Cost	15.5	5.9	7.9	10.4	8.0	10.8
Operating Cost per Passenger	$0.43	$0.58	$0.71	$0.56	$0.70	$0.53
Rides per Capita	50.2	34.5	64.4	85.7	64.4	93.1

Source: SEWRPC.

Transfer data is set forth in Tables 332, 333, and 334 for the Kenosha, Milwaukee, and Racine urbanized areas, respectively.

In the Milwaukee urbanized area the average number of transfers per transit trip approximated 0.4 in 1972. The average number of transfers per transit trip is expected to approximate 0.4 under the "no build" plan, 0.5 under Plans A and A'(50), and 0.6 under Plans A'(25) and R. In the Kenosha urbanized area the average number of transfers per transit trip approximated 0.6 in 1972. Under the "no build" plan and under Plans A, A'(25), A'(50), and R the number of transfers per transit trip could be expected to approach zero. Similarly, in the Racine urbanized area, where the number of transfers per trip averaged 0.5 in 1972, the estimated average number of transfers per trip under all of the plans could be expected to approximate 0.1. The low anticipated incidence of transfers in Kenosha and Racine may be attributed to the provision of new transit routes which more directly and efficiently serve the land use development pattern, providing for single-seat rides within each of these relatively small urbanized areas.

Standard No. 10 indicates that operating headways, or the time between vehicles operating on regular schedules over fixed routes, for tertiary mass transit service within an urbanized area should be designed to provide service at headways capable of accommodating passenger demand at the recommended load standards, but should not exceed 30 minutes during weekday peak periods or 60 minutes during weekday off peak periods and week-

Table 334

TRANSIT SERVICE, SYSTEM UTILIZATION, AND PERFORMANCE CHARACTERISTICS IN THE RACINE URBANIZED AREA: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Characteristic	Existing 1972	Alternative Transportation Plans: 2000			
		No Build	Plan A	Plans A'(25) and A'(50)	Plan R
Service Area					
Square Miles	17.5	31.5	42.6	42.6	42.6
Population	100,600	124,800	140,500	140,500	140,500
Percent of Urbanized Area Population	87.3	82.7	93.1	93.1	93.1
System Characteristics					
Daily Vehicle Miles					
Primary	--	--	--	--	--
Secondary	--	--	--	--	--
Tertiary	1,560	3,130	6,330	6,330	6,330
Total	1,560	3,130	6,330	6,330	6,330
Vehicle Requirements (buses)					
Peak Period	10	26	38	38	38
Midday	10	26	27	27	27
Daily Seat Miles	29,600	140,900	284,900	284,900	284,900
Median Headway (minutes)					
Peak Period	40	30	20	20	20
Midday	40	30	30	30	30
Daily Operating Cost	$1,870	$3,750	$7,590	$7,590	$7,590
Operating Cost per Vehicle Mile	$1.20	$1.20	$1.20	$1.20	$1.20
Basic Fare	$0.40	$0.25	$0.25	$0.25	$0.25
System Utilization					
Daily Revenue Passengers	3,100	19,400	20,700	20,700	20,700
Percent Utilization—Passenger Miles Used Per Seat Miles Available	36.9	26.3	16.3	16.3	16.3
Average Number of Transfers per Trip	0.5	0.1	0.1	0.1	0.1
Passengers per Vehicle Mile	2.0	6.2	3.3	3.3	3.3
Passenger Miles per Vehicle Hours	45.5	110.1	78.8	78.8	78.8
Passenger Miles per Daily Operating Cost	5.8	9.9	6.1	6.1	6.1
Operating Cost per Passenger	$0.60	$0.19	$0.37	$0.37	$0.37
Rides per Capita	5.2	45.1	42.7	42.7	42.7

Source: SEWRPC.

end periods. Median headway data is set forth in Tables 332, 333, and 334 for the Kenosha, Milwaukee, and Racine urbanized areas, respectively. In the Kenosha urbanized area, the median headway would be reduced by plan design during the peak period from 60 minutes in 1972 to 20 minutes for the "no build" plan and for Plans A, A'(25), A'(50), and R. Midday median headways, which were set by design at 60 minutes in 1972, would be reduced to 30 minutes under all of the plans considered.

In the Milwaukee urbanized area, median headways during the peak period, which averaged 24 minutes in 1972, would be reduced to about 20 minutes under the "no build" plan, to about 15 minutes under Plans A and A'(50), and to 14.5 minutes under Plans A'(25) and R. The midday median headway, which was about 28 minutes in 1972, would be reduced to about 24 minutes under the "no build" plan, to about 20 minutes under Plans A and A'(50), and to about 19.5 minutes under Plans A'(25) and R.

In the Racine urbanized area, median headways during the peak period, which averaged about 40 minutes in 1972, would be reduced to about 30 minutes under the "no build" plan and to about 20 minutes under Plans A, A'(25), A'(50), and R. Midday median headways, which averaged about 40 minutes in 1972, would be reduced to about 30 minutes under all plans considered.

Standard No. 11 relates to transit stop spacing for the primary, secondary, and tertiary transit systems. Under this standard, primary transit stops are to be provided at terminal areas and at no less than one mile intervals on line haul sections. On secondary transit routes, stops should be provided at terminal areas, at intersections with other mass transit routes, and at land uses identified as major traffic generators. On the tertiary transit routes, stops should be from 600 to 1,200 feet apart. This standard has been met under each of the alternative transportation plans because it served as an input to the plan design process.

Standard No. 12 indicates that mass transit routes should be located sufficiently near concentrations of demand in the central business districts of the urbanized areas so that 90 percent of the mass transit users need walk no more than one block to or from their destination. This standard has been met under each of the alternative plans because it served as an input to the plan design process.

Standard No. 13 indicates that the proportion of mass transit ridership to the Milwaukee central business district should be increased to a level of at least 30 percent of total person trips made to the central business district. Analyses of the final alternative transportation plans indicate that this standard would be met under Plan A'(25) (33 percent) and under Plan R (34 percent), but would not be met under the "no build" plan (14 percent), under Plan A (26 percent), or under Plan A'(50) (27 percent).

Standard No. 14 indicates that specialized transportation service should be available within the urban transit service areas to meet the transportation needs of those portions of the elderly and handicappped population unable to avail themselves of regular transit service and within the rural portions of the Region to provide transit service at least one day per week. This standard could be met equally well under any of the transportation plans considered. Due to the specialized nature of the services required to meet this standard, the Commission is concurrently conducting a special regional planning effort to determine the magnitude of the need for such specialized transportation service and to further determine the most cost-effective manner in which to meet this need.

Standard No. 15 indicates that parking should be provided at transit stations to accommodate the total parking demand generated by trips which change from automobile to mass transit modes at such stations. This standard is not met under the "no build" situation where continued reliance on shopping center parking lots is assumed, but is met under Plans A, A'(25), A'(50), and R because it served as an input to the plan design process.

Standard No. 16 provides that on a gross area basis, parking in central business districts in urbanized areas of the Region should be provided at specified levels per 1,000 automobile destinations. In the Kenosha urbanized area the standard specifies that there should be provided 140 automobile parking spaces per 1,000 automobile destinations. In 1972 there were 290 parking spaces per 1,000 automobile destinations. The number of parking spaces in the Kenosha central business district per 1,000 automobile destinations in that district would approximate 330 under the "no build" plan, and 340 under Plans A, A'(25), A'(50), and R, all predicated on an assumption that there would be no increase in the total number of parking spaces provided in that district. In the Milwaukee urbanized area the standard specifies that there should be provided 235 automobile parking spaces per 1,000 automobile destinations. In 1972 there were 410 parking spaces per 1,000 automobile destinations. The number of parking spaces in the Milwaukee central business district per 1,000 automobile destinations in that district would approximate 330 under the "no build" plan, 400 under Plan A, 430 under Plans A'(25) and A'(50), and 450 under Plan R, all predicated again upon an assumption that there will be no increase in the gross number of parking spaces provided in that district. In the Racine urbanized area the standard specifies that there should be provided 140 automobile parking spaces per 1,000 automobile destinations. In 1972 there were 310 parking spaces per 1,000 automobile destinations. The number of parking spaces in the Racine central business district per 1,000 automobile destinations in that district would approximate 370 under the "no build" plan, and 380 under Plans A, A'(25), A'(50), and R, again all predicated upon an assumption that there would be no increase in the gross number of parking spaces provided in that district.

In all cases, then, the standard would be met without an increase in the number of automobile parking spaces in

the central business districts of Kenosha, Milwaukee, and Racine. Accordingly, an implicit recommendation of each alternative plan is not to increase the gross number of parking spaces in the major regional central business districts, recognizing, of course, that there may be some redistribution of spaces within the districts needed to properly accommodate demand.

Standard No. 17 indicates that in the central business districts of the urbanized areas of the Region parking should be provided sufficiently near concentrations of demand so that 90 percent of the short-term parkers need walk no more than one block. This standard could be met under all of the final alternative regional transportation plans considered through effective local planning and plan implementation efforts.

Standard No. 18 indicates that the regional transportation system should be capable of being readily adaptable to changes in travel demand and in transportation technology. Since each of the transportation system plans considered contains a mix of arterial street and highway and transit system improvements, it is considered that this standard is equally well met by all of the alternative plans considered.

Objective No. 4—Minimize Disruption

The fourth transportation objective relates to the minimization of disruption by the transportation system of existing neighborhood and community development, including adverse impacts upon the property tax base and the minimization of the deterioration and/or destruction of the natural resource base. This objective is supported by eight specific standards.

Standard No. 1 indicates that the proper use of land for and adjacent to transportation facilities should be maximized and the disruption of future development minimized through advance reservation of rights-of-way for transportation facilities. This standard could be met equally well for all alternative transportation plans considered, but can only be met effectively through vigorous plan implementation by the state and local units and agencies of government concerned.

Standard No. 2 indicates that the penetration of neighborhood units and neighborhood facility service areas by arterial streets and highways and primary transit routes should be minimized. A precise quantitative evaluation of the extent to which this standard is met depends in large part upon the completion of project planning, including the determination of the precise alignment of new transportation facilities. In addition, it is necessary for local units of government to delineate neighborhood boundaries.

Because the current system planning effort is part of a cycle that has included previous system and project planning efforts, the centerline locations of most proposed transportation facilities have been established. However, not all communities, particularly the City of Milwaukee, have delineated neighborhood boundaries. Accordingly, it is still not possible to precisely quantify the extent to which each of the four final regional transportation plan alternatives meets this standard. It is known that in some cases, for example, in the Lake Freeway corridor in the City of Oak Creek and in the Kenosha and Racine Planning Districts, neighborhood units have been established and adjusted in a fully coordinated manner with the proposed transportation facility. In other areas, however, such as the Stadium Freeway-North, neighborhoods have not been delineated and it is not known whether proposed development and redevelopment in this corridor can be readily adjusted to the proposed transportation facility.

Over time it is believed by many that existing urban development will readjust to new major transportation facility locations. Disruption of existing neighborhood units caused by transportation facility construction is at least in part offset by the resultant improvement in traffic conditions in existing neighborhoods. New major transportation facilities will tend to reduce traffic volumes not only on other surface arterial streets but in many cases on collector and minor streets in the neighborhood. This is particularly true in older, developed urban areas with a grid street pattern. Based upon all of the foregoing considerations, it is believed that this standard could be met under all alternative transportation system plans.

Standard No. 3 provides that the dislocation of households, businesses, industries, and other buildings caused by the reconstruction of existing, or the construction of new, transportation facilities should be minimized. In order to estimate the extent to which the final alternative transportation plans met this standard, an estimate was made of the number of residential units and nonresidential structures that would have to be displaced and relocated because of transportation system improvements. The results of this analysis are set forth in Table 335 by county.

The design of Plan R was constrained to include no more than 50 residential unit dislocations in Milwaukee County, and therefore, best meets this standard. As shown in Table 335, Plan R would require the dislocation of 193 residential units and 59 nonresidential structures within the Region as a whole, compared to 1,936 and 190, respectively, for Plans A'(25) and A'(50) and 2,073 and 215, respectively, for Plan A.

Standard No. 4 indicates that the location of transportation facilities in or through primary environmental corridors should be minimized. In order to determine the relative extent to which each of the four alternative transportation plans involving new construction met this standard, an analysis was made of the location of all new or substantially improved transportation facilities proposed under each plan with respect to the primary environmental corridors identified under the recommended regional land use plan. The results of this analysis are summarized in Table 336.

Table 335

COMPARISON OF LAND TAKING REQUIREMENTS FOR TRANSPORTATION SYSTEM IMPROVEMENTS IN THE REGION BY COUNTY: 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

County and Taking	Final Alternative Plan				
	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R[a]
Kenosha County					
Number of Residential Units	--	51	51	51	20
Number of Nonresidential Structures	--	5	5	5	9
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	--	$ 14,627,600	$ 14,627,600	$ 14,627,600	$10,988,000
Milwaukee County					
Number of Residential Units	9	1,804	1,667	1,667	27
Number of Nonresidential Structures	4	165	140	140	7
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$3,139,000	$125,458,000	$107,106,000	$106,056,000	$11,045,500
Ozaukee County					
Number of Residential Units	--	16	16	16	16
Number of Nonresidential Structures	--	5	5	5	5
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	--	$ 4,605,300	$ 4,605,300	$ 4,605,300	$ 4,605,300
Racine County					
Number of Residential Units	--	111	111	111	46
Number of Nonresidential Structures	--	16	16	16	13
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	--	$ 15,689,100	$ 15,689,100	$ 15,689,100	$11,497,300
Walworth County					
Number of Residential Units	--	3	3	3	11
Number of Nonresidential Structures	--	2	2	2	10
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	--	$ 5,697,600	$ 5,697,600	$ 5,697,600	$ 7,630,400
Washington County					
Number of Residential Units	--	12	12	12	11
Number of Nonresidential Structures	--	12	12	12	10
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	--	$ 8,480,900	$ 8,480,900	$ 8,480,900	$ 7,831,400
Waukesha County					
Number of Residential Units	--	76	76	76	62
Number of Nonresidential Structures	--	10	10	10	5
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$ 100,000	$ 16,495,700	$ 16,495,700	$ 16,495,700	$16,330,700
Southeastern Wisconsin Region					
Number of Residential Units	9	2,073	1,936	1,936	193
Number of Nonresidential Structures	4	215	190	190	59
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$3,239,000	$191,054,200	$172,702,200	$171,652,200	$69,928,600

[a]*The design of Plan R was constrained to include no more than 50 residential unit dislocations in Milwaukee County.*

Source: SEWRPC.

Table 336

COMPARISON OF RELATIVE IMPACT UPON PRIMARY ENVIRONMENTAL CORRIDORS
2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Relationship of New or Improved Transportation Facility to Primary Environmental Corridor	Number of Miles of New or Improved Transportation Facilities			
	No Build	Plan A	Plans A'(25) and A'(50)	Plan R
New Construction Within Environmental Corridor	--	36.6	31.7	18.3
Reconstruction of Existing Facility Within Environmental Corridor	--	29.7	29.7	23.4

Source: SEWRPC.

Plan A would have the greatest impact on the primary environmental corridors. This plan would involve the construction of about 37 miles of new transportation facilities across or within environmental corridor areas, and the reconstruction for additional capacity of nearly 30 miles of existing transportation facilities across or within corridors. Comparable figures for Plans A'(25) and A'(50) are 32 miles and 30 miles, respectively. Plan R would involve the construction of about 18 miles of new transportation facilities in the corridor areas, and the reconstruction for additional capacity of about 23 miles of existing facilities. It is important to note that the foregoing analysis has been made at the system planning level and is necessarily general in nature. A more detailed examination during the project planning and design phases may indicate that the new or significantly improved transportation facilities could be placed outside the environmental corridor lands. This is particularly true, of course, where transportation facilities are to be constructed along an alignment approximately parallel to the primary environmental corridors.

Standard No. 5 indicates that the total amount of land used for new transportation and terminal facilities should be minimized. In order to estimate the relative extent to which each of the final alternative transportation plans met this standard, an estimate was made of the amount of land required for the construction of new transportation facilities included in the alternative plans. This estimate, which is expressed in terms of the total acquisition cost for land required to carry out each plan, cost being a readily available surrogate for land area, is set forth in Table 335. For the Region as a whole, it is estimated that the total cost of acquiring and clearing all land needed to provide proposed transportation improvements under the "no build" plan would approximate $3.4 million, under Plan A $191 million, under Plan A'(25) $172.7 million, under Plan A'(50) $171.7 million, and under Plan R $69.9 million. These estimates do not include new collector and land access streets. Thus, as among the three alternative plans involving transportation system improvements, Plan R best meets this standard, a result to be expected since Plan R contains significantly fewer miles of new transportation facilities than either Plans A, A'(25), or A'(50).

Standard No. 6 indicates that the reduction of the property tax as caused by the reconstruction of existing or the construction of new transportation facilities should be minimized. The analysis set forth above with respect to the minimization of the total amount of land needed to provide new and improved transportation facilities was considered to be applicable to this standard, it being assumed that the direct impact upon the property tax base of land and building acquisition for transportation facility improvements would be directly proportional to the cost of such land and building acquisition. It may be concluded that since Plan R requires less land taking than Plans A, A'(25), or A'(50), the impact upon the property tax base as a whole would be less under Plan R than under Plans A, A'(25), or A'(50). [2]

Standard No. 7 indicates that the transportation system should be located and designed so as to minimize the exposure of residents in the Region to harmful, as well as annoying, noise levels. In order to determine the relative extent to which each of the alternative plans met this standard, an analysis was made of the number of miles of arterial streets and highways in the Region under each final alternative plan along which traffic-related noise would exceed 70 dba at the probable building setback base line along the rights-of-way. The results of this analysis are summarized in Table 337. As shown in this table, there were in 1972 a total of 712 miles of arterial

[2] *The tax base loss analysis, while gross, is conservative in the sense that there may be no tax base loss at all within the Region because of relocation of property owners. Even within a single community the construction of a freeway may contribute to a net gain in tax base as contrasted with the assumed loss of tax base in the analysis.*

facilities which did not meet this standard, including 38 miles of freeway facilities and 674 miles of standard arterial facilities. Of this total, 593 miles were in urban areas and 119 miles were in rural areas. All four final alternative plans would result in an increase in highway noise impact over the existing 1972 situation, although to differing degrees.

The "no build" plan and Plan R would have the least increment in total miles, increasing to 1,011 and 1,020 miles, respectively, while Plans A and A'(25) would increase the number of miles exceeding the noise standard to 1,272 and Plan A'(50) to 1,274. It should be noted in this respect that the noise model utilized does not take into account the degree to which the standard is exceeded nor the length of time that the standard is exceeded. The "no build" plan and Plan R, involving construction of fewer miles of new facilities, tend to concentrate traffic more on existing facilities than do Plans A, A'(25), and A'(50) which involve significant new freeway and standard arterial construction. Hence, it is to be expected that there is a greater potential for exceeding this standard over a greater number of arterial miles under Plans A, A'(25), and A'(50) than under the "no build" plan or Plan R. It is also important to note that the noise impact model does not take into account the potential for incorporating noise-reducing features in transportation facility design. Such features can only be considered in the project planning and design phases of facility development.

Standard No. 8 indicates that the destruction of historic buildings and of historic, scenic, scientific, and cultural sites by the reconstruction of existing or the construction of new transportation facilities should be minimized. Attainment of this standard cannot be adequately measured at the system level of planning, since the standard can only be met through proper attention to historic preservation at the project level of planning. Accordingly, it is considered that this standard could be met equally well under all of the alternative plans considered.

Objective No. 5—Facilitate Traffic Flow

The fifth transportation objective relates to the facilitation of traffic flow between component parts of the Region. This objective is supported by six standards. Data pertaining to anticipated utilization of the arterial street and highway and transit systems under each of the final alternative transportation plans are set forth on Maps 78 through 89.

Standard Nos. 1, 2, and 3 indicate that the total passenger hours of travel, total vehicle hours of travel, and total vehicle miles of travel within the Region, respectively, should be minimized. Data pertaining to these standards are set forth in Table 338. Total vehicle miles of travel in the Region in 1972 were estimated at 20.2 million on an average weekday. Vehicle miles of travel could be expected to increase to about 31.5 million on an average weekday under the "no build" plan, about 30.6 million under Plan A, about 30.1 million under Plan A'(25), about 30.4 million under Plan A'(50), and about 30 million under Plan R. Thus, Plan R best meets the vehicle miles of travel standard.

A somewhat different relationship exists, however, when total vehicle hours of travel are examined. In 1972 there were about 619,000 vehicle hours of travel on an average weekday in the Region. Under the "no build" plan this could be expected to increase to about 886,000 vehicle hours per average weekday, about 833,000 under Plan A, about 808,000 under Plan A'(25), and about 829,000 under Plan A'(50), and about 833,000 under Plan R. Thus, Plan A'(25) best meets the total vehicle hours of travel standard.

Finally, when total passenger hours of travel are considered, Plans A and A'(50) are found to best meet the standard, with total estimated passenger hours of travel on an average weekday at 1,207; Plan A'(25) the next best with total passenger hours of travel at 1,209; the "no build" plan next with total estimated passenger hours of travel at 1,233, and Plan R last with total passenger hours of travel at 1,255. In this latter standard Plan R does not do as well as Plans A, A'(25), or A'(50) because of the greater amount of anticipated traffic congestion on the facilities making up the transportation system.

Standard No. 4 indicates that highway transportation facilities should be located and designed so as to provide adequate capacity—a volume-to-capacity ratio equal to or less than 1.10 based on a 24-hour average weekday traffic volume basis. In order to determine the degree to which each final alternative transportation plan meets this standard, the anticipated travel demand expected to be generated under each plan was assigned to the alternative transportation networks to identify potential capacity deficiencies. The anticipated levels of service in each of the final alternative plans as measured by volume-to-capacity ratios are summarized in Table 339. As shown in this table, Plan A would best meet this standard, with 99.3 percent of all arterial streets and highways in the Region operating at or under capacity. Plan A'(25) would result in 99.1 percent, Plan A'(50) in 99.0 percent, Plan R in 96.5 percent, and the "no build" plan 86.7 percent. Table 340 identifies the number of miles of arterial streets and highways anticipated to operate at and over capacity by urban and rural areas. Maps 90 through 94 identify anticipated congestion levels on the arterial street and highway systems in each of the final alternative transportation plans.

Standard No. 5 indicates that mass transit facilities should be located and designed so as to provide adequate transit vehicle capacity to meet potential and existing travel demands. Average maximum load factors are specified in this standard for the primary, secondary, and tertiary levels of service in both peak and offpeak time periods. This standard has been met under each of the final alternative plans considered because it served as input to the plan design process.

Table 337

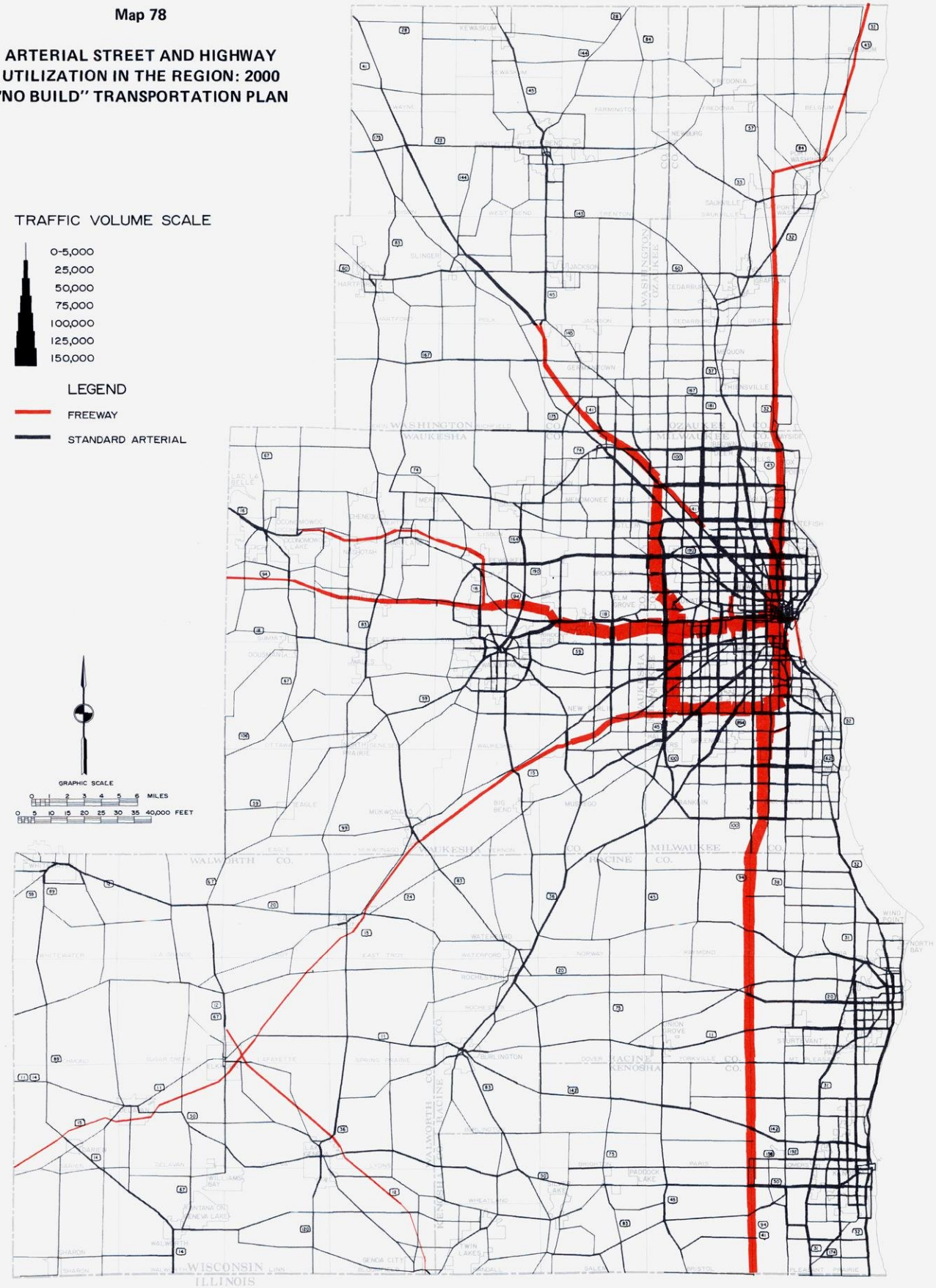
COMPARISON OF MILES OF ARTERIAL STREETS AND HIGHWAYS WITH TRAFFIC-RELATED NOISE EXCEEDING 70 DBA BY COUNTY: 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

County	Arterial Miles Exceeding 70 dba											
			Proposed 2000									
	Existing 1972		No Build Plan		Plan A		Plan A'(25)		Plan A'(50)		Plan R	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Kenosha County												
Freeway	--	--	11.60	0.40	11.60	0.40	11.60	0.40	11.60	0.40	11.60	0.40
Standard Arterial	12.15	33.85	31.10	47.47	48.00	46.25	48.00	46.25	48.00	46.25	20.45	41.22
Subtotal	12.15	33.85	42.70	47.87	59.60	46.65	59.60	46.65	59.60	46.65	32.05	41.62
Milwaukee County												
Freeway	--	38.00	1.25	58.03	1.70	89.79	1.70	89.79	1.70	91.88	1.10	58.43
Standard Arterial	--	330.00	3.59	401.39	2.45	423.18	2.45	423.18	2.45	423.18	--	409.17
Subtotal	--	368.00	4.84	459.42	4.15	512.97	4.15	512.97	4.15	515.06	1.10	467.60
Ozaukee County												
Freeway	--	--	22.20	5.20	22.20	5.20	22.20	5.20	22.20	5.20	22.20	5.20
Standard Arterial	27.45	14.55	1.75	14.45	1.56	15.65	1.56	15.65	1.56	15.65	2.15	17.05
Subtotal	27.45	14.55	23.95	19.65	23.76	20.85	23.76	20.85	23.76	20.85	24.35	22.25
Racine County												
Freeway	--	--	12.00	--	18.40	5.70	18.40	5.70	18.40	5.70	12.00	--
Standard Arterial	2.30	36.70	9.70	57.00	20.25	81.47	20.25	81.47	20.25	81.47	10.10	58.55
Subtotal	2.30	36.70	21.70	57.00	38.65	87.17	38.65	87.17	38.65	87.17	22.10	58.55
Walworth County												
Freeway	--	--	0.99	--	32.54	3.50	32.54	3.50	32.54	3.50	16.49	2.70
Standard Arterial	33.65	15.35	49.77	23.70	28.05	32.13	28.05	32.13	28.05	32.13	37.85	19.70
Subtotal	33.65	15.35	50.76	23.70	60.59	35.63	60.59	35.63	60.59	35.63	54.34	22.40
Washington County												
Freeway	--	--	5.30	1.50	16.54	2.60	16.54	2.60	16.54	2.60	3.90	1.50
Standard Arterial	16.00	24.00	18.78	22.03	35.75	36.71	35.75	36.71	35.75	36.71	32.17	23.25
Subtotal	16.00	24.00	24.08	23.53	52.29	39.31	52.29	39.31	52.29	39.31	36.07	24.75
Waukesha County												
Freeway	--	--	10.28	16.90	13.13	16.60	13.13	16.60	13.13	16.60	7.48	17.70
Standard Arterial	27.20	100.80	37.32	147.08	70.86	190.12	70.86	190.12	70.86	190.12	24.78	162.69
Subtotal	27.20	100.80	47.60	163.98	83.99	206.72	83.99	206.72	83.99	206.72	32.26	180.39
Southeastern Wisconsin Region												
Freeway	--	38.00	63.62	82.03	116.11	123.79	116.11	123.79	116.11	125.88	74.77	85.93
Standard Arterial	118.75	555.25	152.01	713.12	206.92	825.51	206.92	825.51	206.92	825.51	127.50	731.63
Total	118.75	593.25	215.63	795.15	323.03	949.30	323.03	949.30	323.03	951.39	202.27	817.56

Source: SEWRPC.

Map 78

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 "NO BUILD" TRANSPORTATION PLAN

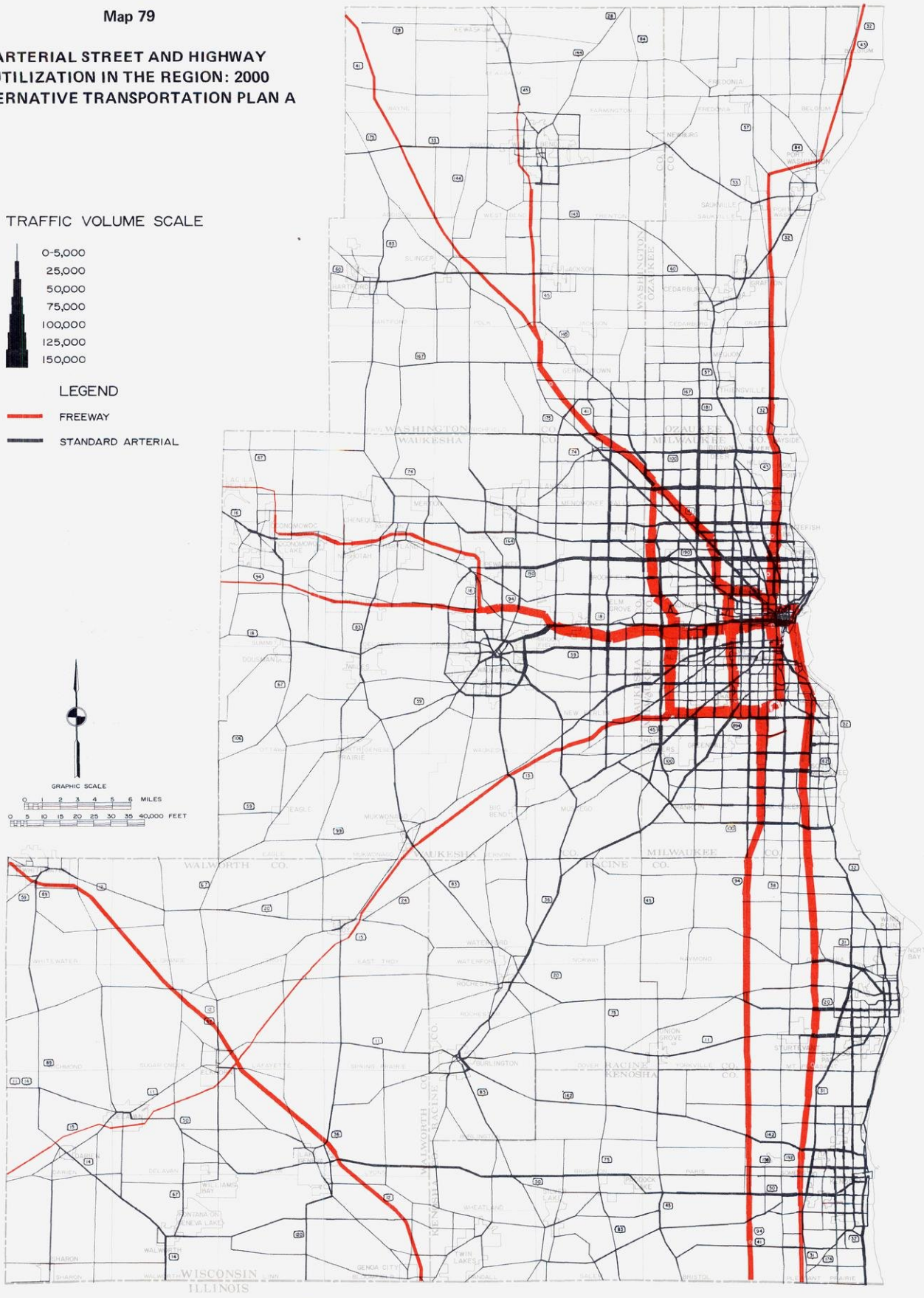


Weekday arterial street and highway system utilization in the Region may be expected to increase to 31.4 million vehicle miles of travel by the year 2000 under the "no build" alternative transportation system plan, an increase of 11.3 million vehicle miles, or about 56 percent, over 1972. About 11.3 million vehicle miles of travel, or 36 percent of the total, could be expected to occur on the freeway system, as compared with 31 percent in 1972.

Source: SEWRPC.

Map 79

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 ALTERNATIVE TRANSPORTATION PLAN A

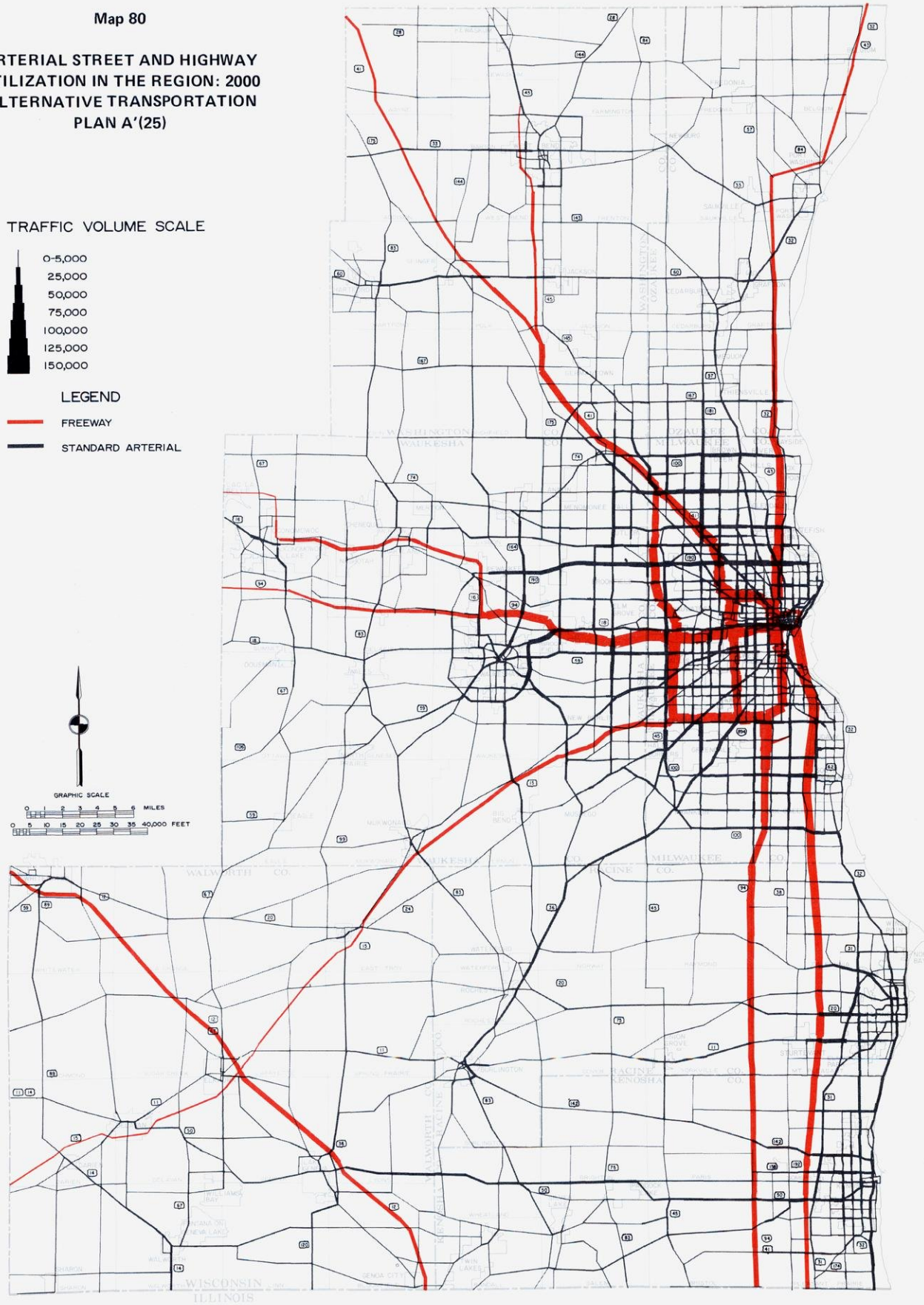


Weekday arterial street and highway system utilization in the Region may be expected to increase to 30.4 million vehicle miles of travel by the year 2000 under the Plan A alternative transportation system plan, an increase of 10.3 million vehicle miles, or about 51 percent, over 1972. About 13.3 million vehicle miles of travel, or 44 percent of the total, could be expected to occur on the freeway system, as compared with 31 percent in 1972.

Source: SEWRPC.

Map 80

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 ALTERNATIVE TRANSPORTATION PLAN A'(25)

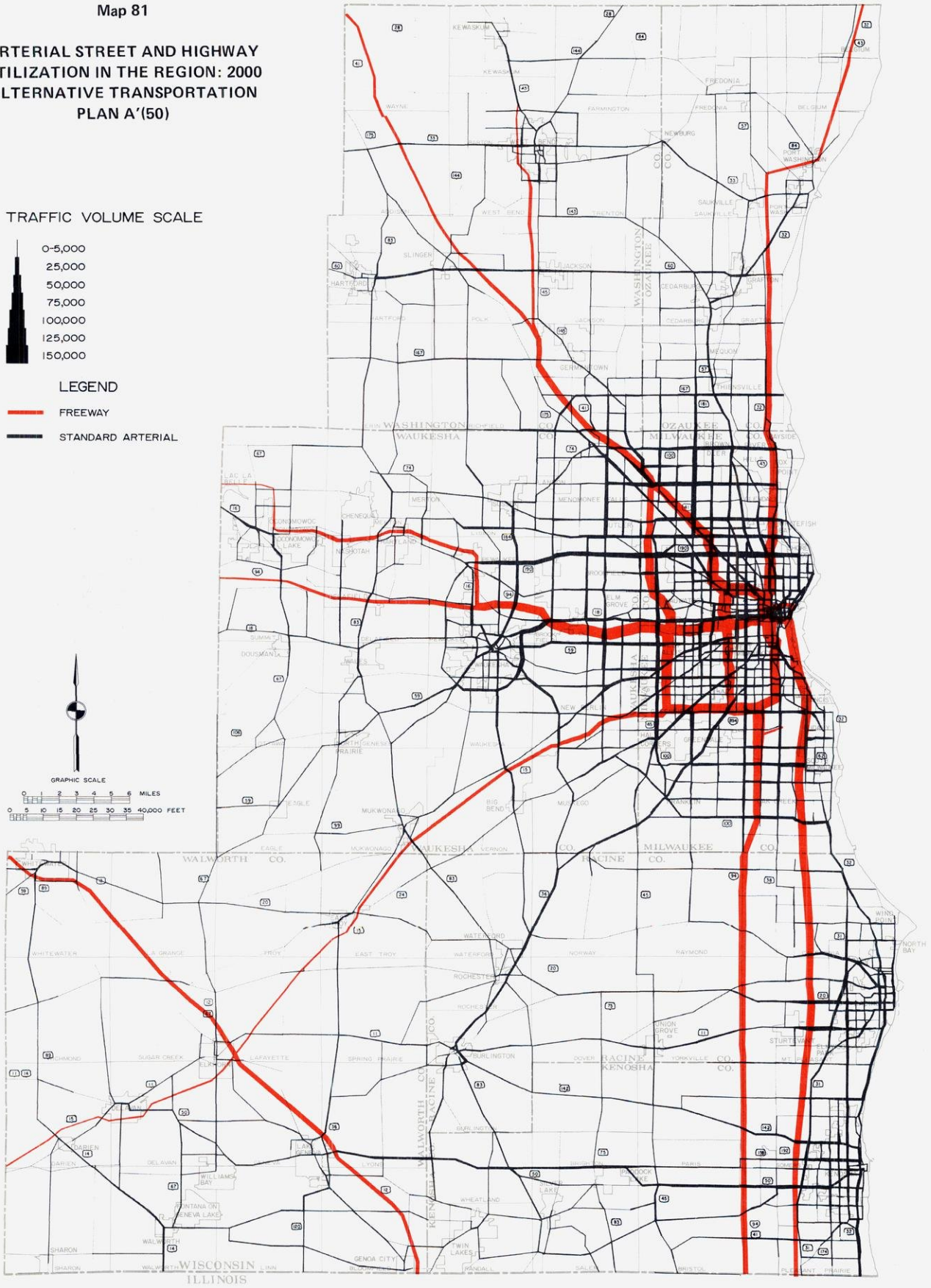


Weekday arterial street and highway system utilization in the Region may be expected to increase to 29.9 million vehicle miles of travel by the year 2000 under the Plan A'(25) alternative transportation system plan, an increase of 9.7 million vehicle miles, or about 48 percent, over 1972. About 13.1 million vehicle miles of travel, or 44 percent of the total, could be expected to occur on the freeway system, as compared with 31 percent in 1972.

Source: SEWRPC.

Map 81

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 ALTERNATIVE TRANSPORTATION PLAN A'(50)

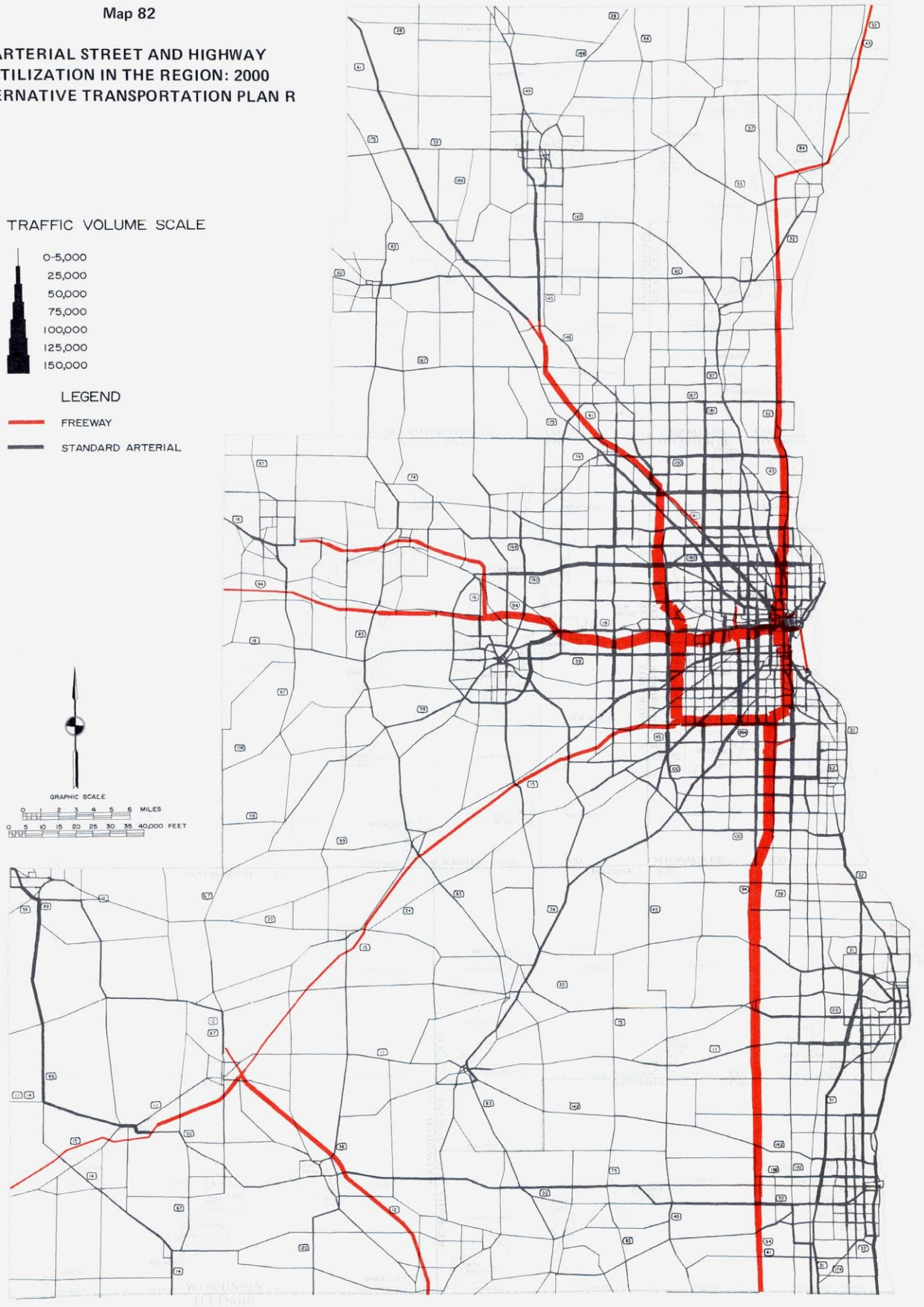


Weekday arterial street and highway system utilization in the Region may be expected to increase to 30.2 million vehicle miles of travel by the year 2000 under the Plan A'(50) alternative transportation system plan, an increase of 10.1 million vehicle miles, or about 50 percent, over 1972. About 12.9 million vehicle miles of travel, or 43 percent of the total, could be expected to occur on the freeway system, as compared with 31 percent in 1972.

Source: SEWRPC.

Map 82

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 ALTERNATIVE TRANSPORTATION PLAN R

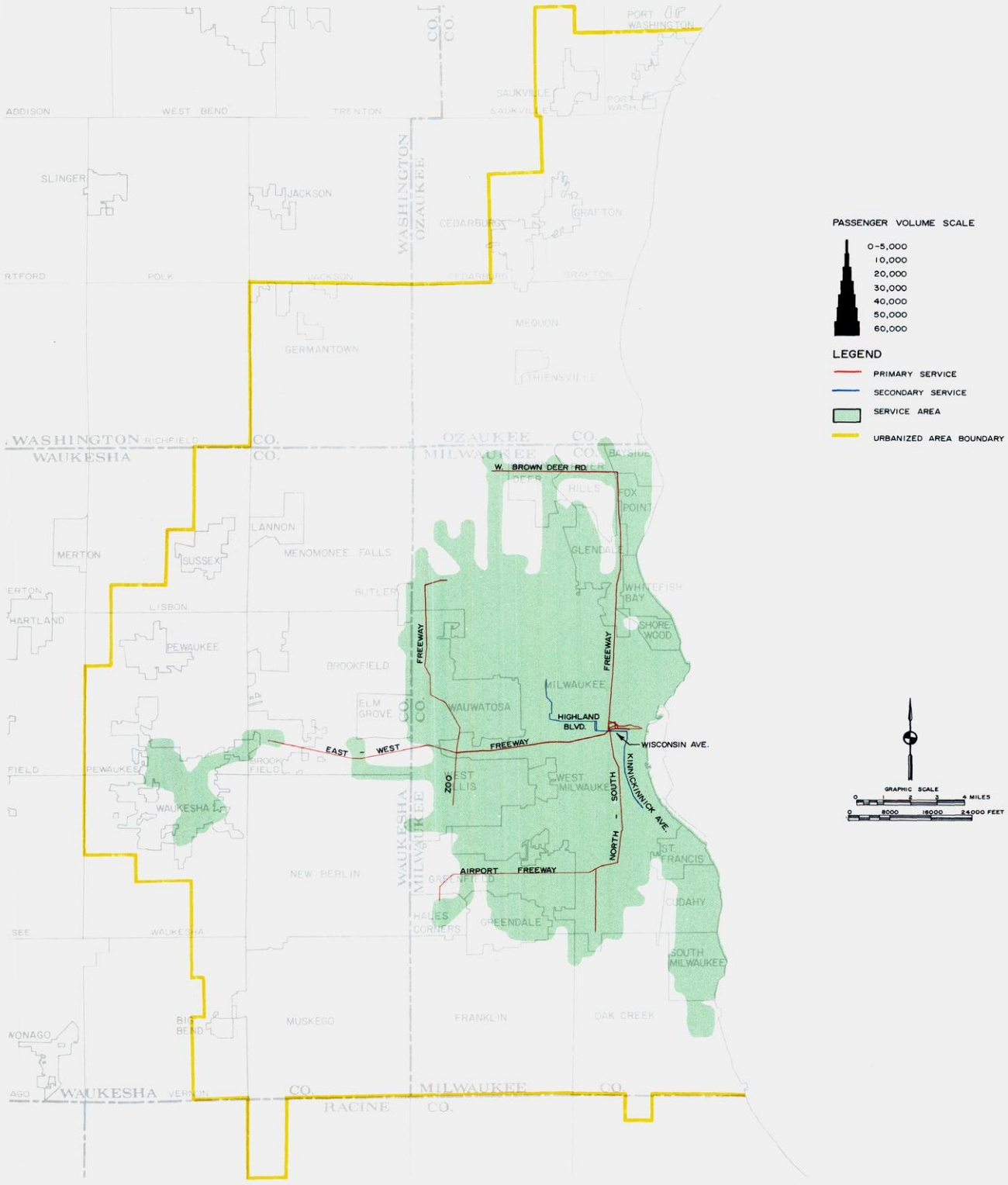


Weekday arterial street and highway system utilization in the Region may be expected to increase to 29.7 million vehicle miles of travel by the year 2000 under the Plan R alternative transportation system plan, an increase of 9.6 million vehicle miles, or about 48 percent, over 1972. About 9.8 million vehicle miles of travel, or 33 percent of the total, could be expected to occur on the freeway system, as compared with 31 percent in 1972.

Source: SEWRPC.

Map 83

TRANSIT SYSTEM UTILIZATION IN THE MILWAUKEE URBANIZED AREA: 2000 "NO BUILD" TRANSPORTATION PLAN

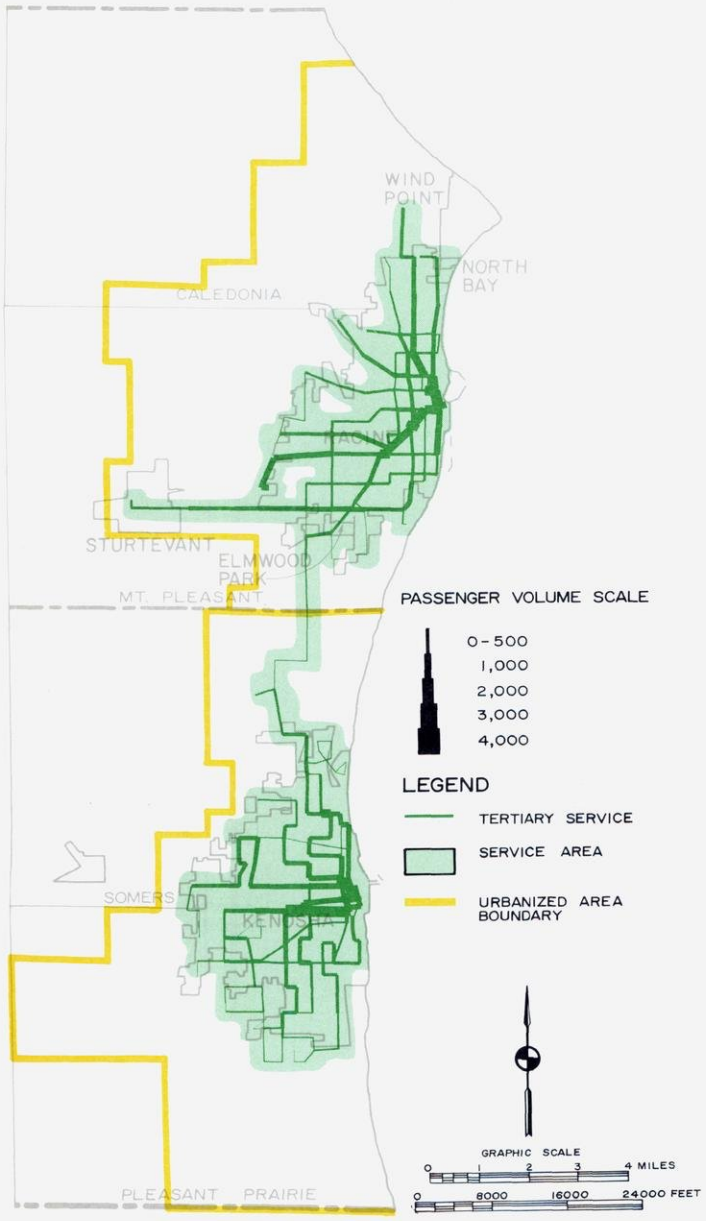


On an average weekday in 1972 about 1.2 million passenger miles of travel were made on the transit system of the Milwaukee area. By the year 2000, under the conditions assumed in the "no build" transportation plan alternative, passenger miles of transit travel could be expected to decline to about 0.4 million. This anticipated decline would be due primarily to the anticipated redistribution of population in the Milwaukee urbanized area, with less population residing in the areas currently served by transit and more population in the areas not now served by transit. Under "no build" conditions, then, declining population densities in the existing transit area can be expected to result in significantly decreasing transit ridership in the Milwaukee urbanized area.

Source: SEWRPC.

Map 84

TRANSIT SYSTEM UTILIZATION
IN THE KENOSHA AND RACINE
URBANIZED AREAS: 2000 "NO BUILD"
TRANSPORTATION PLAN



On an average weekday in 1972 about 9,600 passenger miles of travel were made on the transit system of the Kenosha area, and about 10,900 passenger miles of travel were made on the transit system of the Racine area. By the year 2000, under the conditions assumed in the "no build" transportation plan alternative, passenger miles of transit travel could be expected to increase to about 32,400 per day in the Kenosha area and about 38,200 per day in the Racine area. This anticipated increase would be due primarily to the significant improvements in the level of transit service committed as a result of actions taken pursuant to transit development programs prepared and adopted in these two areas.

Source: SEWRPC.

Standard No. 6 indicates that adequate capacity and a sufficiently high level of geometric design should be provided to permit attainment of specified overall travel speeds based on average weekday conditions for the highway and mass transit components of the transportation system. The overall travel speeds specified in this standard were utilized in the design of the alternative plans. Accordingly, it may be concluded that this standard has been met by design under all of the alternative plans.

Objective No. 6—Reduce Accident Exposure

The sixth transportation objective relates to the reduction of accident exposure and the provision of increased travel safety. This objective is supported by three specific standards relating to traffic congestion and vehicle conflicts.

Standard No. 1 indicates that travel on facilities that exhibit the lowest accident exposure should be maximized. Freeways have been found to experience significantly lower accident rates than standard surface arterial facilities. In addition, travel on transit is generally safer for passengers than travel on other vehicles. Based upon the foregoing, it can be concluded that those plans which provide the greatest amount of travel on freeways and transit would best meet this standard. As shown in Table 341, the proportion of travel on the "safest" facilities as measured by passenger miles of travel on an average weekday would be greatest under Plan A'(25) (46.9 percent), next highest under Plan A (46.1 percent), next highest under Plan A'(50) (44.8 percent), next highest under Plan R (37.1 percent), and lowest under the "no build" plan (36.8 percent). A comparison of anticipated traffic accident experience and costs on the transportation system in the Region under each of the final alternative transportation plans over the entire plan implementation period is set forth in Table 342. Table 343 identifies the anticipated vehicle miles of travel on the arterial street and highway system in the Region by county.

Standard No. 2 indicates that traffic congestion and vehicle conflicts should be reduced by maintaining a volume-to-capacity ratio on the arterial street system equal to or less than 0.9 based on 24-hour average weekday traffic volumes. As shown in Table 339, this standard is best met under Plan A'(25), where 92 percent of all arterial streets and highways in the Region could be expected to operate under design capacity. Comparable figures for the remaining plans are "no build," 76 percent; Plan A, 91 percent; and Plan R, 82 percent.

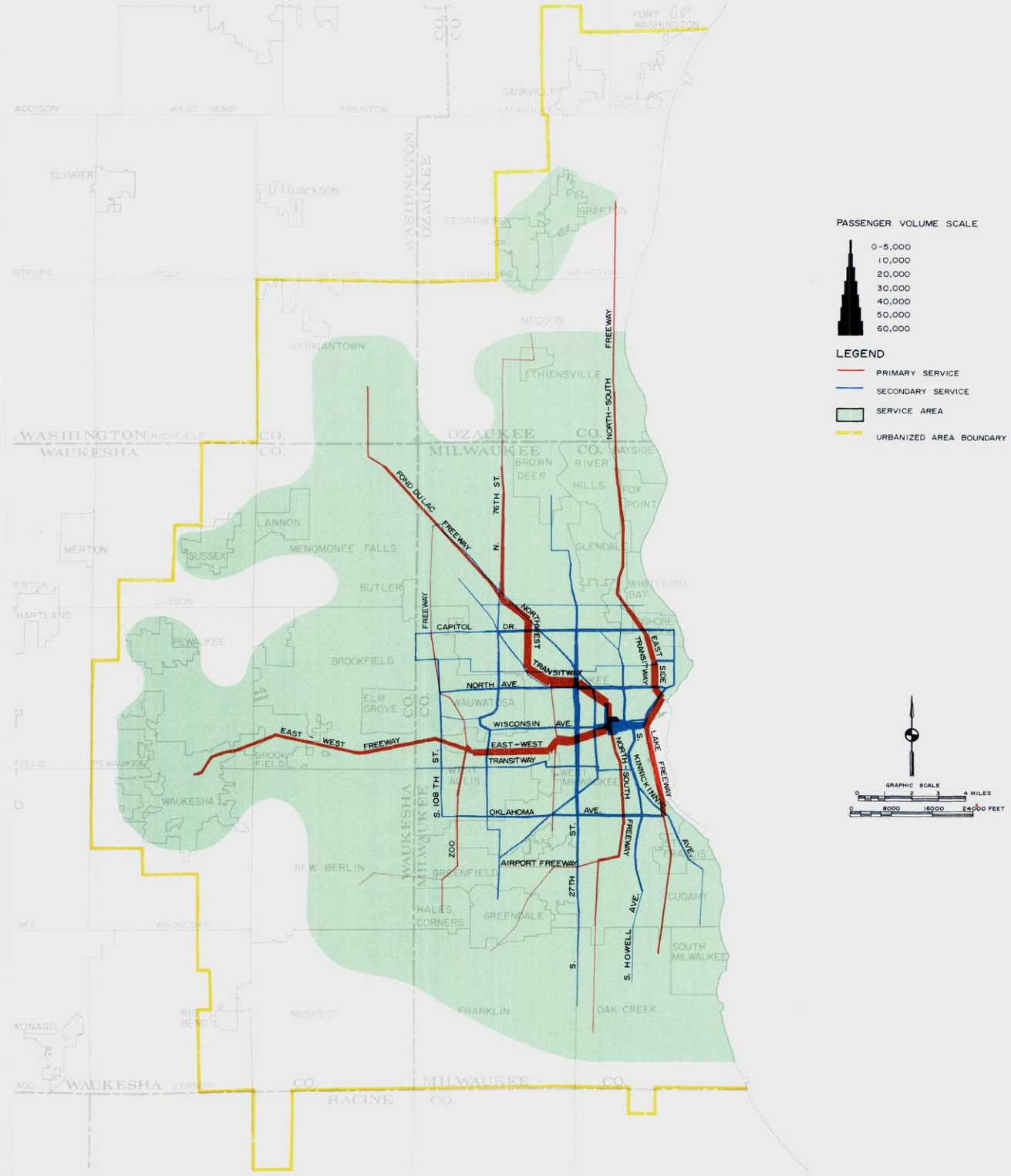
Standard No. 3 indicates that the incident of accidents occurring at railroad grade crossings should be minimized through the provision of warning devices or grade separation, if warranted. This particular standard could be met through effective local planning and plan implementation activities under all of the final alternative plans considered.

Objective No. 7—Aesthetic Quality

The seventh transportation objective relates to the achievement of a transportation system with a high aesthetic quality whose major facilities would possess

Map 85

TRANSIT SYSTEM UTILIZATION IN THE MILWAUKEE URBANIZED AREA: 2000 ALTERNATIVE TRANSPORTATION PLAN A

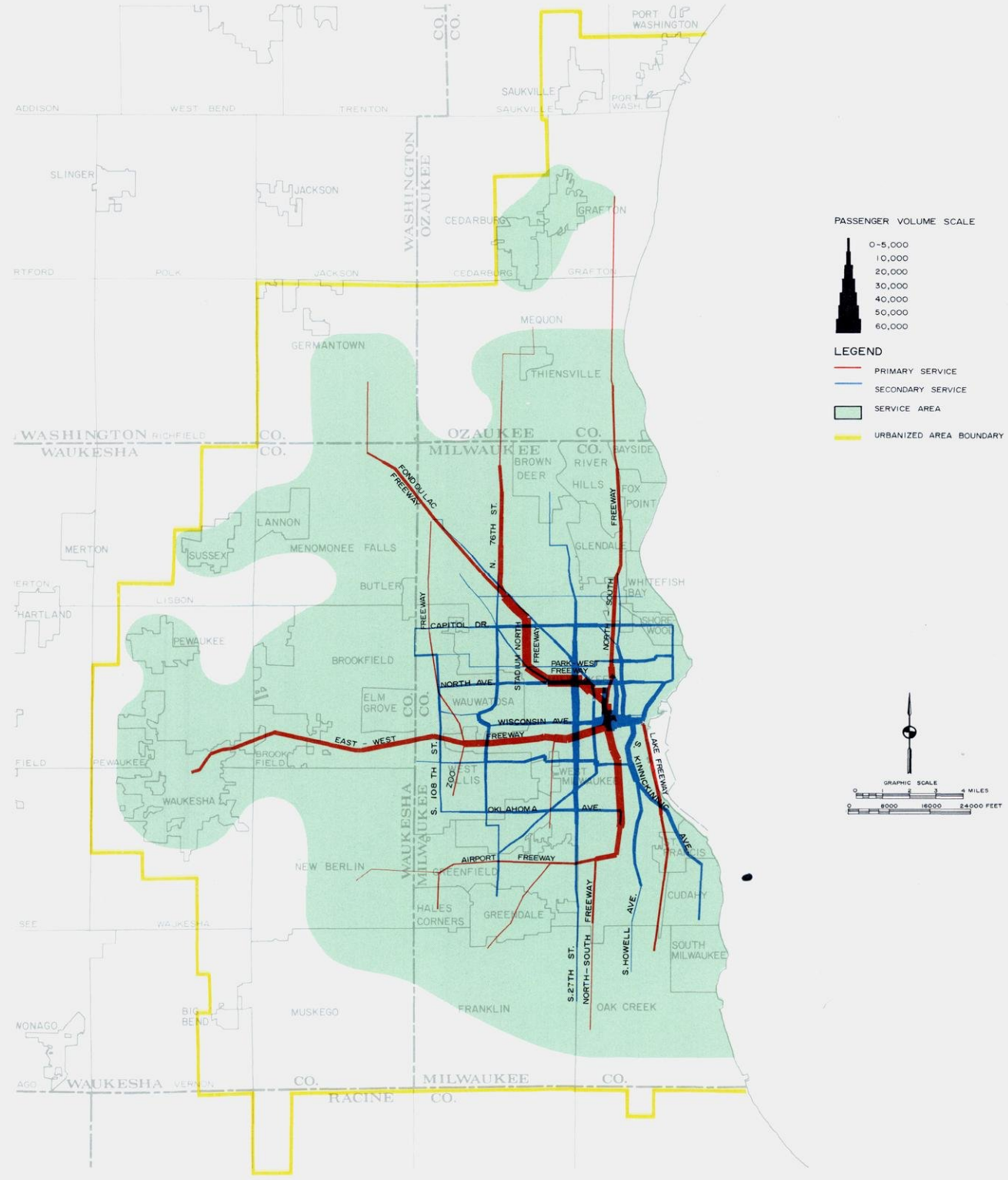


Under alternative transportation Plan A, transit utilization in the Milwaukee area could be expected to increase from about 1.2 million passenger miles per average weekday in 1972 to about 1.7 million in 2000. About 46 percent of the transit travel could be expected to take place on the primary system, about 33 percent on the secondary system, and about 21 percent on the tertiary system. Under this alternative, the base transit fare in Milwaukee would be $0.50.

Source: SEWRPC.

Map 86

TRANSIT SYSTEM UTILIZATION IN THE MILWAUKEE URBANIZED AREA: 2000 ALTERNATIVE TRANSPORTATION PLAN A'(25)

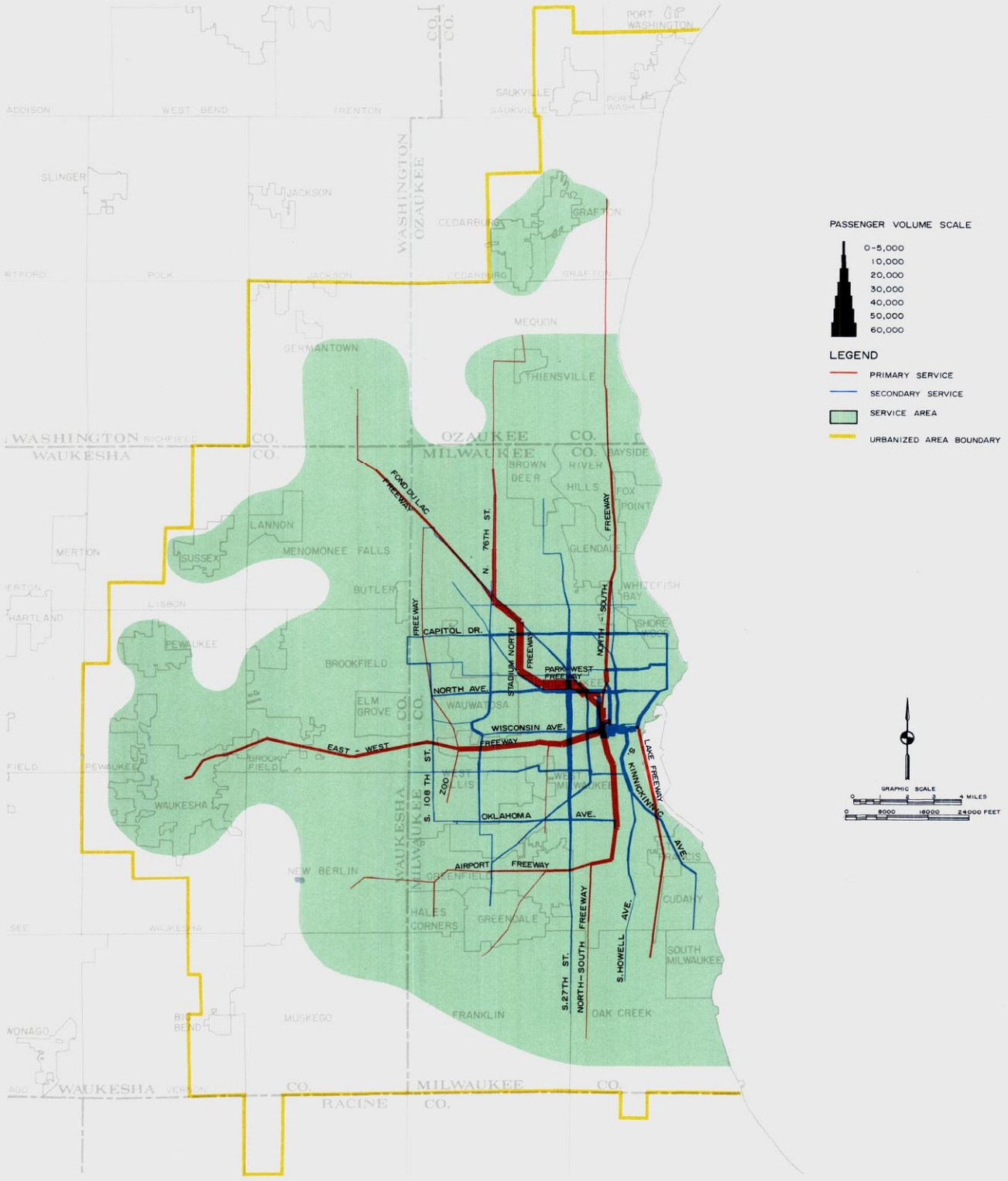


Under alternative transportation Plan A'(25), transit utilization in the Milwaukee area could be expected to increase from about 1.2 million passenger miles per average weekday in 1972 to nearly 2.4 million in 2000. About 42 percent of the transit travel could be expected to take place on the primary system, about 38 percent on the secondary system, and about 20 percent on the tertiary system. Under this alternative, the base transit fare in Milwaukee would be $0.25.

Source: SEWRPC.

Map 87

TRANSIT SYSTEM UTILIZATION IN THE MILWAUKEE URBANIZED AREA: 2000 ALTERNATIVE TRANSPORTATION PLAN A'(50)

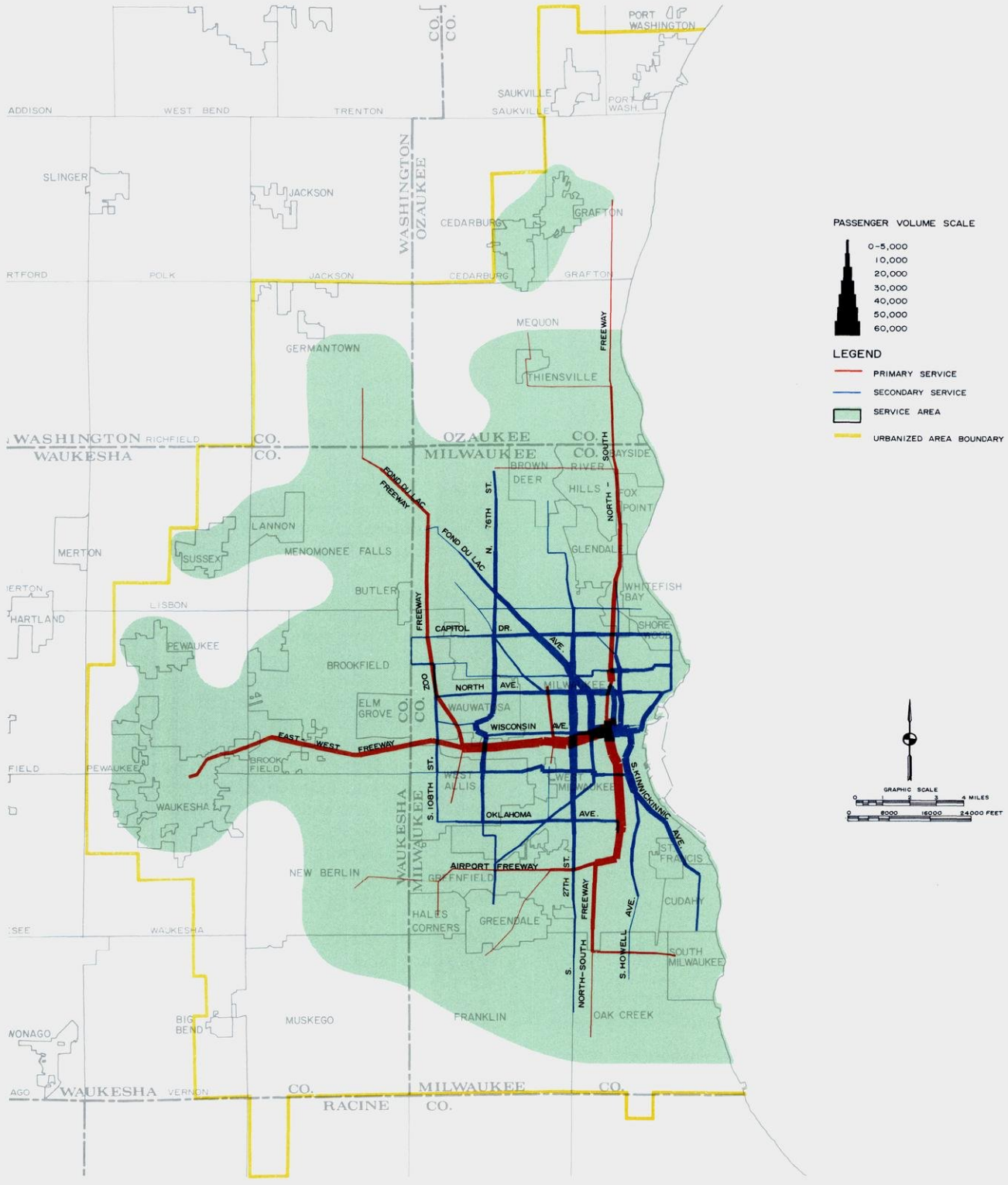


Under alternative transportation Plan A'(50), transit utilization in the Milwaukee area could be expected to increase from about 1.2 million passenger miles per average weekday in 1972 to about 1.7 million in 2000. About 43 percent of the transit travel could be expected to take place on the primary system, about 36 percent on the secondary system, and about 21 percent on the tertiary system. Under this alternative, the base transit fare in Milwaukee would be $0.50.

Source: SEWRPC.

Map 88

TRANSIT SYSTEM UTILIZATION IN THE MILWAUKEE URBANIZED AREA: 2000 ALTERNATIVE TRANSPORTATION PLAN R

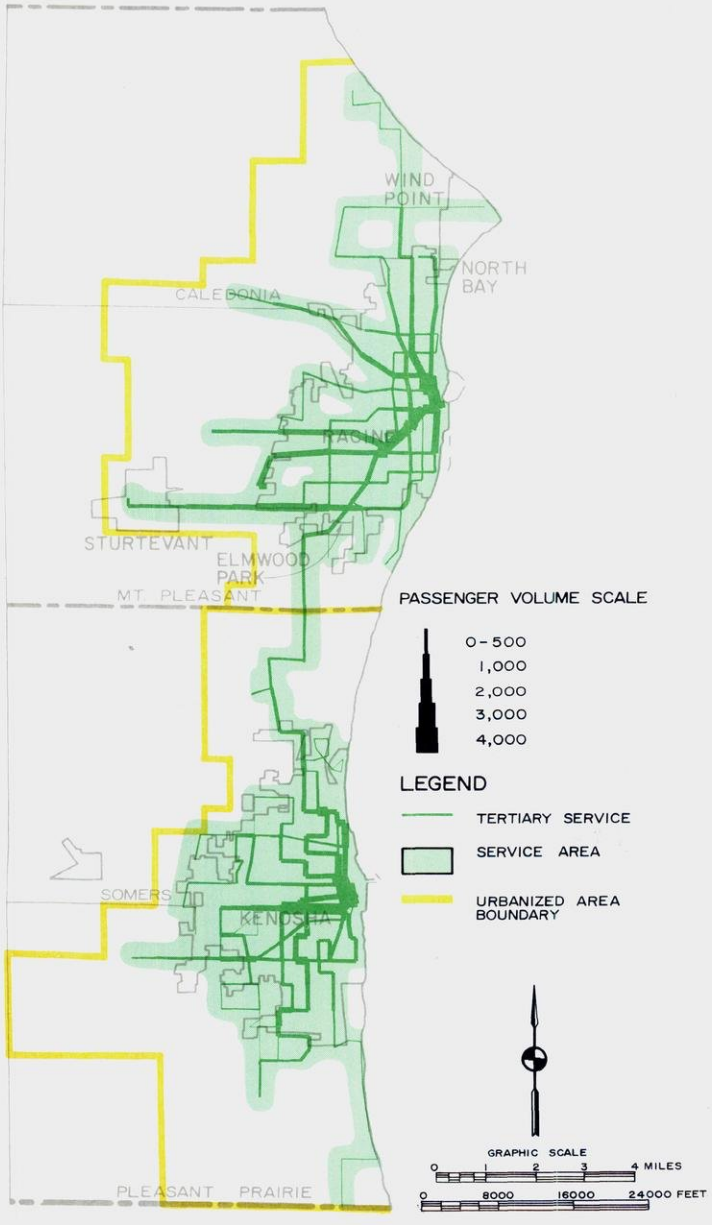


Under alternative transportation Plan R, transit utilization in the Milwaukee area could be expected to increase from about 1.2 million passenger miles per average weekday in 1972 to nearly 2.6 million in 2000. Because Plan R contains virtually no new freeway construction, less transit travel could be expected to take place on the primary system—33 percent as opposed to 46, 42, and 43 percent, respectively, for Plans A, A'(25), and A'(50). Under Plan R about 45 percent of the transit travel would be on the secondary system, with the remaining 22 percent on the tertiary system. Under this alternative, the base transit fare in Milwaukee would be $0.25.

Source: SEWRPC.

Map 89

TRANSIT SYSTEM UTILIZATION IN THE KENOSHA AND RACINE URBANIZED AREAS: 2000 ALTERNATIVE TRANSPORTATION PLANS A, A'(25), A'(50), AND R



Under all of the final alternative transportation plans considered, transit utilization in the Kenosha and Racine urbanized areas could be expected to increase significantly over the 1972 levels. In the Kenosha area, the expected increase would be from about 9,600 passenger miles per average weekday in 1972 to nearly 42,000 in the year 2000. In the Racine area, transit travel could be expected to increase from about 10,900 passenger miles per average weekday in 1972 to about 46,300 in the year 2000. Under all alternative plans, the base transit fare in Racine and Kenosha is assumed to remain at $0.25.

Source: SEWRPC.

a proper visual relationship to the land and cityscape. The aesthetic quality of the transportation system includes the view from the transportation facility by driver and passenger, as well as the view of the facility by residents from adjacent neighborhoods. It is difficult to measure the aesthetic quality of a transportation system at the system planning level. Consideration of this objective and its supporting standards becomes most critical at the project planning level.

Standard No. 1 indicates that transportation facilities should be located to avoid destruction of visually pleasing buildings, structures, and natural features and to avoid interference to such features. This standard can generally be met through careful facility design during plan implementation. Accordingly, it is considered that this standard can be met equally well under all of the final alternative plans.

Standard No. 2 indicates that transportation facility construction plans should be developed using sound geometric, structural, and landscape design standards which consider the aesthetic quality of transportation facilities in the areas through which they pass. Like the first standard, this standard can only be met through proper facility design during plan implementation. Accordingly, it is considered that this standard could be equally met under all of the final alternative plans considered.

Air Quality

Complete ambient air quality analyses were made with respect to the previous set of alternative transportation plans and the results of such analyses were presented in full in Chapter VI of this report. These analyses indicated that the configuration of the different alternative transportation systems had little effect on ambient air quality and on resolving residual ambient air quality problems in order to meet the federal ambient air quality standards. It was also concluded that if the regional air quality maintenance planning program determined that some form of transportation controls would be necessary to meet the standards, those controls would be equally applicable to any of the alternative regional transportation plans considered.

Based upon the results of these analyses, it was determined not to conduct costly full-scale air quality analyses of the final regional transportation plan alternatives. Rather, it was determined that once a decision was made by the Commission as to a final recommended regional transportation system plan, the air quality impacts of that plan would be determined and reported in Chapter IX of this volume.

Cost-Revenue Analysis

In order to determine the approximate financial feasibility of the final alternative transportation plans, a comparison was made of the average annual costs of implementing the highway and transit components of each plan over the plan implementation period 1976-2000 with the anticipated average annual revenues for highway and transit purposes over the same period (see Table 344). Based upon the public financial resource forecast data

Table 338

COMPARISON OF THE AMOUNT OF TOTAL TRAVEL IN THE REGION
1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

Travel Characteristic	Existing 1972		Proposed 2000 (in thousands)									
			No Build		Plan A		Plan A'(25)		Plan A'(50)		Plan R	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
Vehicle Miles of Travel												
Arterial Streets and Highways												
Freeway	6,213	30.9	11,337	36.1	13,312	43.8	13,059	43.7	12,860	42.5	9,799	33.0
Standard Arterial	13,911	69.1	20,065	63.9	17,093	56.2	16,803	56.3	17,382	57.5	19,936	67.0
Subtotal	20,124	100.0	31,402	100.0	30,405	100.0	29,862	100.0	30,242	100.0	29,735	100.0
Transit												
Primary	1	1.5	5	7.4	47	22.5	48	22.1	43	20.9	41	18.4
Secondary	--[a]	--	--[a]	--	49	23.4	56	25.8	51	24.7	68	30.5
Tertiary	64	98.5	63	92.6	113	54.1	113	52.1	112	54.4	114	51.1
Subtotal	65	100.0	68	100.0	209	100.0	217	100.0	206	100.0	223	100.0
Total	20,189	--	31,470	--	30,614	--	30,079	--	30,448	--	29,958	--
Vehicle Hours of Travel												
Arterial Streets and Highways												
Freeway	139	22.7	249	28.3	283	34.6	271	34.1	272	33.3	206	25.1
Standard Arterial	474	77.3	632	71.7	536	65.4	523	65.9	544	66.7	613	74.9
Subtotal	613	100.0	881	100.0	819	100.0	794	100.0	816	100.0	819	100.0
Transit												
Primary	--[a]	--	--[a]	--	3	21.4	3	21.4	2	15.4	2	14.3
Secondary	--[a]	--	--[a]	--	3	21.4	3	21.4	3	23.1	4	28.5
Tertiary	6	100.0	5	100.0	8	57.2	8	57.2	8	61.5	8	57.2
Subtotal	6	100.0	5	100.0	14	100.0	14	100.0	13	100.0	14	100.0
Total	619	--	886	--	833	--	808	--	829	--	833	--
Passenger Hours of Travel												
Arterial Streets and Highways	858	93.7	1,198	97.2	1,114	92.3	1,080	89.3	1,110	92.0	1,114	88.8
Transit	58	6.3	35	2.8	93	7.7	129	10.7	97	8.0	141	11.2
Total	916	100.0	1,233	100.0	1,207	100.0	1,209	100.0	1,207	100.0	1,255	100.0

[a] *Included in tertiary.*

Source: SEWRPC.

set forth in Chapter III of this volume, and upon anticipated transit fare box revenues determined from the ridership levels for each plan, it is estimated that average annual revenues for highway and transit purposes would approximate $209.3 million under the "no build" plan, $218.1 million under Plan A, $213.8 million under Plan A'(25), $218.1 million under Plan A'(50), and $214.8 million under Plan R. Corresponding average annual costs of implementing the street and highway and transit system recommendations in the plan are: "no build" plan $117.8 million, Plan A $199.2 million, Plan A'(25) $196.4 million, Plan A'(50) $194.6 million, and Plan R $175.5 million. Thus, on an average annual basis, revenues could be expected to exceed costs for all plans. The estimated average annual public transit subsidy is $9.1 million for the "no build" plan, $30.5 million for Plan A, $32.5 million for Plan A'(25), $25.9 million for Plan A'(50), and $32.7 million for Plan R.

Table 339

COMPARISON OF THE DISTRIBUTION OF MILES OF ARTERIAL STREET AND HIGHWAY FACILITIES OPERATING AT VARIOUS SERVICE LEVELS IN THE REGION BY COUNTY: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

County and Service Level	Miles of Arterial Facility											
			Proposed 2000									
	1972		No Build		Plan A		Plan A'(25)		Plan A'(50)		Plan R	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
Kenosha County												
Under Design Capacity[a]	243.1	86.9	206.6	62.3	307.3	85.8	307.3	85.8	307.3	85.8	253.6	70.8
At Design Capacity[b]	14.7	5.3	53.0	16.0	47.9	13.4	47.9	13.4	47.9	13.4	88.3	24.7
Over Design Capacity[c]	22.0	7.8	72.1	21.7	2.9	0.8	2.9	0.8	2.9	0.8	16.2	4.5
Subtotal	279.8	100.0	331.7	100.0	358.1	100.0	358.1	100.0	358.1	100.0	358.1	100.0
Milwaukee County												
Under Design Capacity[a]	601.4	81.9	549.9	74.7	673.6	86.7	695.0	89.6	641.8	82.8	524.7	69.8
At Design Capacity[b]	71.8	9.8	92.8	12.6	92.8	12.0	69.4	9.0	114.8	14.8	168.9	22.4
Over Design Capacity[c]	61.0	8.3	93.9	12.7	9.9	1.3	10.9	1.4	18.7	2.4	58.3	7.8
Subtotal	734.2	100.0	736.6	100.0	776.3	100.0	775.3	100.0	775.3	100.0	751.9	100.0
Ozaukee County												
Under Design Capacity[a]	234.7	93.8	268.7	88.5	303.2	98.0	301.2	97.3	301.2	97.3	305.4	98.7
At Design Capacity[b]	10.1	4.0	15.0	4.9	6.3	2.0	8.3	2.7	8.3	2.7	4.1	1.3
Over Design Capacity[c]	5.5	2.2	20.0	6.6	--	0.0	--	--	--	--	--	0.0
Subtotal	250.3	100.0	303.7	100.0	309.5	100.0	309.5	100.0	309.5	100.0	309.5	100.0
Racine County												
Under Design Capacity[a]	310.0	88.7	280.4	72.0	379.6	93.0	379.6	93.0	379.6	93.0	329.4	80.7
At Design Capacity[b]	19.1	5.5	46.4	11.9	28.6	7.0	28.6	7.0	28.6	7.0	61.2	15.0
Over Design Capacity[c]	20.3	5.8	62.8	16.1	--	0.0	--	--	--	--	17.6	4.3
Subtotal	349.4	100.0	389.6	100.0	408.2	100.0	408.2	100.0	408.2	100.0	408.2	100.0
Walworth County												
Under Design Capacity[a]	400.7	98.1	389.9	86.5	472.8	97.9	472.8	97.9	472.8	97.9	432.4	92.0
At Design Capacity[b]	2.7	0.7	27.0	6.0	10.4	2.1	10.4	2.1	10.4	2.1	19.3	4.1
Over Design Capacity[c]	4.8	1.2	33.6	7.5	--	0.0	--	0.0	--	0.0	18.2	3.9
Subtotal	408.2	100.0	450.5	100.0	483.2	100.0	483.2	100.0	483.2	100.0	469.9	100.0
Washington County												
Under Design Capacity[a]	320.4	94.4	326.5	79.6	424.8	96.3	424.8	96.3	424.8	96.3	404.6	91.7
At Design Capacity[b]	9.7	2.9	51.5	12.6	16.4	3.7	16.4	3.7	16.4	3.7	36.6	8.3
Over Design Capacity[c]	9.1	2.7	32.2	7.8	--	0.0	--	0.0	--	--	--	0.0
Subtotal	339.2	100.0	410.2	100.0	441.2	100.0	441.2	100.0	441.2	100.0	441.2	100.0
Waukesha County												
Under Design Capacity[a]	581.8	89.7	479.2	69.7	612.4	85.9	613.4	86.1	582.9	81.8	563.0	79.2
At Design Capacity[b]	23.8	3.7	83.6	12.2	86.8	12.2	82.8	11.6	114.9	16.1	137.3	19.3
Over Design Capacity[c]	42.9	6.6	124.8	18.1	13.6	1.9	16.6	2.3	15.0	2.1	11.0	1.5
Subtotal	648.5	100.0	687.6	100.0	712.8	100.0	712.8	100.0	712.8	100.0	711.3	100.0
Southeastern Wisconsin Region												
Under Design Capacity[a]	2,692.1	89.5	2,501.2	75.5	3,173.7	91.0	3,194.1	91.5	3,110.4	89.2	2,813.1	81.5
At Design Capacity[b]	151.9	5.0	369.3	11.2	289.2	8.3	263.8	7.6	341.3	9.8	515.7	15.0
Over Design Capacity[c]	165.6	5.5	439.4	13.3	26.4	0.7	30.4	0.9	36.6	1.0	121.3	3.5
Subtotal	3,009.6	100.0	3,309.9	100.0	3,489.3	100.0	3,488.3	100.0	3,488.3	100.0	3,450.1	100.0

[a] *Volume-to-capacity ratio.*

[b] *Volume-to-capacity ratio.*

[c] *Volume-to-capacity ratio.*

Source: SEWRPC.

Table 340

COMPARISON OF THE DISTRIBUTION OF MILES OF ARTERIAL STREETS AND HIGHWAYS OPERATING AT AND OVER CAPACITY IN THE REGION BY COUNTY: 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

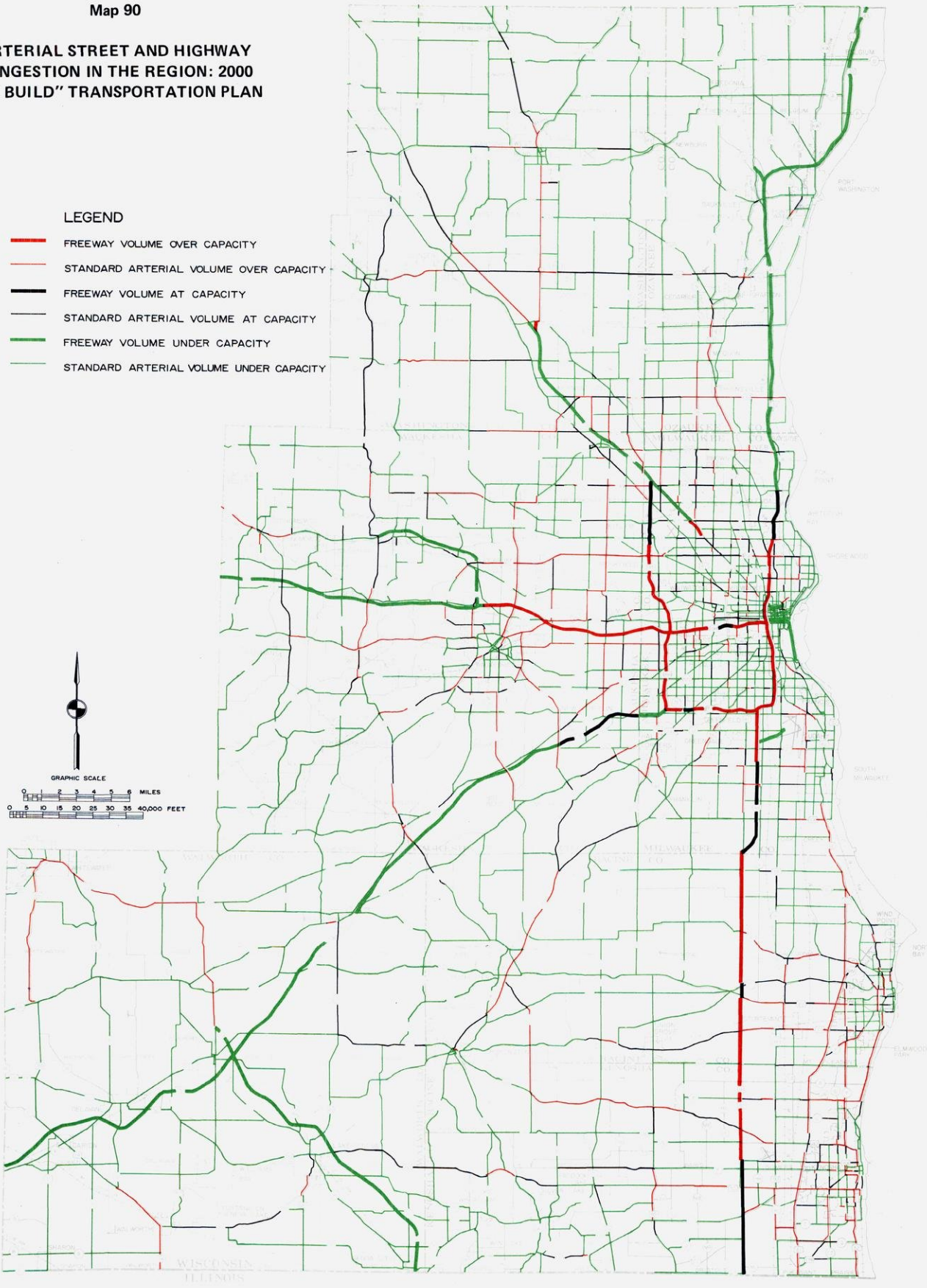
County and Arterial Design Type	Miles of Arterial Facility																			
	No Build				Plan A				Plan A'(25)				Plan A'(50)				Plan R			
	At Capacity		Over Capacity		At Capacity		Over Capacity		At Capacity		Over Capacity		At Capacity		Over Capacity		At Capacity		Over Capacity	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Kenosha																				
Standard Arterial. .	23.5	22.7	39.2	27.6	20.7	27.2	2.5	0.4	20.7	27.2	2.5	0.4	20.7	27.2	2.5	0.4	32.3	50.5	13.6	2.6
Freeway.	--	6.8	--	5.3	--	--	--	--	--	--	--	--	--	--	--	--	--	5.5	--	--
Subtotal	23.5	29.5	39.2	32.9	20.7	27.2	2.5	0.4	20.7	27.2	2.5	0.4	20.7	27.2	2.5	0.4	32.3	56.0	13.6	2.6
Milwaukee																				
Standard Arterial. .	80.0	--	65.0	0.6	63.9	--	7.8	--	53.2	--	9.6	--	98.1	0.3	16.2	--	125.3	2.0	56.0	0.6
Freeway.	11.6	1.2	28.3	--	28.9	--	2.1	--	16.2	--	1.3	--	16.4	--	2.5	--	40.5	1.1	1.7	--
Subtotal	91.6	1.2	93.3	0.6	92.8	--	9.9	--	69.4	--	10.9	--	114.5	0.3	18.7	--	165.8	3.1	57.7	0.6
Ozaukee																				
Standard Arterial. .	7.1	7.9	18.5	1.5	2.9	3.4	--	--	2.9	5.4	--	--	2.9	5.4	--	--	2.2	1.9	--	--
Freeway.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	7.1	7.9	18.5	1.5	2.9	3.4	--	--	2.9	5.4	--	--	2.9	5.4	--	--	2.2	1.9	--	--
Racine																				
Standard Arterial. .	28.0	17.5	31.3	20.4	19.9	8.7	--	--	19.9	8.7	--	--	19.9	8.7	--	--	33.1	16.0	11.3	6.3
Freeway.	--	0.9	--	11.1	--	--	--	--	--	--	--	--	--	--	--	--	--	12.1	--	--
Subtotal	28.0	18.4	31.3	31.5	19.9	8.7	--	--	19.9	8.7	--	--	19.9	8.7	--	--	33.1	28.1	11.3	6.3
Walworth																				
Standard Arterial. .	1.7	25.3	5.6	28.0	1.9	8.5	--	--	1.9	8.5	--	--	1.9	8.5	--	--	5.9	13.4	0.8	17.4
Freeway.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Subtotal	1.7	25.3	5.6	28.0	1.9	8.5	--	--	1.9	8.5	--	--	1.9	8.5	--	--	5.9	13.4	0.8	17.4
Washington																				
Standard Arterial. .	8.6	37.1	12.0	14.1	5.5	10.9	--	--	5.5	10.9	--	--	5.5	10.9	--	--	8.9	15.6	--	--
Freeway.	--	5.8	0.8	5.3	--	--	--	--	--	--	--	--	--	--	--	--	0.8	11.3	--	--
Subtotal	8.6	42.9	12.8	19.4	5.5	10.9	--	--	5.5	10.9	--	--	5.5	10.9	--	--	9.7	26.9	--	--
Waukesha																				
Standard Arterial. .	48.3	30.4	83.3	32.4	44.9	32.2	8.6	5.0	48.0	28.6	12.8	3.8	56.5	52.1	13.1	1.9	70.2	58.9	10.3	0.7
Freeway.	2.7	2.2	7.6	1.5	8.2	1.5	--	--	4.7	1.5	--	--	4.8	1.5	--	--	6.7	1.5	--	--
Subtotal	51.0	32.6	90.9	33.9	53.1	33.7	8.6	5.0	52.7	30.1	12.8	3.8	61.3	53.6	13.1	1.9	76.9	60.4	10.3	0.7
Southeastern Wisconsin Region																				
Standard Arterial. .	197.2	140.9	254.9	124.6	159.7	90.9	18.9	5.4	152.1	89.3	24.9	4.2	205.5	113.1	31.8	2.3	277.9	158.3	92.0	27.6
Freeway.	14.3	16.9	36.7	23.2	37.1	1.5	2.1	--	20.9	1.5	1.3	--	21.2	1.5	2.5	--	48.0	31.5	1.7	--
Total	211.5	157.8	291.6	147.8	196.8	92.4	21.0	5.4	173.0	90.8	26.2	4.2	226.7	114.6	34.3	2.3	325.9	189.8	93.7	27.6

Source: SEWRPC.

From the foregoing, it would appear that based upon the forecast of revenues for transportation purposes set forth in Chapter III of this report and the anticipated transit fare box revenue, there should be sufficient monies available over the plan implementation period to fully implement any one of the final alternative plans considered. It should be noted, however, that the foregoing cost-revenue analysis assumes that if general price inflation continues to occur, it will affect both the costs associated with transportation system development and operation and transportation revenues to the same degree. This would mean, for example, that if inflation does occur, such inflation-resistent revenues as the transit fare and the tax per gallon on gasoline would have to be raised periodically to offset such inflationary effects. The Wisconsin Department of Transportation has indicated that this assumption is unrealistic since the elected governing bodies concerned have tended to defer increases in fares and gasoline taxes, thus effecting a real dollar reduction in fares and gasoline taxes. Accordingly, at the request of the Wisconsin Department of Transportation, a second cost-revenue analysis was prepared. The results of this second analysis are also shown in Table 344. This second analysis assumed that those components of trans-

Map 90

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 "NO BUILD" TRANSPORTATION PLAN

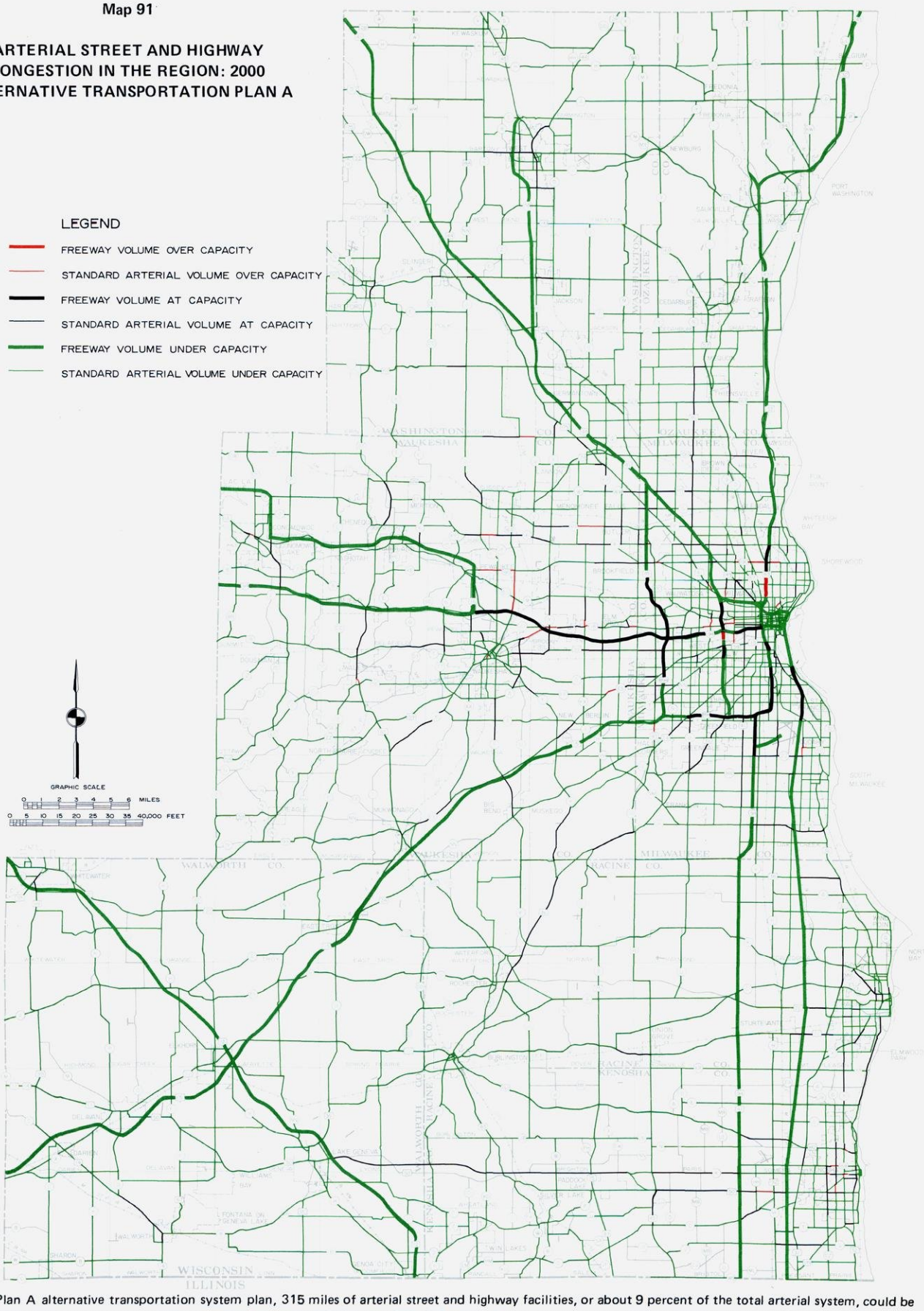


Under the "no build" alternative transportation system plan, 808 miles of arterial street and highway facilities, or about 24 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, were operating at or over design capacity.

Source: SEWRPC.

Map 91

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 ALTERNATIVE TRANSPORTATION PLAN A

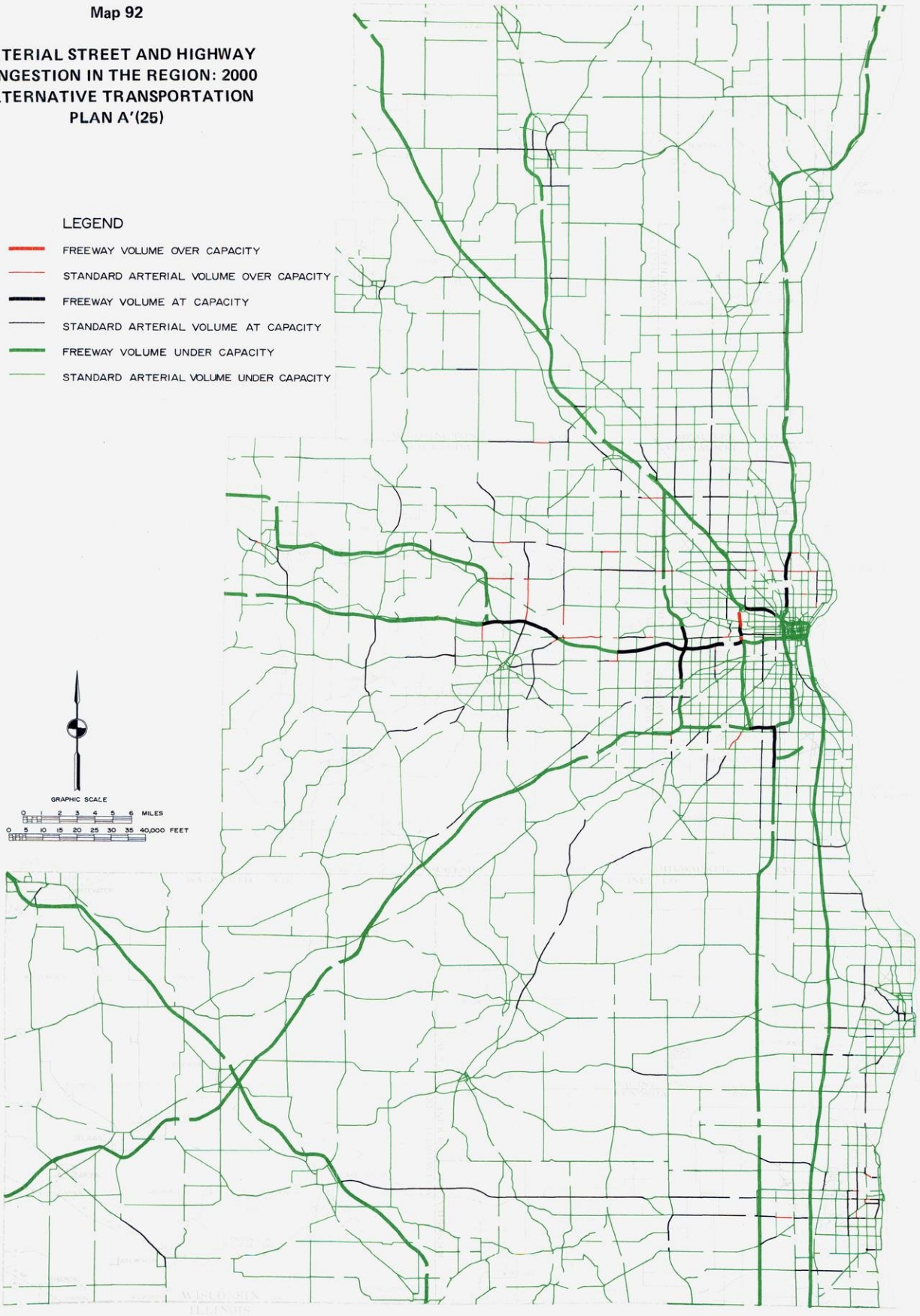


Under the Plan A alternative transportation system plan, 315 miles of arterial street and highway facilities, or about 9 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, were operating at or over design capacity.

Source: SEWRPC.

Map 92

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 ALTERNATIVE TRANSPORTATION PLAN A'(25)

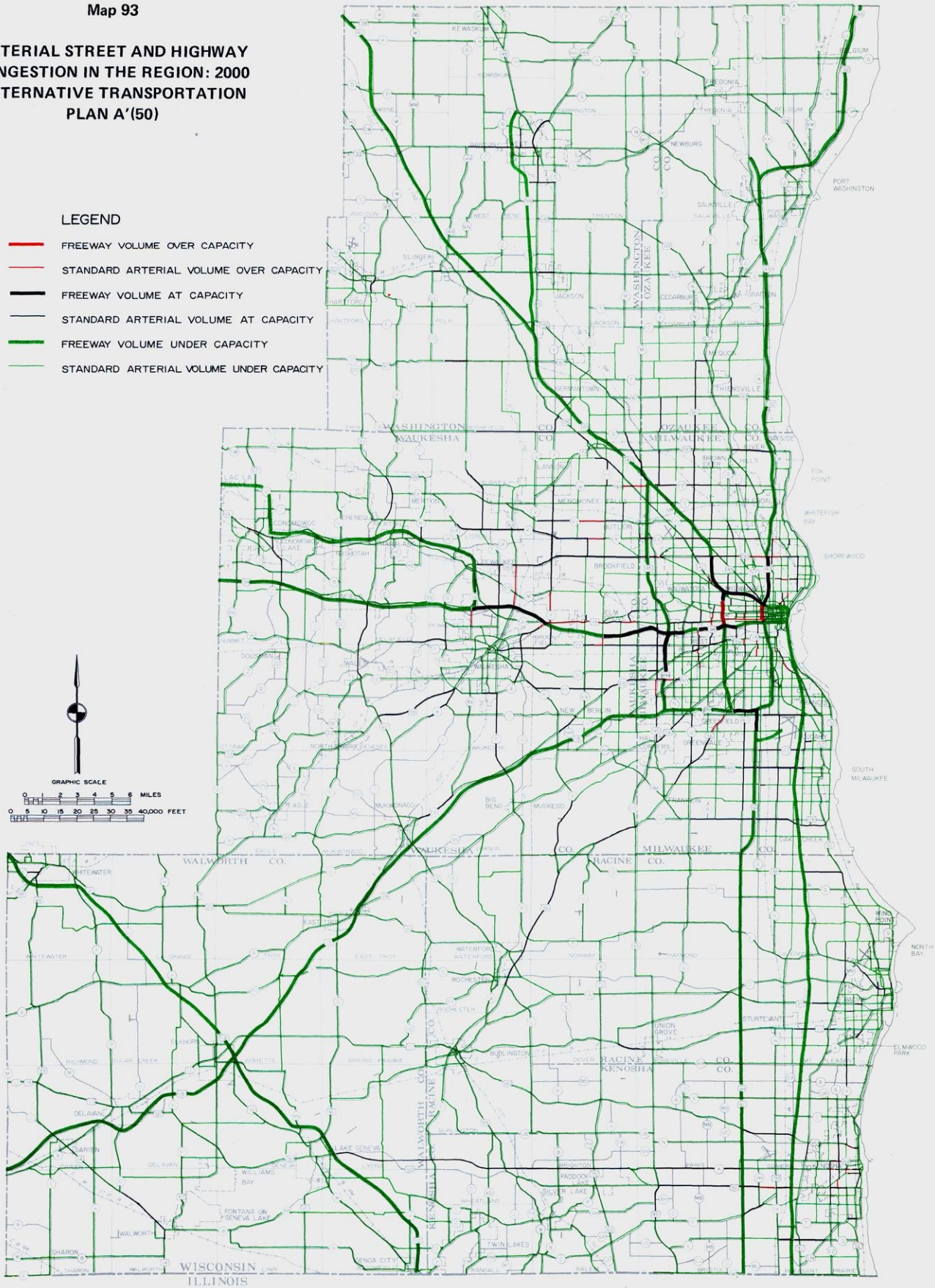


Under the Plan A'(25) alternative transportation system plan, 294 miles of arterial street and highway facilities, or about 9 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, were operating at or over design capacity.

Source: SEWRPC.

Map 93

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 ALTERNATIVE TRANSPORTATION PLAN A'(50)

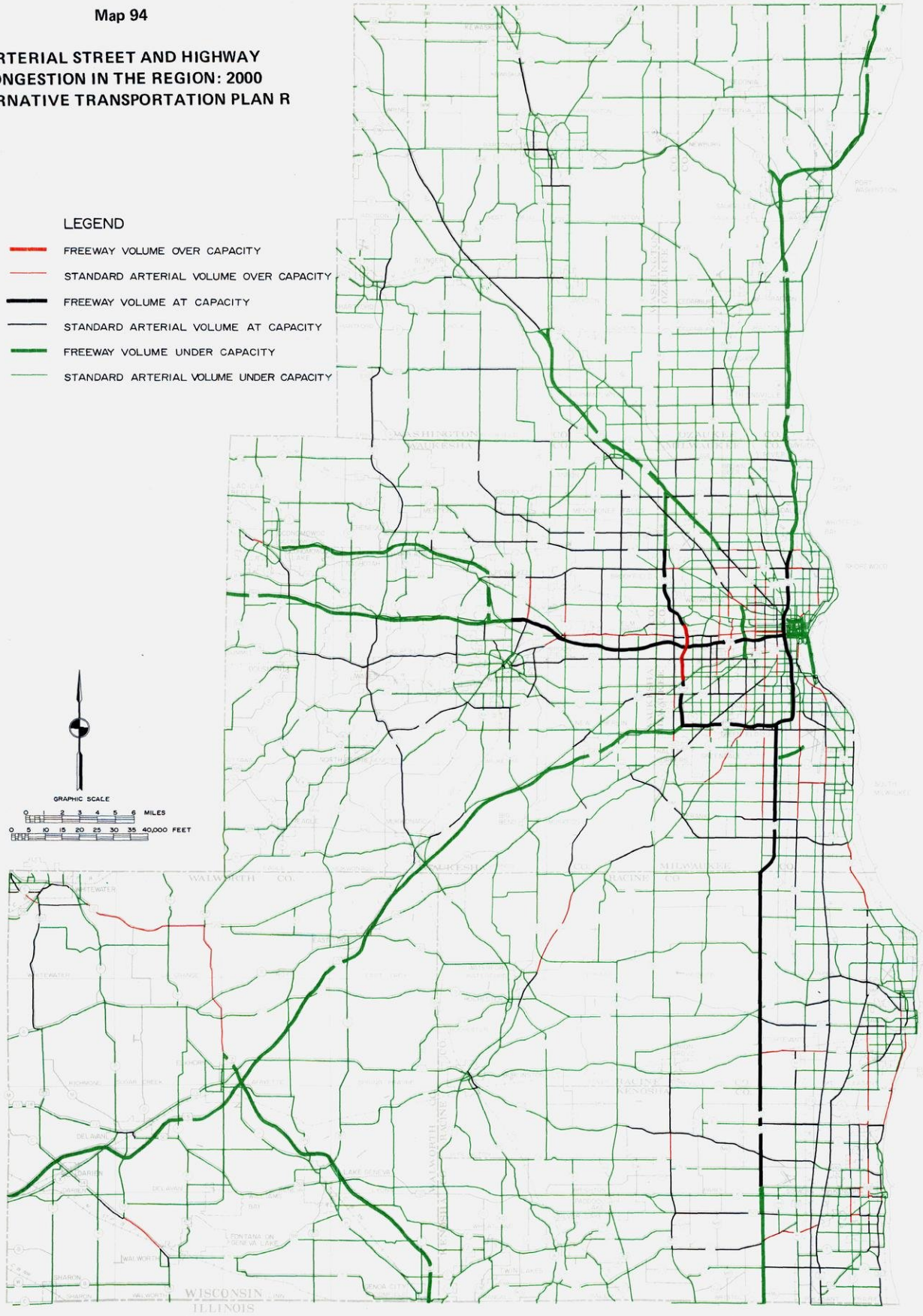


Under the Plan A'(50) alternative transportation system plan, 378 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, were operating at or over design capacity.

Source: SEWRPC.

Map 94

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION: 2000 ALTERNATIVE TRANSPORTATION PLAN R



Under the Plan R alternative transportation system plan, 637 miles of arterial street and highway facilities, or about 19 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, were operating at or over design capacity.

Source: SEWRPC.

Table 341

DISTRIBUTION OF PASSENGER MILES OF TRAVEL IN THE REGION BY MODE AND FACILITY TYPE: FINAL 2000 TRANSPORTATION PLAN ALTERNATIVES

Mode/Facility Type	Passenger Miles of Travel on an Average Weekday (in thousands)									
	No Build		Plan A		Plan A'(25)		Plan A'(50)		Plan R	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Freeways	15,418	35.7	18,104	41.9	17,760	41.2	17,490	40.8	13,327	31.0
Mass Transit	497	1.1	1,809	4.2	2,456	5.7	1,732	4.0	2,637	6.1
Subtotal	15,915	36.8	19,913	46.1	20,216	46.9	19,222	44.8	15,964	37.1
Standard Arterials	27,288	63.2	23,246	53.9	22,852	53.1	23,640	55.2	27,113	62.9
Total	43,203	100.0	43,159	100.0	43,068	100.0	42,862	100.0	43,077	100.0

Source: SEWRPC.

portation revenues that are particularly inflation-resistent, such as the transit fare and the per gallon tax on motor fuel, would remain at their current levels over the plan implementation period, while price inflation would average 5 percent annually. All other revenues, such as the property tax and excise tax, were assumed to be non-resistent to inflation. In addition, this analysis took into account proposed increases in fuel efficiencies for automobiles, a factor not taken into account in the analysis based solely on past trends (see Appendix J).

The results of this second analysis indicate that, for the transportation sytem as a whole, revenues would exceed costs for the "no build" plan by about $65.4 million annually and for Plan R by about $9 million annually. There would be revenue shortfalls, however, for Plans A, A'(25), and A'(50) of about $13.9 million, $12.1 million, and $9.3 million, respectively. The estimated average annual public transit subsidy required under this second analysis is $14.8 million under the "no build" plan, $42.9 million under Plan A, $41.6 million under Plan A'(25), $38.3 million under Plan A'(50), and $42.6 million under Plan R.

Summary—Application of Rank-Based Expected Value Method of Plan Evaluation

The above analyses with respect to each of the seven regional transportation development objectives and supporting standards are summarized in Table 345. This summary data was utilized to apply the rank-based expected value method of plan evaluation, as that method was fully described in Chapter VI of this volume, to the final set of alternative regional transportation plans. Detailed tables supporting this application are set forth in Appendix I, and the results of the computation of the plan values for the final alternatives are set forth in Table 346.

The application of the rank-based expected value method of plan evaluation requires that probability of implementation factors be selected for each plan. Probability of implementation values of 0.3, 0.4, 0.4, 0.6, and 0.5 were selected for the "no build" plan, Plan A, Plan A'(25), Plan A'(50), and Plan R, respectively. A probability of implementation value of 1.0 would be a perfect value, indicating that implementation was uncertain. Plans A and A'(25) were each assigned probability of implementation factors of 0.4 because of the difficulties that would likely be encountered in building the proposed transitways in Plan A and in securing the proposed $0.25 base transit fare in Milwaukee in Plan A'(25). By the same token, Plan A'(50) was assigned a probability of implementation factor of 0.6, slightly higher than either A or A'(25), because Plan A'(50) does not include either the proposed transitways or the $0.25 base transit fare. Plan R was assigned a probability of implementation factor of 0.5 since, while it does not contain the proposed freeways, it does contain a proposed $0.25 transit fare. The "no build" plan was given the lowest probability of implementation value in the belief that arterial street and highway transit improvements would likely take place within the Region during the planning period even if major freeways and transit facilities are not constructed. As shown in Table 346, Plan A'(50) has the highest total plan value, with Plan A'(25) second, Plan R third, Plan A fourth, and the "no build" plan fifth.

ADVISORY COMMITTEE AND COMMISSION ACTION ON FINAL ALTERNATIVES

Technical Coordinating and Advisory Committee

The Technical Coordinating and Advisory Committee on Regional Land Use-Transportation Planning met on May 31 and July 19, 1977, to consider the results of the analysis of the final regional transportation plan alterna-

Table 342

COMPARISON OF TRAFFIC ACCIDENT EXPERIENCE AND COST ON THE TRANSPORTATION SYSTEM IN THE REGION BY COUNTY: 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

County and Accident Characteristics	Street and Highway System Cumulative Accident Experience and Cost[a]: 1976-2000				
	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Kenosha County					
Number of Property Damage Accidents	170,316	153,550	154,510	154,270	167,187
Number of Injuries	55,235	50,045	50,343	50,260	54,083
Number of Fatalities	1,169	1,056	1,066	1,060	1,141
Cost of Accidents	$454.18	$410.88	$413.75	$413.08	$444.45
Milwaukee County					
Number of Property Damage Accidents	1,551,326	1,421,555	1,389,401	1,433,100	1,479,942
Number of Injuries	322,873	283,668	287,269	297,000	309,364
Number of Fatalities	2,615	2,386	2,327	2,410	2,500
Cost of Accidents	$2,319.79	$2,067.24	$2,067.00	$2,135.96	$2,219.99
Ozaukee County					
Number of Property Damage Accidents	77,995	74,910	74,544	75,470	75,933
Number of Injuries	25,751	24,671	24,548	24,790	24,998
Number of Fatalities	553	524	522	530	539
Cost of Accidents	$212.15	$202.67	$201.73	$203.76	$206.28
Racine County					
Number of Property Damage Accidents	184,893	168,867	168,748	168,300	184,324
Number of Injuries	60,051	55,259	55,213	55,070	59,866
Number of Fatalities	1,266	1,167	1,168	1,170	1,266
Cost of Accidents	$493.14	$453.55	$453.40	$452.35	$492.05
Walworth County					
Number of Property Damage Accidents	114,784	106,536	106,303	106,100	128,663
Number of Injuries	37,050	35,127	35,127	35,060	41,856
Number of Fatalities	795	752	746	740	894
Cost of Accidents	$306.09	$289.29	$288.41	$287.82	$344.96
Washington County					
Number of Property Damage Accidents	128,810	107,039	107,002	107,510	131,583
Number of Injuries	41,347	35,089	35,076	35,250	42,285
Number of Fatalities	882	739	743	750	896
Cost of Accidents	$341.25	$287.69	$288.08	$289.39	$348.25
Waukesha County					
Number of Property Damage Accidents	330,401	320,962	318,583	324,420	330,514
Number of Injuries	108,077	104,806	104,044	105,870	107,693
Number of Fatalities	2,297	2,226	2,210	2,250	2,283
Cost of Accidents	$888.76	$861.90	$855.62	$870.78	$885.40
Southeastern Wisconsin Region					
Number of Property Damage Accidents	2,558,525	2,353,419	2,319,091	2,369,170	2,498,146
Number of Injuries	649,384	588,725	591,620	603,300	640,145
Number of Fatalities	9,577	8,850	8,782	8,910	9,519
Cost of Accidents	$5,015.35	$4,573.50	$4,567.99	$4,653.14	$4,941.38

Transit System and Accident Experience	Transit System Cumulative Accident Experience and Cost: 1976-2000				
	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Southeastern Wisconsin Region					
Number of Passenger Accidents	9,937	19,251	23,830	19,323	25,113
Number of Vehicle Accidents	24,746	54,210	54,381	53,682	57,068
Number of Fatalities	36	65	79	65	77
Cost of Accidents	$15,350,650	$31,257,110	$34,846,000	$31,115,300	$35,395,470
Southeastern Wisconsin Region Total Cost of Accidents	$5,030,700,650	$4,604,755,110	$4,602,836,000	$4,984,255,300	$4,976,775,470

[a] *Million Dollars.*

Source: SEWRPC.

Table 343

VEHICLE MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION BY COUNTY: 1972 AND 2000 FINAL TRANSPORTATION PLAN ALTERNATIVES

County	Arterial Vehicle Miles of Travel on an Average Weekday (thousands)											
	1972		No Build		Plan A		Plan A'(25)		Plan A'(50)		Plan R	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Kenosha												
Freeway	382	26.8	757	25.0	898	31.7	887	31.3	883	31.2	612	21.6
Standard Arterial	1,046	73.2	2,265	75.0	1,932	68.3	1,951	68.7	1,948	68.8	2,226	78.4
Subtotal	1,428	100.0	3,022	100.0	2,830	100.0	2,838	100.0	2,831	100.0	2,838	100.0
Milwaukee												
Freeway	3,977	37.2	5,980	44.2	6,520	51.3	6,295	51.5	6,125	49.0	4,668	39.4
Standard Arterial	6,718	62.8	7,547	55.8	6,181	48.7	5,928	48.5	6,385	51.0	7,181	60.6
Subtotal	10,695	100.0	13,527	100.0	12,701	100.0	12,223	100.0	12,510	100.0	11,849	100.0
Ozaukee												
Freeway	223	26.2	749	46.3	660	44.6	652	44.4	644	43.7	664	44.2
Standard Arterial	627	73.8	867	53.7	821	55.4	815	55.6	831	56.3	839	55.8
Subtotal	850	100.0	1,616	100.0	1,481	100.0	1,467	100.0	1,475	100.0	1,503	100.0
Racine												
Freeway	415	22.9	916	29.0	1,198	38.6	1,188	38.4	1,189	38.5	903	28.7
Standard Arterial	1,398	77.1	2,248	71.0	1,909	61.4	1,908	61.6	1,900	61.5	2,239	71.3
Subtotal	1,813	100.0	3,164	100.0	3,107	100.0	3,096	100.0	3,089	100.0	3,142	100.0
Walworth												
Freeway	56	6.4	498	25.4	1,230	50.4	1,235	50.6	1,234	50.7	867	34.1
Standard Arterial	817	93.6	1,464	74.6	1,211	49.6	1,206	49.4	1,202	49.3	1,675	65.9
Subtotal	873	100.0	1,962	100.0	2,441	100.0	2,441	100.0	2,436	100.0	2,542	100.0
Washington												
Freeway	190	16.5	252	13.3	872	43.2	876	43.3	884	43.4	296	14.9
Standard Arterial	961	83.5	1,637	86.7	1,146	56.8	1,145	56.7	1,153	56.6	1,684	85.1
Subtotal	1,151	100.0	1,889	100.0	2,018	100.0	2,021	100.0	2,037	100.0	1,980	100.0
Waukesha												
Freeway	970	29.3	2,185	35.1	1,934	33.2	1,926	33.3	1,901	32.4	1,789	30.4
Standard Arterial	2,344	70.7	4,037	64.9	3,893	66.8	3,850	66.7	3,963	67.6	4,092	69.6
Subtotal	3,314	100.0	6,222	100.0	5,827	100.0	5,776	100.0	5,864	100.0	5,881	100.0
Southeastern Wisconsin Region												
Freeway	6,213	30.9	11,337	36.1	13,312	43.8	13,059	43.7	12,860	42.5	9,799	33.0
Standard Arterial	13,911	69.1	20,065	63.9	17,093	56.2	16,803	56.3	17,382	57.5	19,936	67.0
Total	20,124	100.0	31,402	100.0	30,405	100.0	29,862	100.0	30,242	100.0	29,735	100.0

Source: SEWRPC.

tives. Several members expressed concern that none of the final alternatives included the Metropolitan Belt Freeway, indicating that in their opinion the need for that freeway would become increasingly evident with the passage of time, particularly if the development recommendations contained in the recommended regional land use plan are not followed. Other members of the Committee expressed concern over the potential ramifications of the assumed extensive ramp metering on the freeway system in the Milwaukee urbanized area, indicating that the ramp metering would affect most directly and adversely the residents of Milwaukee County who had to date paid the local share of the cost of constructing the freeways and who had suffered the most in terms of disruption and dislocation. For this reason, these Committee members believed that the transitways should remain in any final recommended plan. In addition, the Committee believed the $0.25

Table 344

COMPARISON OF AVERAGE ANNUAL TRANSPORTATION SYSTEM PLAN COSTS AND REVENUES

Costs and Revenues	Alternative Revenue Forecasts (millions of 1975 dollars)									
	1960-1972 Trend					Modified Trend				
	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Average Annual Cost										
Street and Highway System. . .	91.1	142.3	141.8	142.3	119.7	91.1	142.3	141.8	142.3	119.7
Transit System	26.7	56.9	54.6	52.3	55.8	26.7	56.9	54.6	52.3	55.8
Total	117.8	199.2	196.4	194.6	175.5	117.8	199.2	196.4	194.6	175.5
Average Annual Revenues										
Street and Highway System. . .	191.7	191.7	191.7	191.7	191.7	171.3	171.3	171.3	171.3	171.3
Transit System (fare box revenue only)	17.6	26.4	22.1	26.4	23.1	11.9	14.0	13.0	14.0	13.2
Total	209.3	218.1	213.8	218.1	214.8	183.2	185.3	184.3	185.3	184.5
Surplus	91.5	18.9	17.4	23.5	39.3	65.4	--	--	--	9.0
Deficit	--	--	--	--	--	--	13.9	12.1	9.3	--

Source: SEWRPC.

Table 345

COMPARISON OF THE RELATIVE ABILITY OF THE FINAL TRANSPORTATION PLAN ALTERNATIVES TO MEET THE TRANSPORTATION SYSTEM DEVELOPMENT STANDARDS

Development Objective and Supporting Standards	Alternative Transportation System Plans									
	No Build		Plan A		Plan A'(25)		Plan A'(50)		Plan R	
Objective No. 1—Effectively Serve Regional Land Use Pattern										
1. Serve Urbanized Area Land Uses	Highway	Transit	Highway	Transit	Highway	Transit	Highway	Transit	Highway	Transit
Percent of Population Served										
a. Employment Opportunities	94.5	14.1	95.4	53.8	95.4	52.5	95.4	52.5	94.8	52.4
b. Major Retail and Service Centers	99.2	5.0	99.8	47.9	99.8	47.7	99.8	47.7	99.9	48.0
c. Medical Center Hospital/Clinic	100.0	45.4	100.0	73.1	100.0	72.5	100.0	72.5	100.0	72.9
d. Major Outdoor Recreation Center	100.0	36.5	100.0	73.8	100.0	70.3	100.0	70.3	100.0	70.8
e. Higher Educational Facility	100.0	57.7	100.0	80.8	100.0	80.7	100.0	80.7	100.0	80.7
f. Scheduled Air Transport Airport	100.0	10.7	100.0	49.3	100.0	51.5	100.0	51.5	100.0	46.4
2. Adequate Accessibility	$148{,}050 \times 10^6$		$148{,}890 \times 10^6$		$148{,}890 \times 10^6$		$148{,}890 \times 10^6$		$148{,}630 \times 10^6$	
Objective No. 2—Minimize Costs and Energy Utilization										
1. Minimize Sum of Transportation System Capital and Operating Costs	$72,591 Million		$72,774 Million		$72,317 Million		$72,728 Million		$72,844 Million	
2. Direct Benefits Exceed Direct Costs	--		1.09		1.26		1.07		0.89	
3. Maximize Use of Existing Facilities.	$92.8 Million		$1,594.5 Million		$1,492.7 Million		$1,478.2 Million		$909.2 Million	
4. Minimize Energy Utilization, Particularly Petroleum-Based Fuels	758 Million Gallons		735 Million Gallons		727 Million Gallons		737 Million Gallons		736 Million Gallons	

Table 345 (continued)

Development Objective and Supporting Standards	Alternative Transportation System Plans				
	No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Objective No. 3—Provide Flexible, Balanced Transportation System					
1. Arterial Street and Highway System					
a. Arterial Spacing	Met	Met	Met	Met	Met
b. Freeway Warrants	Not Met	Met	Met	Met	Met
2. Transit System					
a. Mass Transit Warrants Percent Cost Paid by Equivalent Farebox Revenue	88.9	70.2	46.3	70.7	48.1
b. Minimize Subsidy Per Ride	$0.16	$0.34	$0.35	$0.33	$0.33
c. Primary Rapid Transit Warrants	Not Met	Met	Met	Met	Met
d. Primary/Secondary Transit to Reduce Peak Hour Congestion	Not Met	Met	Met	Met	Met
e. Primary/Secondary Transit Collection-Distribution	Not Met	Met	Met	Met	Met
f. Service Area (square miles)	281.1	517.7	517.7	517.7	517.7
Percent of Population of Urbanized Area Served	73.2	93.7	93.7	93.7	93.7
g. Transit Route Alignment Transfers/Trip	0.4	0.5	0.6	0.5	0.6
h. Median Headways-Peak	20.0 Minutes	15.0 Minutes	14.5 Minutes	15.0 Minutes	14.5 Minutes
-Midday	24.0 Minutes	20.0 Minutes	19.5 Minutes	20.0 Minutes	19.5 Minutes
i. Transit Stop Spacing	Met	Met	Met	Met	Met
j. Transit User Walking Distance in CBD	Met	Met	Met	Met	Met
k. Percent Transit to Milwaukee CBD	13.5	26.2	32.5	26.7	34.4
l. Elderly-Handicapped Transit Service	Could be Met	Could be Met	Could be Met	Could be Met	Could be Met
3. Parking					
a. Transit Station Parking	Not Met	Met	Met	Met	Met
b. Parking Spaces in CBD per 1,000 Auto CBD Destinations	330	400	430	430	450
c. CBD Walking Distance for Short-Term Parkers	Could be Met	Could be Met	Could be Met	Could be Met	Could be Met
4. System Adaptability	Could be Met	Could be Met	Could be Met	Could be Met	Could be Met
Objective No. 4—Minimize Disruption					
1. Advance Right-of-Way Reservation	Could be Met	Could be Met	Could be Met	Could be Met	Could be Met
2. Minimize Penetration of Neighborhood Units	Met	Could be Met	Could be Met	Could be Met	Could be Met
3. Minimize Dislocation of Households and Nonresidential Structures	4 Nonresidential Structures	215 Nonresidential Structures	190 Nonresidential Structures	190 Nonresidential Structures	59 Nonresidential Structures
4. Minimize Penetration of Environmental Corridors	9 Households Met	2,073 Households 66.3 Miles	1,936 Households 61.4 Miles	1,936 Households 61.4 Miles	193 Households 41.7 Miles
5. Minimize Land Used for Transportation and Terminal Facilities	$3,164,000	$175,914,000	$158,860,000	$157,810,100	$68,582,000
6. Minimize Property Tax Base Reduction	$3,164,000	$175,914,000	$158,860,000	$157,810,100	$68,582,000
7. Minimize Harmful and Annoying Noise Exposure	1,011 Miles	1,272 Miles	1,272 Miles	1,274 Miles	1,020 Miles
8. Minimize Destruction of Cultural Sites	Could be Met	Could be Met	Could be Met	Could be Met	Could be Met
Objective No. 5—Facilitate Traffic Flow					
1. Minimize Passenger Hours of Travel	1,233,000 Hours/Day	1,207,000 Hours/Day	1,209,000 Hours/Day	1,207,000 Hours/Day	1,255,000 Hours/Day
2. Minimize Vehicle Hours of Travel	886,000 Hours/Day	833,000 Hours/Day	808,000 Hours/Day	829,000 Hours/Day	833,000 Hours/Day
3. Minimize Vehicle Miles of Travel	31,470,000 Miles/Day	30,614,000 Miles/Day	30,079,000 Miles/Day	30,448,000 Miles/Day	29,958,000 Miles/Day
4. Adequate Street and Highway Capacity (volume-to-capacity ratio equal to or less than 1.1)	86.7 Percent	99.3 Percent	99.1 Percent	99.0 Percent	96.5 Percent
5. Adequate Transit Capacity (load capacity of less than 1.0)	Met	Met	Met	Met	Met
6. Overall Travel Speeds	Met	Met	Met	Met	Met
Objective No. 6—Reduce Accident Exposure					
1. Maximize Travel on Facilities with Lowest Accident Exposure	36.8 Percent of Passenger Miles of Travel	46.1 Percent of Passenger Miles of Travel	46.9 Percent of Passenger Miles of Travel	44.8 Percent of Passenger Miles of Travel	37.1 Percent of Passenger Miles of Travel
2. Maintain Volume-to-Capacity Ratio Equal to or Less than 0.9	75.5 Percent	91.0 Percent	91.5 Percent	89.2 Percent	81.5 Percent
3. Provide Railroad Grade Separation or Warning Devices as Warranted	Could be Met	Could be Met	Could be Met	Could be Met	Could be Met
Objective No. 7—Aesthetic Quality					
1. Minimize Destruction of Visually Pleasing Objects and Vistas	Could be Met	Could be Met	Could be Met	Could be Met	Could be Met
2. Aesthetic Quality Design Standards	Could be Met	Could be Met	Could be Met	Could be Met	Could be Met

Source: SEWRPC.

Table 346

COMPUTATION OF PLAN VALUES FOR FINAL ALTERNATIVE TRANSPORTATION PLANS

Alternative Transportation Plan	Probability of Implementation	Objective 1 Rank Order Equals 4 Rank Order Value of Plan[a]	Objective 2 Rank Order Equals 4 Rank Order Value of Plan[a]	Objective 3 Rank Order Equals 3 Rank Order Value of Plan[a]	Objective 4 Rank Order Equals 3 Rank Order Value of Plan[a]	Objective 5 Rank Order Equals 2 Rank Order Value of Plan[a]	Objective 6 Rank Order Equals 2 Rank Order Value of Plan[a]	Objective 7 Rank Order Equals 1 Rank Order Value of Plan[a]	Plan Value	Rank Order
No Build	0.3	1	4	1	4	1	1	1	12.0	1
A	0.4	3	2	3	1	3	4	1	18.8	2
A'(25)	0.4	3	5	3	2	5	5	1	27.2	4
A'(50)	0.6	3	3	4	2	4	2	1	33.0	5
R	0.5	2	1	5	3	2	3	1	23.5	3

[a] *Based on rank order values as shown in Appendix Table I-4.*

Source: SEWRPC.

transit fare in Milwaukee in Plans A'(25) and R to have a very low probability of implementation. After considerable debate and discussion concerning these and related issues including a preliminary vote favoring Plan A, the Committee voted seven ayes, six nayes, and three absentions in favor of recommending Plan A'(50) to the Regional Planning Commission as the final recommended regional transportation plan for the year 2000. The Committee also asked that the Commission conduct traffic assignments to an arterial highway network that included the Belt Freeway in order that such information might be available to decision makers within the Region. Finally, the Committee also stated its belief that the current relocation laws, properly applied, adequately compensate those who are displaced for transportation system improvement projects, and that the current procedure, including the use of a condemnation commission, is adequate to handle problems that may arise in the application of relocation laws. The Committee indicated that additional emphasis on physically relocating displaced structures would be warranted, subject to the establishment of guidelines setting an upper limit on the cost of relocating a structure based on the value of that structure. These comments were made by the Technical Committee in response to relocation procedure comments made by the citizens committee and discussed below.

Citizens Advisory Committee

The Citizens Advisory Committee on the Freeway-Transit Element of the Regional Land Use and Transportation Plan Reevaluation considered the results of the analysis of the final regional transportation plan alternatives on June 3 and July 20, 1977. Much of the Committee discussion centered around the dislocation aspects associated with the final plan alternatives. The majority of the Committee members were particularly concerned over the apparent failure of relocation laws and practices to adequately compensate those whose lives are disrupted and whose homes and businesses are removed to make way for transportation system improvements.

After considerable discussion and debate concerning the dislocation aspects of the plan, the Citizens Advisory Committee, with all 18 members present or represented, recommended to the Regional Planning Commission Plan A'(25), modifying that plan with respect to implementation practices for those who would be dislocated due to the possible future construction of the Stadium Freeway-North, the Stadium Freeway-South, and the Lake Freeway, all in Milwaukee County. The final vote was 11 members favoring Plan A'(25) with the relocation implementation practices modification as noted above, one vote favoring Plan A'(25) with such modified relocation practices applicable only to the Stadium Freeway-North dislocation, and the remaining six members favoring Plan R.[3]

It should be noted that the rank-based expected value method of plan evaluation, as applied earlier in this chapter to the final plan alternatives, was not utilized by the Citizens Advisory Committee in its decision-making process. The Citizens Advisory Committee, while recognizing the utility of the method and while agreeing with the objectives and standards used as a basis for applying the method, determined that it would not be guided by the results of the method but would, rather, let each individual Committee member make his own evaluation based upon the plan comparison and evaluation data presented in this chapter.

The proposed modifications to the current relocation procedures center around two problems as perceived by the Committee. The first problem relates to the apparent failure of the current acquisition process to adequately compensate the homeowner for expenditures

needed to properly maintain a home in the interim period between adoption of a plan and actual implementation of the plan through public purchase of the home. For example, if a homeowner expends $2,000 to replace an existing roof on a home and then his property is appraised the following year, the appraisal may not fully reflect that investment, Hence, it is believed that the appraised value will not adequately compensate the homeowner for such major maintenance expenditures. Accordingly, homeowners whose homes lie in the path of proposed public improvements of all kinds, including transportation system improvements, generally exhibit a reluctance to make major maintenance investments in their structures because they never quite know when their structure will be acquired for public purposes. It is difficult, therefore, for such homeowners to keep their properties in a decent, safe, and sanitary condition. This factor contributes to blight in a neighborhood and creates anxieties and uncertainties on the part of all concerned.

Accordingly, the Committee, in endorsing Plan A'(25), recommended that, with respect to those relocations made necessary due to the potential future construction of the Stadium Freeway-North, the Stadium Freeway-South, and the Lake Freeway in Milwaukee County, the current acquisition procedures be modified as necessary to enable the responsible public agencies to include direct cash payments for documented building repairs and renovations that cannot be adequately reflected in the appraised value of the structure. The Committee further recommended that if the current acquisition procedures were not modified, then the responsibility for incurring those costs alone and beyond that permitted by the current law should be borne by the various local governments affected in order for a freeway project to move forward. This would apply to both homes and commercial structures for those owners who may choose not to have their structure physically relocated, a second Committee proposal discussed below. The Committee recommended that policies be set to enable such additional cash payments upon certification of documented receipts of work performed within a 10-year period preceding the public taking. The Committee recommended further that a three-member citizen review panel be established in Milwaukee County to hear requests for such additional cash payments from those structure owners who believe that the appraised value does not adequately provide compensation for repair and renovation work completed during the period in which the public freeway development proposal "cast a shadow" on their properties. The three-member review panel would receive the appraisal report, would hear the appeal of the property owner as to repair and maintenance work performed over the preceding 5-year period, would review the property as necessary to verify that the work had been performed, would review any documented receipts of work performed, would apply appropriate depreciation rates to the repair and maintenance work, and would issue a determination as to the amount of additional compensation due to the structure owner, if any. It was envisioned by the Committee that the determination of the three-member review panel would be binding on the Milwaukee County Expressway and Transportation Commission and the Wisconsin Department of Transportation. The Committee envisioned that the three-member review panel would be made up of an individual with recognized credentials in the building repair and maintenance field, appointed by the Mayor of the City of Milwaukee; an individual with recognized credentials in the real estate appraisal field, appointed by the Milwaukee County Executive; and a citizen member from Milwaukee County, appointed by the Secretary of the Wisconsin Department of Transportation.

The second major change in acquisition procedures recommended by the Committee involves the undertaking of an affirmative program by the highway agencies concerned to physically relocate the affected residential and nonresidential structures on vacant sites preferably in the same neighborhood, but if that is not possible then as near to the same neighborhood as practicable so as to preserve the housing stock and tax base of a given community, if such relocation is the desire of the owner of the building and if it were found that movement of the building is physically feasible. The Committee thus recognized that there may be a number of individuals involved in relocations with respect to the

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[3] *The final vote was as follows: 11 members favoring Plan A'(25) with the relocation implementation practices modification applicable to the Stadium Freeway-North, the Stadium Freeway-South, and the Lake Freeway, namely—Mrs. Evelyn Petshek, Director of Development, University of Wisconsin-Milwaukee, and former Chairman, City of Milwaukee Plan Commission; Mr. Sebastian Helfer, Director of Campus Planning, Marquette University; Mr. Thomas P. Leisle, Supervisor, Ozaukee County Board of Supervisors, and former Mayor, City of Mequon; Mr. Wesley Scott, Executive Director, Milwaukee Urban League; Mr. L. William Teweles, Management Consultant, Milwaukee; Mr. John S. Randall, Management Consultant, Milwaukee; Mr. George Watts, President, George Watts & Son, Milwaukee, and Chairman, Downtown Development of the Metropolitan Milwaukee Association of Commerce; Dr. Eric Schenker, Professor, Department of Economics, University of Wisconsin-Milwaukee, and former Chairman, Harbor Commission, City of Milwaukee; Mr. Lee G. Roemer, Chairman of the Board, Wisconsin Public Service Corporation, Whitefish Bay; Mr. Orren J. Bradley, President, Boston Store Department Stores, Milwaukee; and Mr. Harold A. Lenicheck, Chairman of the Board, Wisconsin Division, Chicago Title Insurance Company, Milwaukee; one member favoring Plan A'(25) with modified relocation practices applicable only to the Stadium Freeway-North dislocation--Mr. James N. Elliott, President, Milwaukee Building and Construction Trades Council, AFL-CIO; and the remaining six members favoring Plan R—Mrs. Cynthia Kukor, Alderman, City of Milwaukee; Mr. Roger C. Cobb, Administrator, Milwaukee Legal Services Program; Dr. Robert F. Purtell, Brookfield; Mr. Thomas M. Spellman, West Side Citizens Coalition, Milwaukee; Mr. Bert Stitt, Executive Secretary, Bradystreet Merchants Association, Milwaukee; and Dr. Abraham Scherr, Citizens Regional Environmental Coalition, North Lake.*

Stadium Freeway-North, the Stadium Freeway-South, and the Lake Freeway in Milwaukee County who, for whatever reason, may prefer, despite even liberalized relocation benefits, to have their home or small business structure physically relocated to an available vacant site within or adjacent to the existing neighborhood.

Accordingly, the Committee recommended that existing relocation laws and procedures be modified as necessary to establish a program of physical relocation of existing structures. The Committee envisioned that a three-member panel would be created to oversee this aspect of the relocation program. The review panel would receive requests from individuals who desire to explore the feasibility of physically relocating their structure. The panel would make an initial determination as to whether or not it was physically feasible to relocate the structure given its physical condition and size. It was envisioned by the Committee that the panel would be comprised of an individual having recognized credentials in the building inspection and repair field, to be appointed by the Mayor of the City of Milwaukee; an individual having recognized credentials in the structure moving field, to be appointed by the Milwaukee County Executive; and a citizen member from Milwaukee County, to be appointed by the Secretary of the Wisconsin Department of Transportation.

If the review panel made a determination that it was physically feasible to relocate a given structure, the panel would direct the appropriate relocation staff of the highway agencies to assist the structure owner in viewing and selecting possible alternate site locations. Such sites would be equivalent to the existing site to the greatest extent possible taking into account lot size and shape, neighborhood environment, and such relationships as availability of mass transit service and location of shopping, parks, churches, and other identifiable neighborhood features. The Committee recommended that if necessary the relocation laws and procedures be changed to enable the applicable highway agencies to acquire and "bank" available vacant lands for such purposes, including granting condemnation powers to a highway agency for lands not directly needed for a freeway project.

Assuming that the highway relocation staff is successful in finding an alternate site acceptable to the structure owner desiring to have his building moved, the Committee envisioned that the three-member review panel would direct the relocation staff to undertake the moving effort. As necessary, relocation laws and precedures would be changed to enable the highway agencies to directly incur all costs involved in the movement of the structure, including temporary housing for the occupants of the structure, temporary storage of personal belongings, actual moving costs, and site preparation costs at the new site. The Committee recommended that the implementing agencies bear all responsibility for securing all permits necessary from public agencies and public utilities to relocate the structure. The Committee further recommended that the review panel make a determination as to any possible significant differential value in the new site as opposed to the old site. In making such determination, the review panel would take into account the site itself, including its shape and size, trees and landscaping, and location to convenient shopping, churches, and parks. If the review panel were to find that the new site as raw land had a value less than the value of the old site as raw land, then the panel would determine the differential and direct that a cash payment in the amount would be due to the structure owner. If the review panel, however, were to find that the raw land value of the new site is greater than the raw land value of the old site, the owner of the structure would not be entitled to a supplemental cash benefit.

These proposed modifications to the current relocation procedures if implemented could be expected to increase the cost of constructing the three major freeway facilities concerned. There are a total of 1,011 residential units and 100 nonresidential structures required to be dislocated in connection with the Stadium Freeway-North, 91 residential units and 14 nonresidential structures associated with the Stadium Freeway-South, and 535 residential units and 19 nonresidential structures associated with the Lake Freeway. The total costs associated with these three freeways in Plan A'(25) presented earlier in this chapter assumed an average value of about $48,000 as the cost of acquiring and relocating an individual housing unit or nonresidential structure, including the cost of adequately compensating displaced homeowners as described above. Based upon the experience to date of relocation for highway purposes in Milwaukee County, it may be conservatively assumed that at most 30 percent of those involved in any relocation project would desire to physically relocate their structure. It is further estimated that the additional cost per residential unit or nonresidential structure of implementing the above-described relocation procedures is $24,000. These estimates include the additional agency costs involved in implementing the program, as well as the additional costs that may be incurred in physically relocating the buildings. Based on these per unit estimates, it is further estimated that the additional cost of implementing Plan A'(25) due to the Committee-recommended relocation procedures is $12.8 million, or an average of $0.5 million annually over the 25-year plan implementation period. No new benefits may be attributed to these projects. Accordingly, the benefit-cost ratio for Plan A'(25) described earlier in this chapter was recomputed based upon the additional costs that may be incurred in relocation. The resultant benefit-cost ratio for Plan A'(25) as modified by the Citizens Advisory Committee is 1.25.

Regional Planning Commission

The foregoing recommendations of the Technical and Citizens Advisory Committees were reported to the Regional Planning Commission in September 1977. Simultaneously, the Commission was given another set of recommendations from an ad hoc task force established by a group of Milwaukee-area State Legislators. The report submitted by the ad hoc task force urged the Commission to acknowledge that the unfinished portions of the Milwaukee County freeway system would not be built in the foreseeable future because,

among other reasons, the posture of the State Legislature was such that it would not make available sufficient construction monies to complete the system. The ad hoc task force report further suggested that steps be taken to deal with the traffic congestion problems existing at the "stub ends" of currently completed freeway segments, effecting relatively low capital improvements that would abate these problems, as well as instituting measures which would modify travel demand by discouraging peak-hour auto use.

After weighing the Technical and Citizens Advisory Committee recommendations to proceed with a recommended regional transportation plan based on the A' final alternative plan presented earlier in this chapter—the two committees differing only with respect to the base transit fare in Milwaukee, the Technical Committee recommending a $0.50 base fare and the Citizens Committee recommending a $0.25 fare; the suggestions made by the legislative ad hoc task force; and the acknowledged sharp division of public opinion that exists concerning completion of the Milwaukee County freeway system and the impasse that has been created by that division of opinion—the Commission determined that a preliminary recommended regional transportation plan be taken to public hearing that would be based on Plan A' with a $0.50 transit fare in the Milwaukee area and that would further consist of two tiers with respect to the freeway system in Milwaukee County. Under the two-tier concept, the Commission directed that all of the remaining uncompleted freeway segments in Milwaukee County be placed on the preliminary recommended plan, but that these segments be divided into two groups. The first group, constituting the lower tier, would consist of those freeway segments which in the Commission's judgment should be constructed as soon as possible. The second group, constituting the upper tier, would consist of those freeway segments which in the Commission's judgment should be deferred for at least a decade while attempts are made both to increase the capacity of the existing system through low capital investment transportation system management measures and to reduce the anticipated peak-hour travel demand through the institution of automobile use disincentives. The Commission directed that the preliminary recommended plan include such major system management proposals as an extensive freeway control system effected through areawide ramp metering; increased promotion of carpooling and vanpooling; and significantly improved mass transit service, and such automobile use disincentives as parking supply restriction, parking rate restructuring and a parking surcharge, all to be carried out in the Milwaukee central business district. Under the two-tier concept, such efforts would be designed to optimize the utilization of the capacity of the existing system while encouraging a shift from the automobile mode to transit and other high-occupancy vehicle modes of travel. If such efforts are successful, peak-hour automobile travel demand would be reduced and, consequently, it may not be necessary in the long term to construct the remaining uncompleted freeway segments retained in the upper tier of the plan. The Commission further directed that the preliminary recommended plan include low capital intensive improvements in the Milwaukee County freeway corridors which would consist of minor freeway modifications, ramp improvements, and adjustments in the connecting surface arterials to effect better transitions between the "stub ends" of the uncompleted freeway system and the surface arterial system for those freeways not included in the lower tier, as well as traffic engineering improvements on existing arterial streets to better manage traffic flows. The Commission directed that the staff prepare such a two-tier plan and submit it for public hearing before the end of 1977.

PRELIMINARY RECOMMENDED REGIONAL TRANSPORTATION PLAN

Acting pursuant to the above-described Commission direction, the Commission staff prepared a preliminary recommended regional transportation plan. This plan was based on Plan A'(50) described earlier in this chapter, modified to appropriately incorporate the two-tier concept described above with respect to the freeway system in Milwaukee County. The preliminary recommended plan consisted of four major components: freeways, standard surface arterials and highways, mass transit facilities and services, and system management recommendations.

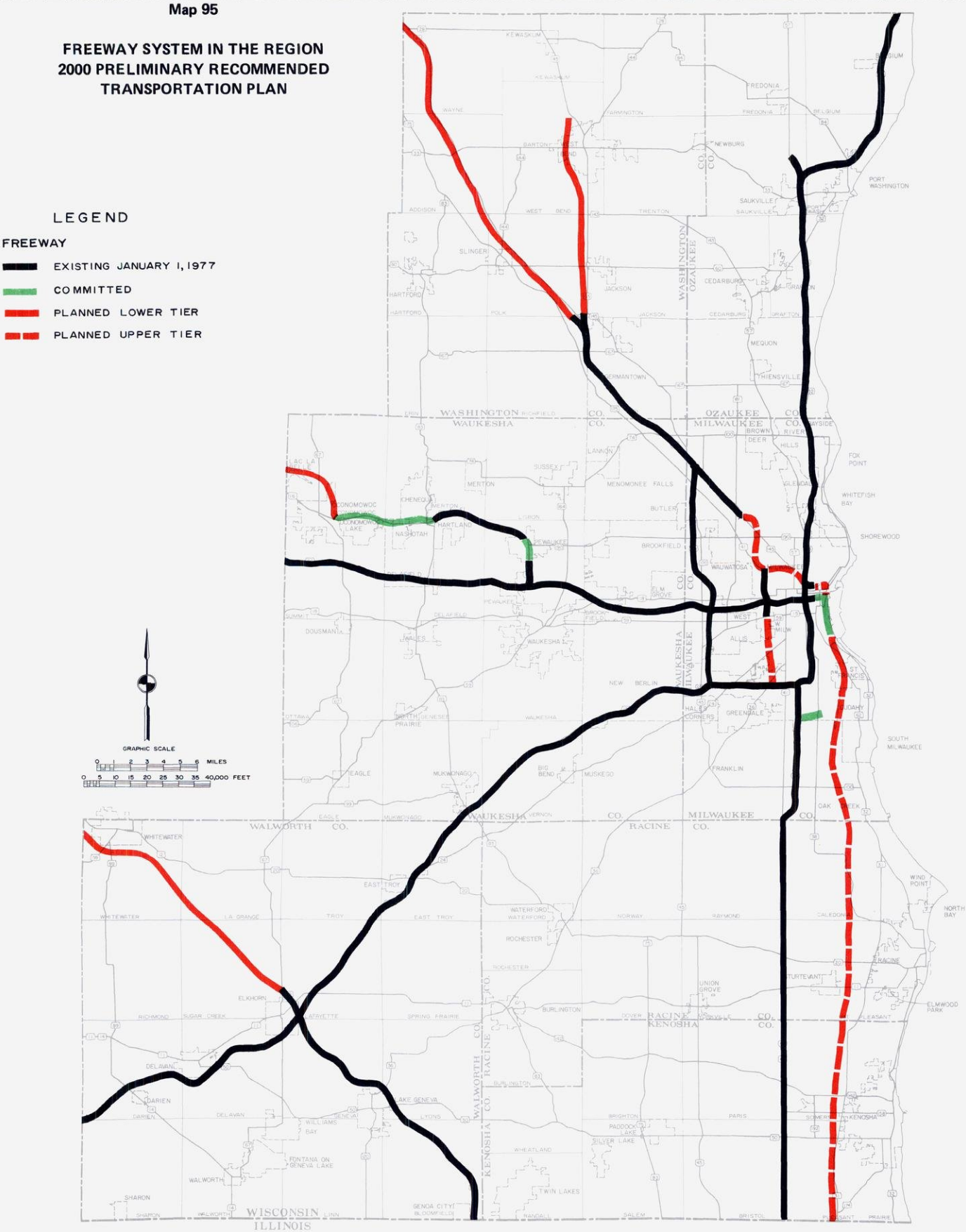
Freeways

The preliminary recommended regional freeway system for the year 2000 is shown on Map 95. Mileage data for the existing, committed, and proposed freeway systems are set forth in Table 347. As of January 1, 1977, there were nearly 228 miles of freeways in the Region open to traffic. An additional 11 miles of freeways were considered to be fully committed, including that portion of the Lake Freeway opened to traffic in November 1977 as the Daniel Webster Hoan Memorial Bridge, a small portion of the East-West Freeway also opened to traffic in November 1977 and connecting with the Daniel Webster Hoan Memorial Bridge, the Airport Spur Freeway under construction and scheduled for completion in 1978, and the conversion of existing USH 16 to a freeway near Pewaukee and from STH 83 to the City of Oconomowoc.

The lower tier of the preliminary plan included 60 miles of proposed freeways, consisting of the following: the West Bend Freeway (USH 45) in Washington County from STH 145 to existing USH 45 north of CTH D, on right-of-way already acquired for this purpose; the completion of the conversion of existing USH 41 in Washington County from an expressway to a freeway; the completion of the USH 12 Freeway in Walworth County from Elkhorn to Whitewater; the USH 16 Freeway bypass of Oconomowoc; the extension of the existing Stadium Freeway-South in Milwaukee County to W. Lincoln Avenue on right-of-way already acquired for this purpose; and the extension of the Lake Freeway (IH 794) from the south end of the Daniel Webster Hoan Memorial Bridge to E. Layton Avenue. In addition, the lower tier included the provision of two additional travel lanes on IH 43 from W. Henry Clay Street in the City of Glendale to STH 167 in the City of Mequon.

Map 95

FREEWAY SYSTEM IN THE REGION 2000 PRELIMINARY RECOMMENDED TRANSPORTATION PLAN



The freeway system proposed under the preliminary recommended new year 2000 regional transportation system plan consisted of a total of about 344 miles, or about 10 percent, of the total arterial street and highway system. About 66 percent, or 228 miles, of this proposed freeway system would be comprised of existing facilities open to traffic as of January 1977; about 3 percent, or 11 miles, would be comprised of facilities considered to be committed to construction; and about 31 percent, or 106 miles of the system, would be comprised of planned new facilities. The planned facilities consist of a lower tier, the implementation of which should proceed immediately, and an upper tier, the implementation of which should not proceed beyond the phase of right-of-way preservation for at least a decade until such time as the effect of proposed substitute low-capital intensive improvements and their impact on the need for the upper tier freeways has been fully demonstrated. The lower tier consists of about 60 miles of facility, or 18 percent of the total proposed system. The upper tier consists of about 46 miles of facility, or 13 percent of the total proposed system.

Source: SEWRPC.

Table 347

EXISTING, COMMITTED, AND PROPOSED FREEWAYS IN THE REGION
2000 PRELIMINARY RECOMMENDED TRANSPORTATION PLAN

Freeway	Number of Miles				
	Existing January 1, 1977	Committed	Planned		Total
			Lower Tier	Upper Tier	
Airport	5.1	--	--	--	5.1
Airport Spur	--	1.4	--	--	1.4
East-West	33.3	0.2	--	--	33.5
Fond du Lac	4.5	--	--	--	4.5
Lake	--	2.6	3.1	33.3	39.0
North-South	78.0	--	--	--	78.0
Park	1.2	--	--	3.7	4.9
Rock	48.7	--	--	--	48.7
Stadium	2.7	--	0.8	8.7	12.2
USH 12	19.1	--	17.0	--	36.1
USH 16	8.3	7.0	5.4	--	20.7
USH 41	11.3	--	21.0	--	32.3
West Bend	1.0	--	12.7	--	13.7
Zoo	14.5	--	--	--	14.5
Total	227.7	11.2	60.0	45.7	344.6

Source: SEWRPC.

The upper tier of the preliminary plan contained about 46 miles of proposed freeways, consisting of the completion of the Park Freeway-East from N. Milwaukee Street to the Juneau Interchange with the Lake Freeway and the Park Freeway-West from IH 43 to the Stadium Freeway-North; the completion of the Stadium Freeway-South from W. Lincoln Avenue to IH 894 and the Stadium Freeway-North "gap closure" from the present terminus at W. Lisbon Avenue to the Fond du Lac Freeway in Milwaukee County; and the completion of the Lake Freeway-North from the Juneau Interchange to the East-West Freeway with the proposed Park Freeway-East completing the "downtown loop closure" in Milwaukee County, and the Lake Freeway-South from E. Layton Avenue to the Illinois state line in Kenosha, Milwaukee, and Racine Counties.

The two-tier plan concept envisions that, if at some future date it is determined that actions to optimize the utilization of the capacity of the existing system and modify travel demand have been effective and that the freeway stub end and associated surface arterial improvements are adequately accommodating travel demand, then steps can be taken at that time to formally remove the remaining freeway proposals from the long-range plan. On the other hand, if it is the consensus at such time that travel demand modification efforts have not been effective and that the freeway stub end and associated improvements do not adequately provide the needed transportation service, then work could proceed again toward the design and construction of the freeways. In the meantime, the preliminary plan recommended that all right-of-way currently cleared for the remaining freeway segments be held in a transportation land bank with appropriate consideration given to the use of the land for park and open-space purposes. The plan envisioned that the lands involved would be landscaped and well-maintained and made available for play areas and other open-space activities that do not involve heavy capital investment. The plan also recommended that any currently undeveloped lands needed to accommodate construction of these freeways included in the upper, or long-term, tier of the plan continue to be held in open use. This would be done through official mapping on the part of the state, county, and local units of government involved, and supplemented as necessary by public purchase of lands in special hardship cases and by the placement of such lands in the transportation land bank.

In total, then, the year 2000 regional freeway system would approximate 345 miles, or 106 miles more than the existing and committed system, if all planned freeways included in the preliminary plan were completed and opened to traffic. If, as discussed above, it were to be determined at some future date that those freeway facilities included in the upper tier of the plan were not required, the total mileage in the regional freeway system would be reduced to about 299 miles, or about 60 miles more than the existing and committed system.

The following freeways that had been included on the initial year 1990 regional transportation system plan were not recommended for inclusion in either tier of the new year 2000 plan: the Milwaukee Metropolitan Belt Freeway extending from the proposed Lake Freeway in the City of Oak Creek westerly through Milwaukee County and northerly through the eastern tier of communities in Waukesha County to a junction with USH 41 in the Village of Germantown; the Bay Freeway from the Village of Pewaukee easterly to IH 43 near the Hampton Avenue Interchange; the extension of the Stadium Freeway-North from the Fond du Lac Freeway in the N. 76th Street corridor to a junction with IH 43 near the Village of Saukville; and the Racine Loop Freeway. The Bay Freeway was deleted in view of the fact that the State Legislature has enacted legislation specifically prohibiting the Wisconsin Department of Transportation from constructing a freeway in the Hampton Avenue corridor. Analyses conducted for the other three previously proposed freeways indicated that these facilities did not meet recommended demand warrants for significant portions of their lengths, given the anticipated changes in population levels and distribution, employment levels and distribution, and land use development envisioned in the recommended regional land use plan.

The lower tier of the preliminary plan recommended that an attempt be made to provide an acceptable level of transportation service through the development of lower capital cost alternatives in those contested freeway corridors where the freeways were placed in the upper tier of the plan. This would require that intensive design studies be undertaken to precisely determine the specific nature of the facilities to be provided. A number of such proposals have been advanced from various sources in recent years. Some of these proposals are described in the following discussion.

Park Freeway-East: In the Park Freeway-East corridor at least three alternatives have been proposed (see Map 96). In the first alternative, the Park Freeway-East would be extended on the cleared right-of-way a distance of about 1,200 feet. At that point an off-ramp would be constructed to E. Ogden Avenue and an on-ramp would be constructed from N. Farwell Avenue. A new surface street connection would be made between N. Astor Street and N. Humboldt Avenue. In addition, ramps would be constructed from the current terminus of the freeway to E. Ogden Avenue and E. Lyon Street, and the connections of N. Jackson and N. Van Buren Streets would be constructed between E. Lyon Street and E. Ogden Avenue.

Under the second alternative, no extension of the freeway is envisioned. Ramps would be constructed from the existing "stub end" to E. Ogden Avenue and E. Lyon Street and the previously noted connection between N. Astor Street and N. Humboldt Avenue would be constructed. Under both the first and second alternatives, E. Lyon Street and E. Ogden Avenue and N. Jackson Street and N. Van Buren Street would be operated as one-way pairs.

The third alternative would involve a minimum of new construction, proposing merely the construction of freeway on- and off-ramps from the present terminus of the freeway to N. Jackson Street. Under this alternative, both E. Ogden Avenue and E. Lyon Street and N. Jackson and N. Van Buren Streets between E. Ogden Avenue and E. Lyon Street would operate as two-way facilities. Similarly, the local street pattern in the vicinity of N. Humboldt and E. Ogden Avenues would not be changed.

Lake Freeway-North: At the north end of the Daniel Webster Hoan Memorial Bridge at least four alternatives have been proposed. Under the first alternative, as shown on Map 97, the Lake Freeway would be extended about 1,400 feet to a point just south of the War Memorial Art Center where the ramps would interchange with a relocated Lincoln Memorial Drive and a connection with E. Michigan Street. Under this alternative, all northbound and southbound traffic would continue to be carried under the War Memorial Bridge. Detailed engineering studies would have to be accomplished to determine whether the War Memorial Bridge should be replaced or simply repaired. Under this alternative, complete movements through the Lake Interchange could be made from north to west, from west to north, from west to south, and from south to west.

Under the second alternative the surface street-to-freeway connections would remain essentially unchanged from those recently opened to traffic. It is envisioned that a minor realignment of E. Michigan Street and changes to accommodate a smoother interchange of traffic between the freeway and N. Lincoln Memorial Drive would be effected. Under this second alternative, it would not be possible to make the west to north movement through the Lake Interchange. Traffic bound from west to north would have to exit on the East-West Freeway at N. Van Buren Street and use N. Van Buren Street and E. Michigan Street to reach Lincoln Memorial Drive. The north to west movement through the Lake Interchange, however, would be accommodated.

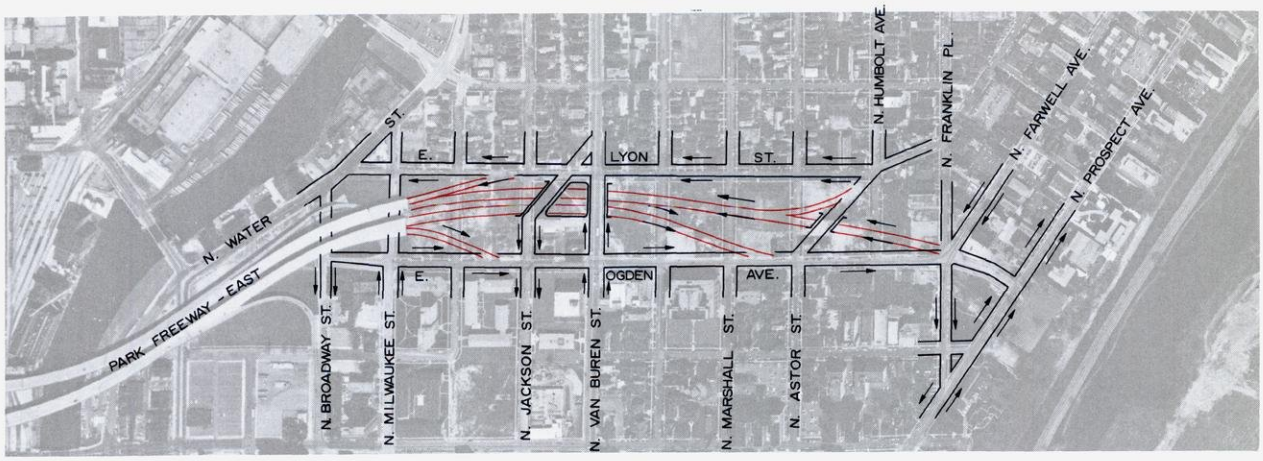
The third alternative as shown on Map 97 would be similar to the first alternative in all respects except for the provision of southbound on-ramps and northbound off-ramps between the Lake Freeway and E. Michigan Street and the design of the N. Harbor Drive and E. Michigan Street intersection.

Under the fourth alternative, the Lake Freeway is proposed to be extended north about 1,200 feet to connect with E. Wisconsin Avenue at N. Prospect Avenue providing for traffic movement from that point both south on the Lake Freeway and west on the East-West Freeway. In addition, E. Michigan Street would interchange with the Lake Freeway as proposed under alternative three. The present connection of N. Harbor Drive and N. Lincoln Memorial Drive would be relocated. However, a direct connection between N. Lincoln Memorial Drive and the Lake Freeway would not be provided.

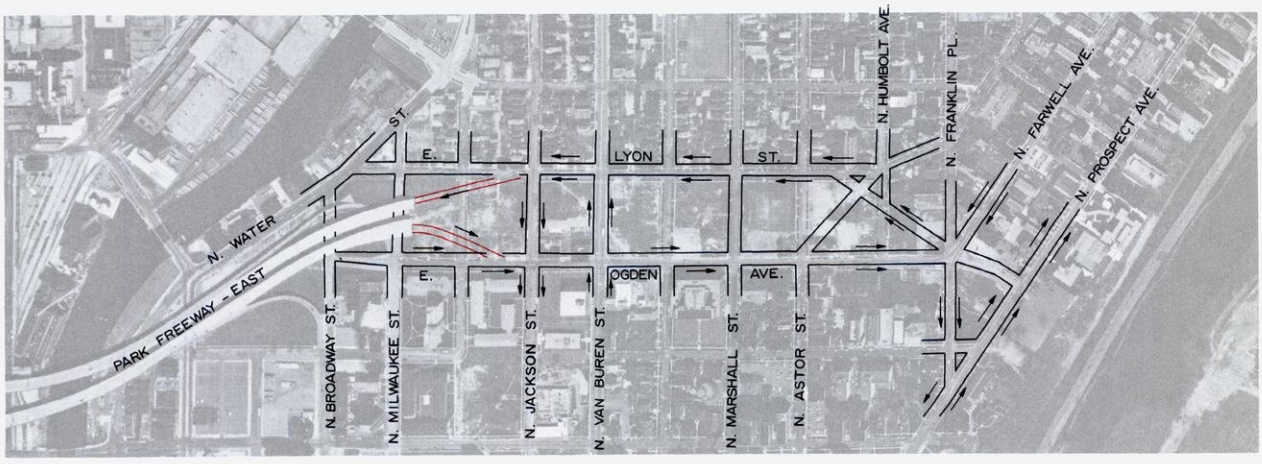
Map 96

ALTERNATIVE PARK FREEWAY-EAST "STUB END" TREATMENTS

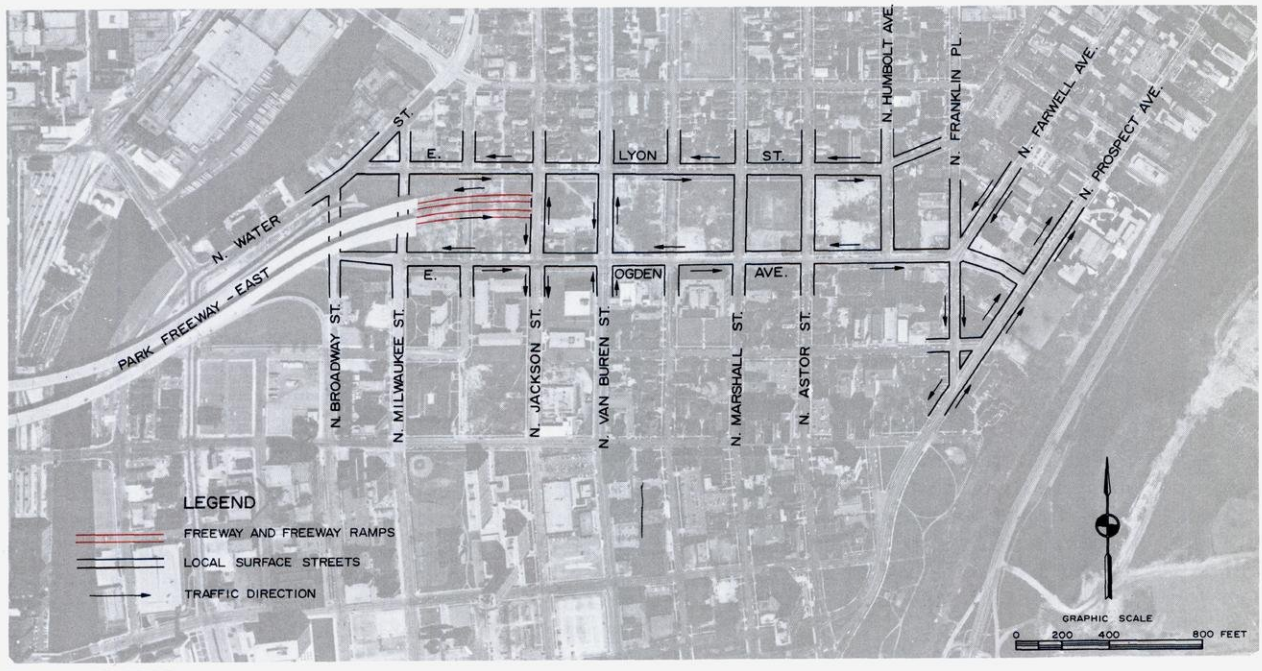
ALTERNATIVE NO. 1



ALTERNATIVE NO. 2



ALTERNATIVE NO. 3

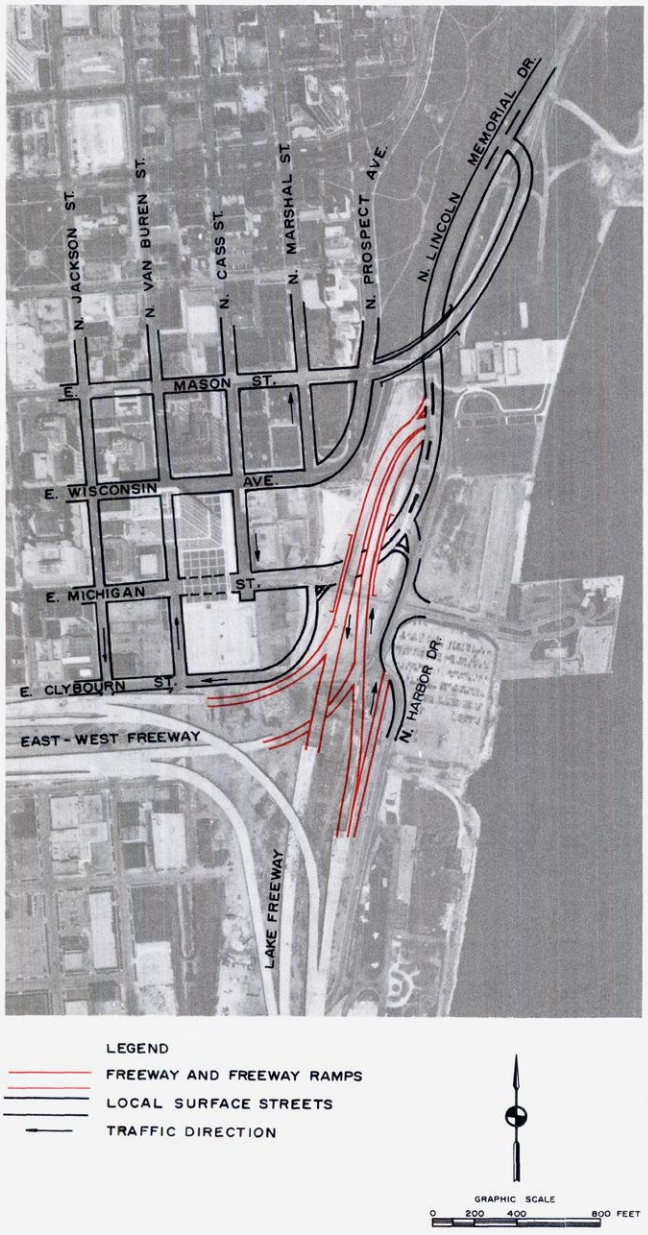


Source: SEWRPC.

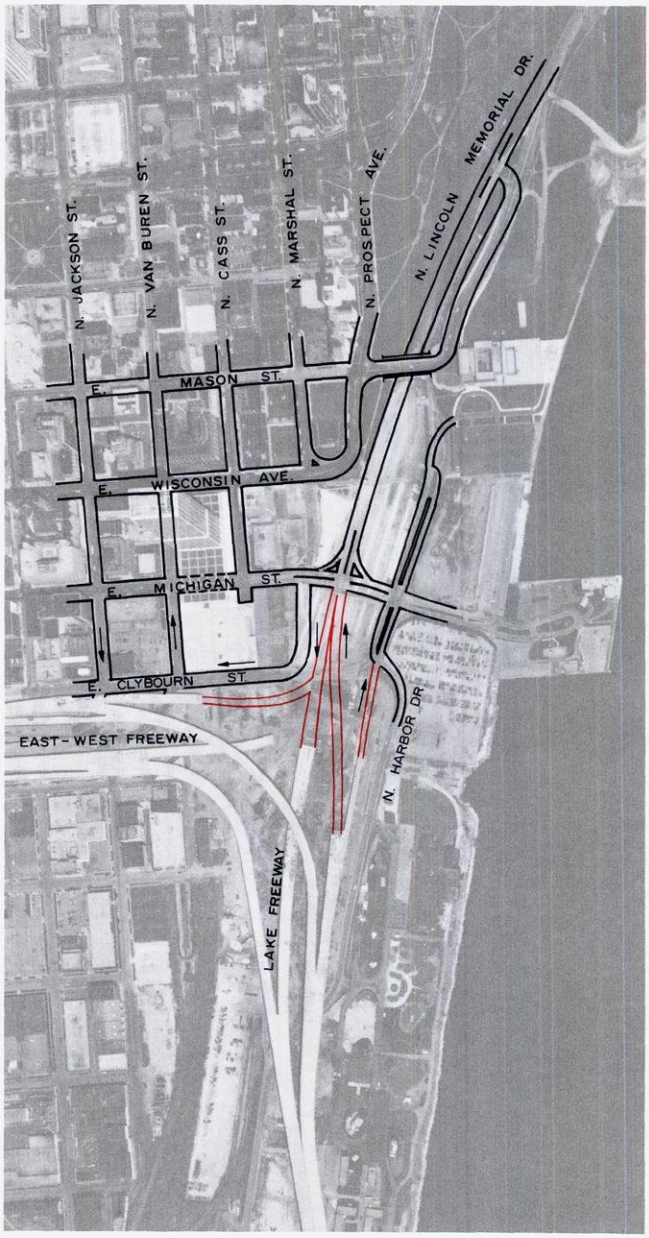
Map 97

ALTERNATIVE LAKE FREEWAY-NORTH "STUB END" TREATMENTS

ALTERNATIVE NO. 1



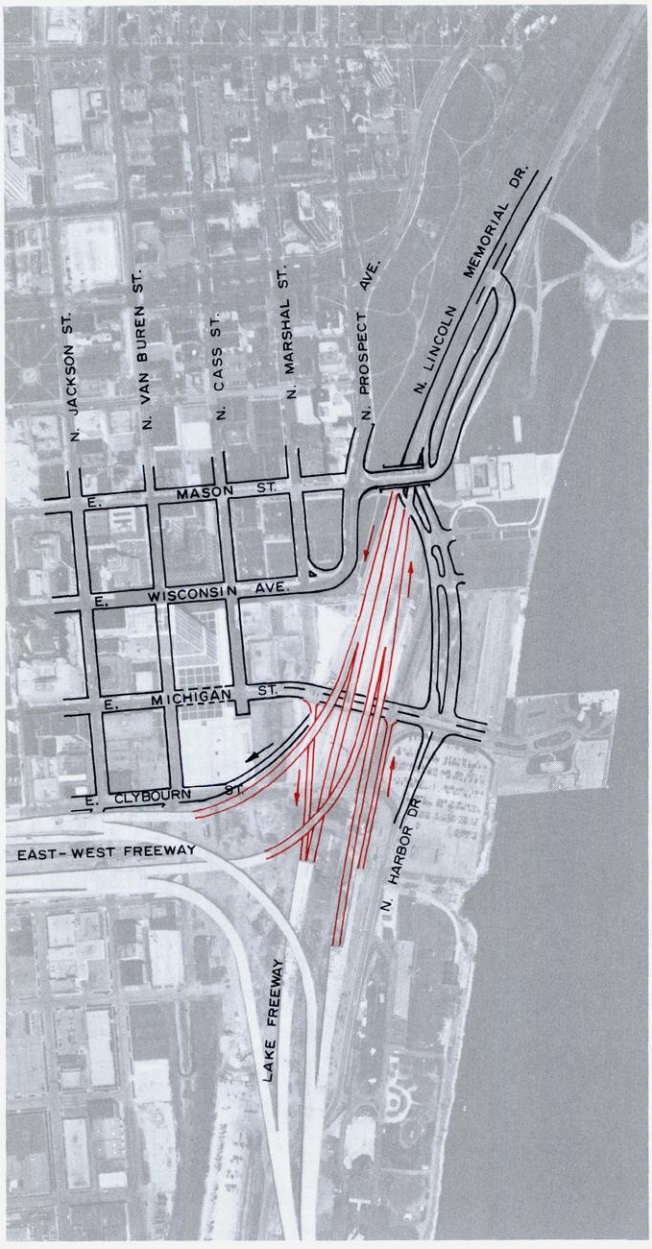
ALTERNATIVE NO. 2



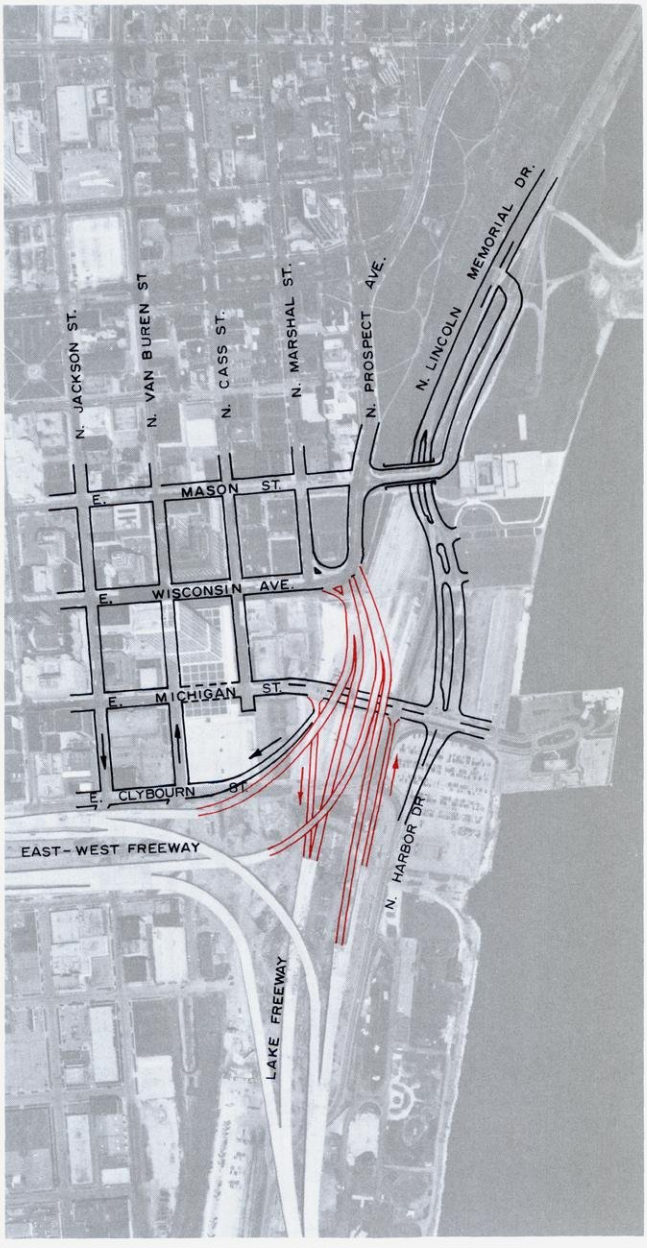
Lake Freeway-South: At the south end of the Daniel Webster Hoan Memorial Bridge surface street connections are currently made through an interchange with S. Carferry Drive. Three alternatives to effecting a better transition to the surface arterial street system in and beyond the Bayview area of Milwaukee are shown on Map 98.

Under the first alternative, which is the recommended alternative and the one that corresponds with the lower tier of the preliminary plan as described earlier, the Lake Freeway would be extended south about 3.1 miles to a new terminus just south of E. Layton Avenue, connecting at that point directly to S. Pennsylvania Avenue. From that point south, S. Pennsylvania Avenue would

ALTERNATIVE NO. 3



ALTERNATIVE NO. 4



Source: SEWRPC.

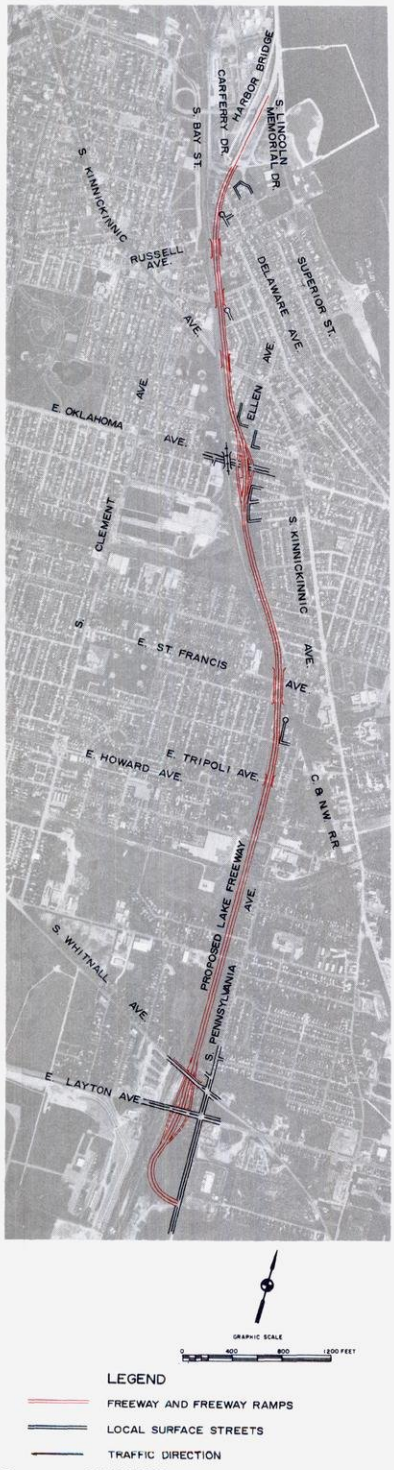
serve as a substitute for the Lake Freeway. Presently S. Pennsylvania Avenue terminates at E. Oakwood Road in the City of Oak Creek. In the lower tier of the plan it is envisioned that a surface arterial connection would be made at that point to the Lake Freeway right-of-way adjacent to the Chicago and North Western Transportation Company railroad tracks and continue south all the way through Racine and Kenosha Counties, connecting with existing STH 31 near the Illinois-Wisconsin state line.

Under the second alternative, the Lake Freeway would be extended south about 1,600 feet to an interchange with E. Russell Avenue. At that point it is envisioned that traffic would be dispersed over two major surface arterial

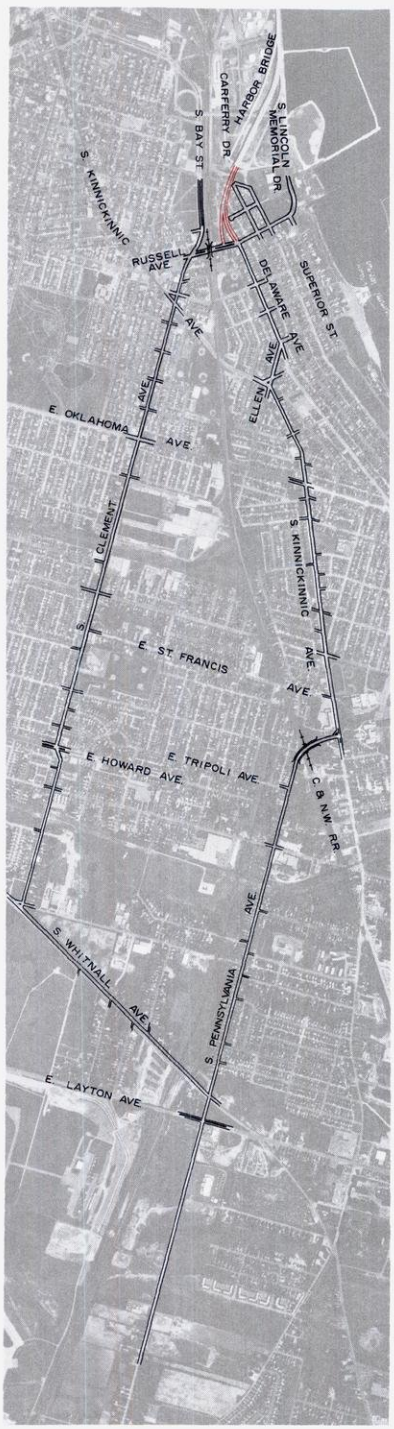
Map 98

ALTERNATIVE LAKE FREEWAY-SOUTH "STUB END" TREATMENTS

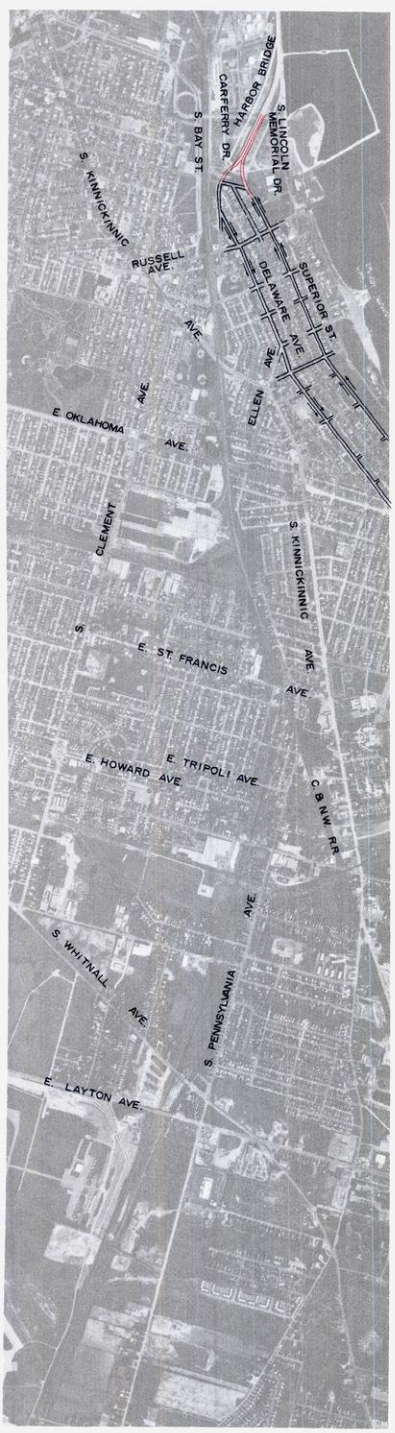
ALTERNATIVE NO. 1



ALTERNATIVE NO. 2



ALTERNATIVE NO. 3



LEGEND

- FREEWAY AND FREEWAY RAMPS
- LOCAL SURFACE STREETS
- TRAFFIC DIRECTION

Source: SEWRPC.

routes. The first of these would consist of S. Delaware Avenue to S. Ellen Street to S. Kinnickinnic Avenue and from there south in the City of St. Francis to S. Pennsylvania Avenue. A second route would disperse traffic via E. Russell Avenue, S. Clement Avenue, S. Whitnall Avenue, and S. Pennsylvania Avenue.

Under the third alternative at the south end of the Daniel Webster Hoan Memorial Bridge, ramps would be extended off the current terminus of the bridge to S. Delaware Avenue and S. Superior Street at E. Conway Street. These two streets would function as a one-way pair to E. Oklahoma Avenue. From E. Oklahoma Avenue traffic would be dispersed south over S. Lake Drive. S. Packard Avenue, and S. Pennsylvania Avenue.

Stadium Freeway-South: In the Stadium Freeway-South corridor four alternative treatments have been proposed (see Map 99). The first would be to extend the Stadium Freeway south to a point about 1,800 feet south of W. Lincoln Avenue over the Chicago and North Western Transportation Company railroad tracks. At that point the freeway would ramp down to existing S. 43rd Street and continue as a four-lane divided surface arterial on the existing S. 43rd Street alignment to W. Loomis Road, interchanging through that road with the Airport Freeway.

The second alternative would extend the Stadium Freeway south to about 1,200 feet north of W. Lincoln Avenue where it would ramp down to existing W. Lincoln Avenue and continue as a four-lane divided surface arterial on the S. 43rd Street alignment in the manner described above. S. 43rd Street and S. 44th Street and its extension would operate as a one-way street pair from W. Greenfield Avenue to W. Lincoln Avenue. This was the alternative recommended by the Commission in the preliminary plan and the one assumed above in describing the lower tier of the freeway plan.

The third alternative would extend the Stadium Freeway south to W. Greenfield Avenue, a distance of about 1,400 feet south of the current W. National Avenue terminus. At that point a new four-lane divided surface arterial would be constructed along the existing alignment of S. 43rd Street and continue south in the manner described above.

The fourth alternative would not extend the current Stadium Freeway south at all. Instead, a new four-lane divided surface arterial would be constructed in part on the cleared right-of-way from W. National Avenue south to W. Lincoln Avenue and continue south as an undivided surface arterial on the existing S. 43rd Street alignment.

Park Freeway-West: At the east end of the Park Freeway-West, including the Hillside Interchange with the North-South Freeway, at least two alternatives have been proposed (see Map 100). Under the first alternative, the Park Freeway-West from the Hillside Interchange would be extended northwesterly generally as originally planned but would terminate at W. Fond du Lac Avenue just west of N. 13th Street. The Park spur connection would not, however, be made. Rather, W. Lloyd Street would be connected to the North-South Freeway to provide a west to north traffic movement. In addition, W. Lloyd Street would be connected with W. Brown Street.

Under the second alternative, freeway ramp connections would be made at the Hillside Interchange to W. Fond du Lac Avenue and W. Walnut Street. W. Fond du Lac Avenue would be widened into a four-lane boulevard on cleared freeway land from N. 13th Street to N. 20th Street. North of W. Fond du Lac Avenue a new street connection between N. 16th Street and N. 17th Street would be made, with N. 16th Street and N. 17th Street operating north from that point as a one-way pair. W. Walnut Street from N. 12th Street to N. 14th Street would also be widened. This alternative would not provide any facility in lieu of the Park spur proposal.

Analysis of this alternative by the Wisconsin Department of Transportation indicates that this alternative is not feasible due to the vertical clearances and grades involved in effecting the proposed connections.

Stadium Freeway-North: The "stub end" of the Stadium Freeway-North near the intersection of W. North Avenue and W. Lisbon Avenue is perhaps the most difficult stub end-surface arterial situation with which to deal. The only improvements that can be made without effecting considerable disruption of existing development in the area are traffic engineering type improvements on existing rights-of-way on the arterials that lead away from this freeway "stub end." No specific alternatives for the treatment of this "stub end" have as yet been proposed.

Standard Surface Arterial Street and Highway System

In 1972 the surface arterial street and highway system in the Region consisted of 2,847 miles of facilities. By the year 2000 this surface arterial system would be increased under the preliminary recommended regional transportation plan by about 297 miles. This additional mileage reflects primarily the addition of existing nonarterial facilities to the arterial system. The construction of new surface arterial facilities would total only about 144 miles under the recommended plan.

Table 348 summarizes by county and by arterial facility type the improvements proposed under the entire—freeways and surface arterials—arterial street and highway system in the preliminary recommended plan. The improvements may be categorized as system preservation, system improvement, and system expansion efforts. System preservation includes all arterial improvement projects required to maintain the structural adequacy and serviceability of the existing arterial system without significantly increasing the capacity of that system. This would include all projects classified as resurfacing and reconstruction for the same capacity—that is without significant widening. System improvement includes all projects which would significantly increase the capacity of the existing system through street widening or relocation. System expansion includes all projects which would significantly increase the capacity of the existing system through construction of new facilities.

Map 99

ALTERNATIVE STADIUM FREEWAY-SOUTH "STUB END" TREATMENTS

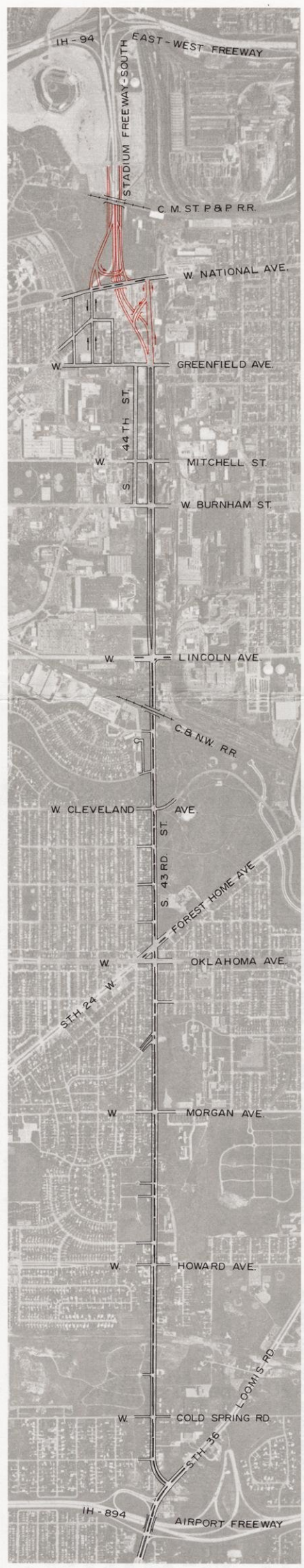
ALTERNATIVE NO. 1



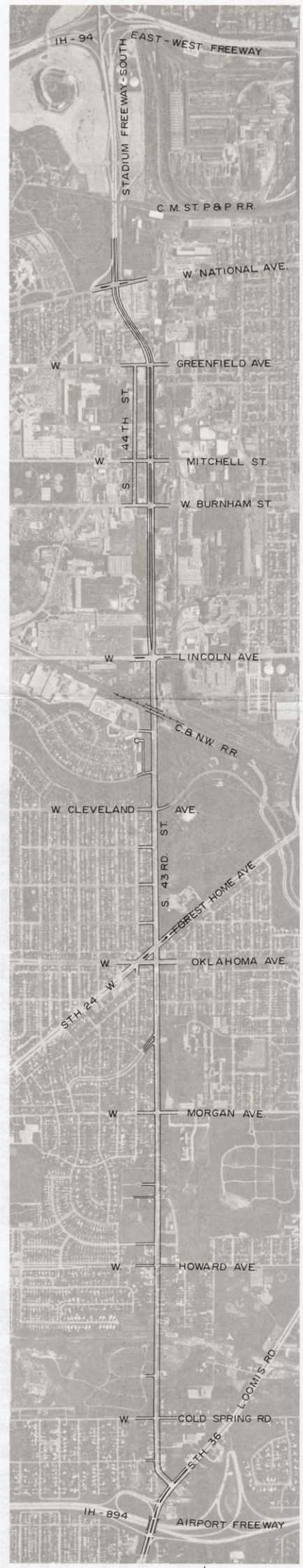
ALTERNATIVE NO. 2



ALTERNATIVE NO. 3



ALTERNATIVE NO. 4



LEGEND

- FREEWAY AND FREEWAY RAMPS
- LOCAL SURFACE STREETS
- TRAFFIC DIRECTION

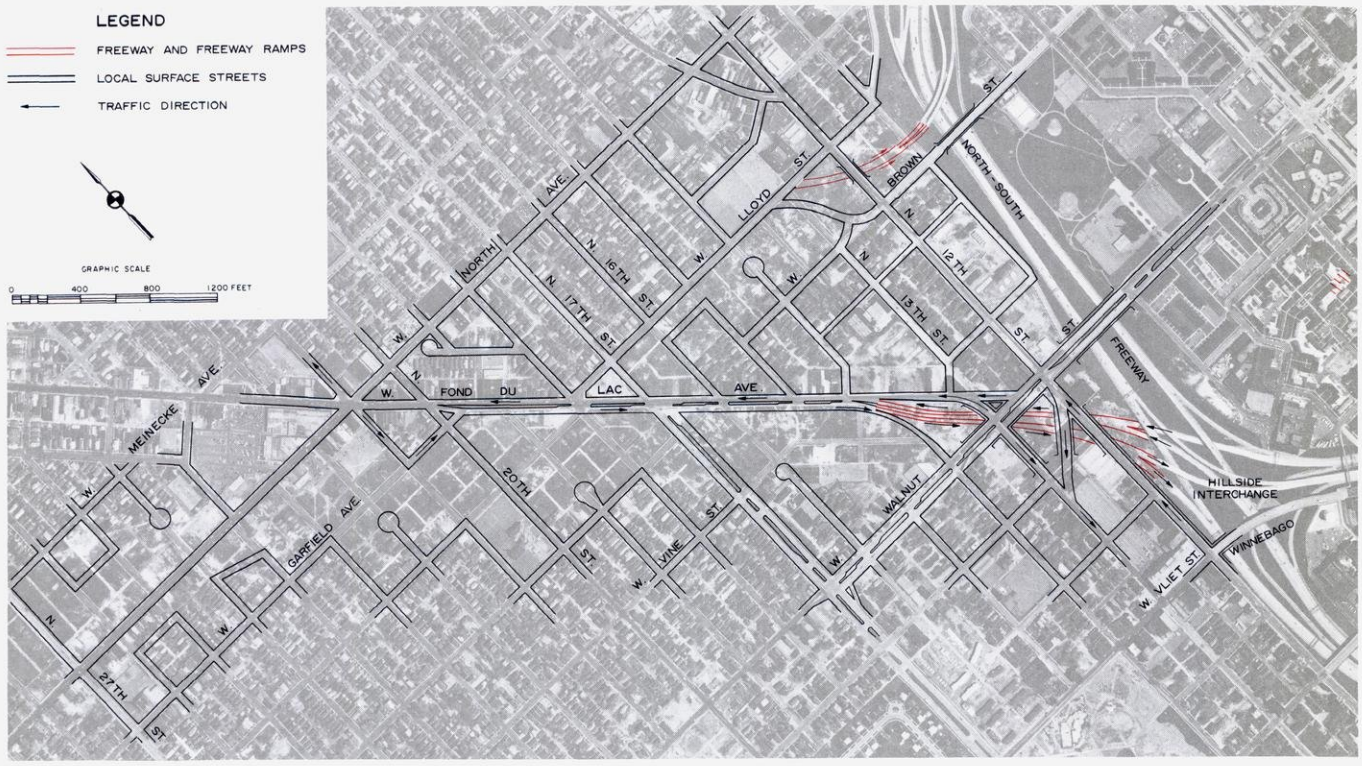
GRAPHIC SCALE
0 800 1600 2400 FEET

Source: SEWRPC.

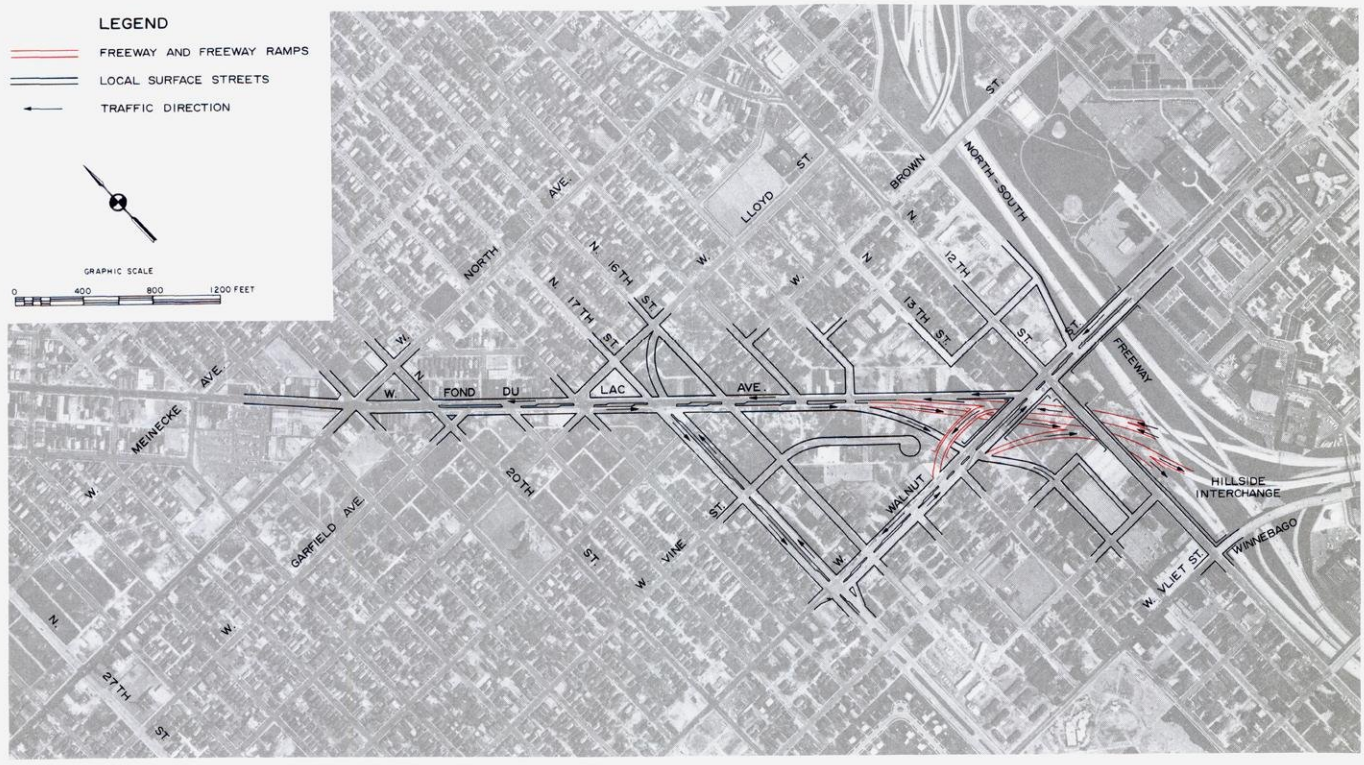
Map 100

ALTERNATIVE PARK FREEWAY-WEST "STUB END" TREATMENTS

ALTERNATIVE NO. 1



ALTERNATIVE NO. 2



Source: SEWRPC.

Table 348

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2000 PRELIMINARY RECOMMENDED TRANSPORTATION PLAN

Arterial Facility Type	System Preservation				System Improvement			System Expansion		Total (miles)
	No Work Required (miles)	Resurface (miles)	Reconstruct for Same Capacity (miles)	Percent of Total	Reconstruct for Additional Capacity (miles)	New Construction–Replacement Facility (miles)	Percent of Total	New Construction–New Facility (miles)	Percent of Total	
Kenosha County										
Freeway	–	12.1	–	49.8	–	–	–	12.2	50.2	24.3
Standard Arterial	0.9	131.2	114.2	73.8	67.0	9.7	23.0	10.8	3.2	333.8
Subtotal	0.9	143.3	114.2	72.2	67.0	9.7	21.4	23.0	6.4	358.1
Milwaukee County										
Freeway	9.8	53.0	–	66.5	5.4	–	5.7	26.2	27.8	94.4
Standard Arterial	61.1	324.2	66.6	66.4	216.1	3.9	32.3	9.0	1.3	680.9
Subtotal	70.9	377.2	66.6	66.4	221.5	3.9	29.1	35.2	4.5	775.3
Ozaukee County										
Freeway	16.8	8.8	–	92.8	2.0	–	7.2	–	–	27.6
Standard Arterial	4.0	146.2	85.9	83.7	42.8	–	15.2	3.0	1.1	281.9
Subtotal	20.8	155.0	85.9	84.5	44.8	–	14.5	3.0	1.0	309.5
Racine County										
Freeway	–	12.0	–	49.8	–	–	–	12.1	50.2	24.1
Standard Arterial	5.7	100.4	170.4	72.0	78.5	8.1	22.5	21.0	5.5	384.1
Subtotal	5.7	112.4	170.4	72.0	78.5	8.1	21.2	33.1	8.1	408.2
Walworth County										
Freeway	50.3	–	–	74.9	–	–	–	16.9	25.1	67.2
Standard Arterial	9.3	226.8	134.0	89.0	21.9	10.2	7.7	13.8	3.3	416.0
Subtotal	59.6	226.8	134.0	87.0	21.9	10.2	6.6	30.7	6.4	483.2
Washington County										
Freeway	2.2	6.4	–	20.3	21.1	–	49.8	12.7	29.9	42.4
Standard Arterial	1.8	218.7	110.8	83.1	42.2	6.8	12.3	18.5	4.6	398.8
Subtotal	4.0	225.1	110.8	77.0	63.3	6.8	15.9	31.2	7.1	441.2
Waukesha County										
Freeway	14.1	38.8	–	81.9	5.6	–	8.7	6.1	9.4	64.6
Standard Arterial	18.5	261.7	174.3	70.1	164.2	6.0	26.3	23.5	3.6	648.2
Subtotal	32.6	300.5	174.3	71.2	169.8	6.0	24.7	29.6	4.1	712.8
Southeastern Wisconsin Region										
Freeway	93.2	131.1	–	65.1	34.1	–	9.9	86.2	25.0	344.6
Standard Arterial	101.3	1,409.2	856.2	75.3	631.7	44.7	21.5	99.6	3.2	3,143.7
Total	194.5	1,540.3	856.2	74.2	666.8	44.7	20.4	185.8	5.4	3,488.3

Source: SEWRPC.

Under the preliminary recommended plan, about 2,591 miles of the total proposed system of 3,488 miles would fall into the system preservation category, representing about 75 percent of the total arterial system. This includes 195 miles, or 6 percent of the total system, on which no work is required; 1,540 miles, or 44 percent of the total system, on which only resurfacing is required; and 856 miles, or 25 percent of the total system, where reconstruction for the same capacity is required. About 711 miles, or about 20 percent of the total proposed system, falls into the system improvement category, including 666 miles, or about 19 percent of the total system, that would be reconstructed for additional capacity—significant street widening—and 45 miles, or about 1 percent of the total system, involving construction of replacement facilities. The remaining 186 miles, or 5 percent of the total proposed system, falls into the system expansion category where new construction of

new facilities is required. The entire arterial street and highway system in the preliminary recommended plan is shown on Map 101.

Mass Transit Facilities and Services

The preliminary recommended regional transportation plan included transit system development proposals for the three urbanized areas of the Region—Kenosha, Milwaukee, and Racine. The base transit fare was recommended to remain at $0.50 in the Milwaukee urbanized area and at $0.25 in the Kenosha and Racine urbanized areas. These fares are expressed in 1975 dollars. If general price inflation continues, it should be anticipated that increases in the base transit fare would occur in order to offset the effects of such inflation and keep the fare box revenues at the relative levels envisioned in the plan.

In the Milwaukee urbanized area, the preliminary plan envisioned the provision of three levels of transit service. The primary level of service is intended to link the major activity centers—such as commercial, industrial, institutional, and recreational centers—to each other and to the various residential communities in the area. Primary service is characterized by relatively high operating speeds but relatively low accessibility. The primary service envisioned in the plan would include no true rapid transit; that is, transit service provided over exclusive fully grade separated rights-of-way. All of the primary service in the plan would be of the modified rapid transit type; that is, the operation of motor buses in mixed traffic on freeways and, in some cases, over surface arterial streets on route extensions.

The primary transit network proposed in the preliminary plan is shown in red on Map 102. Such primary transit service would be provided over a total of 89 miles of freeway facility with nonfreeway extensions of such service provided over 22 miles of surface arterial facilities. A total of 38 transit stations would be established along the primary transit system, of which six stations are already in existence (see Table 349).

The primary service system is closely related to implementation of the previously described upper tier of freeway facilities. If the upper tier of freeway facilities is not ultimately constructed, then the primary transit network would have to be redesigned, rerouting some service to existing freeways and providing the best level of service possible over surface arterial streets, particularly in the northwest travel corridor of Milwaukee County.

The secondary level of transit service envisioned in the preliminary plan would provide express bus service over arterial streets with stops generally located at intersecting transit routes. Thus, secondary service is distinguished from primary service in that it provides a greater degree of accessibility at somewhat slower operating speeds. Under the preliminary recommended plan, secondary service would be provided on 14 individual transit routes operating over 153 miles of arterial facilities, with exclusive transit lanes—that is, traffic lanes where only buses would be allowed during specified hours of the day—provided for eight individual transit routes over six arterial streets. The exclusive transit lanes would total nearly 10 miles (see Table 350), providing about 20 round-trip route miles of secondary transit service, or 6 percent of all secondary route-trip route miles.

The tertiary level of mass transit service envisioned in the preliminary plan consisted of local transit service provided primarily over arterial and collector streets with frequent stops for passenger boarding and alighting. Under the preliminary recommended plan, extensive additions to the tertiary or local transit service routes would be provided. The plan envisions the ultimate extension of tertiary transit service to all of the Milwaukee urbanized area, including low-density urban residential areas in southern Ozaukee and Washington Counties, eastern Waukesha County, and southern Milwaukee County. In these areas the tertiary level of service would be either the traditional fixed-route service or some form of nontraditional transit service, such as route deviation, subscription, dial-a-ride, or shared-ride taxi service.

In the Kenosha and Racine urbanized areas, only the tertiary or local level of mass transit service was envisioned in the preliminary plan. Significant improvements in mass transit service in these two urbanized areas have taken place in recent years in accordance with transit development programs previously prepared by the Commission in cooperation with the Cities of Kenosha and Racine. Consequently, the preliminary recommended regional transportation plan for the year 2000 envisioned only relatively minor route extensions and changes to reflect the anticipated expansion of these urbanized areas. Map 103 identifies the proposed transit service areas and suggested route systems for the year 2000 in the Kenosha and Racine areas.

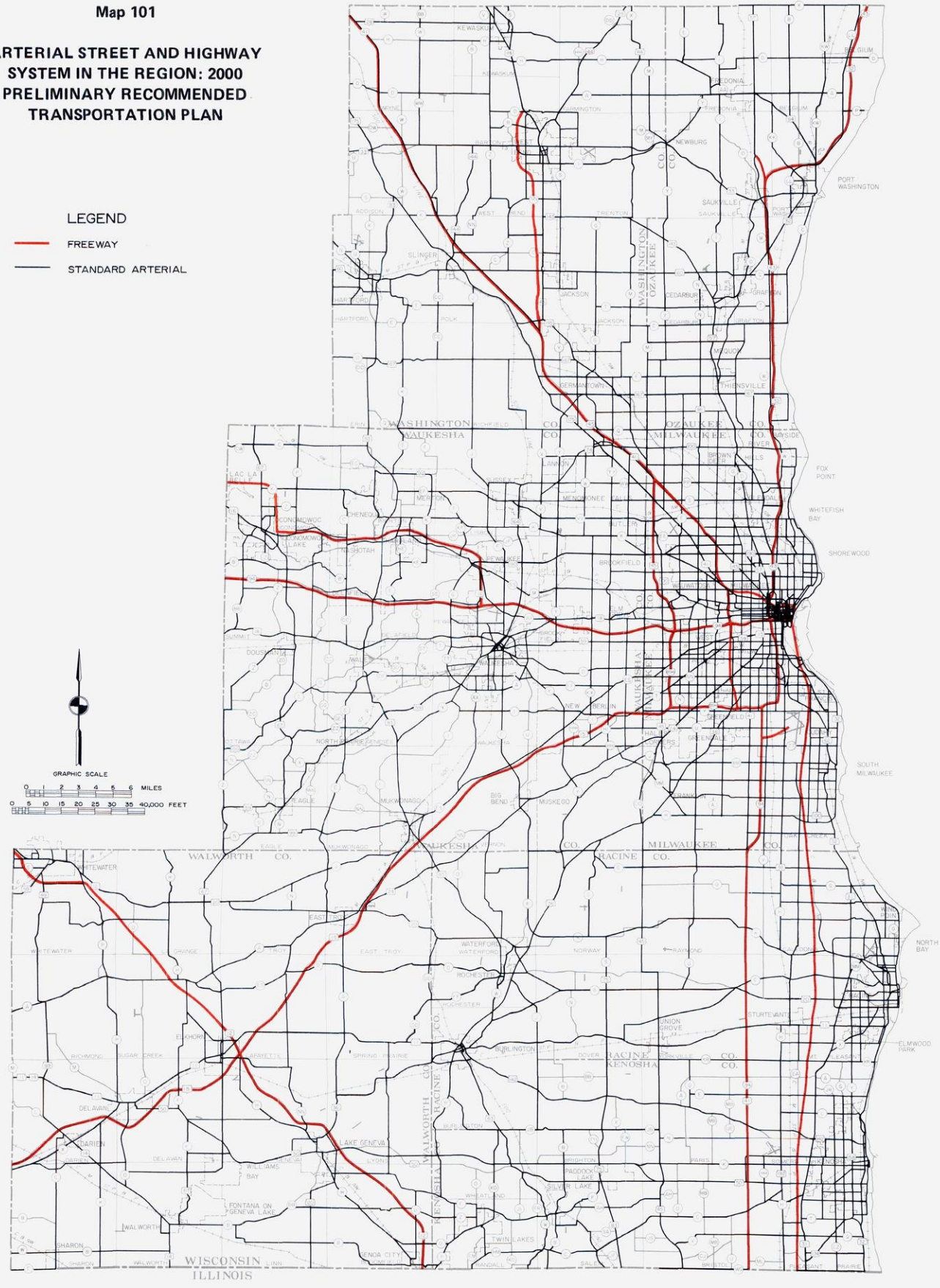
Transportation System Management Recommendations

In addition to the arterial street and highway and transit facility and service recommendations described above, the preliminary recommended regional transportation plan for the year 2000 included four major transportation system management recommendations. These management recommendations were designed to accomplish four objectives: to ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment; to encourage use of high occupancy vehicles, including buses, vans, and carpools; to reduce vehicle use in congested areas; and to effect motor fuel savings. Together these actions would seek to modify travel demand through reductions in vehicular traffic during the peak period, thereby better adjusting such demand to available transportation system capacity. These four system management recommendations were:

Freeway Operational Control System: In the Milwaukee urbanized area, the preliminary plan recommended that a freeway operational control system be instituted to constrain access to the freeway system during peak hours, and thereby to ensure high rates of traffic flow

Map 101

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 PRELIMINARY RECOMMENDED TRANSPORTATION PLAN

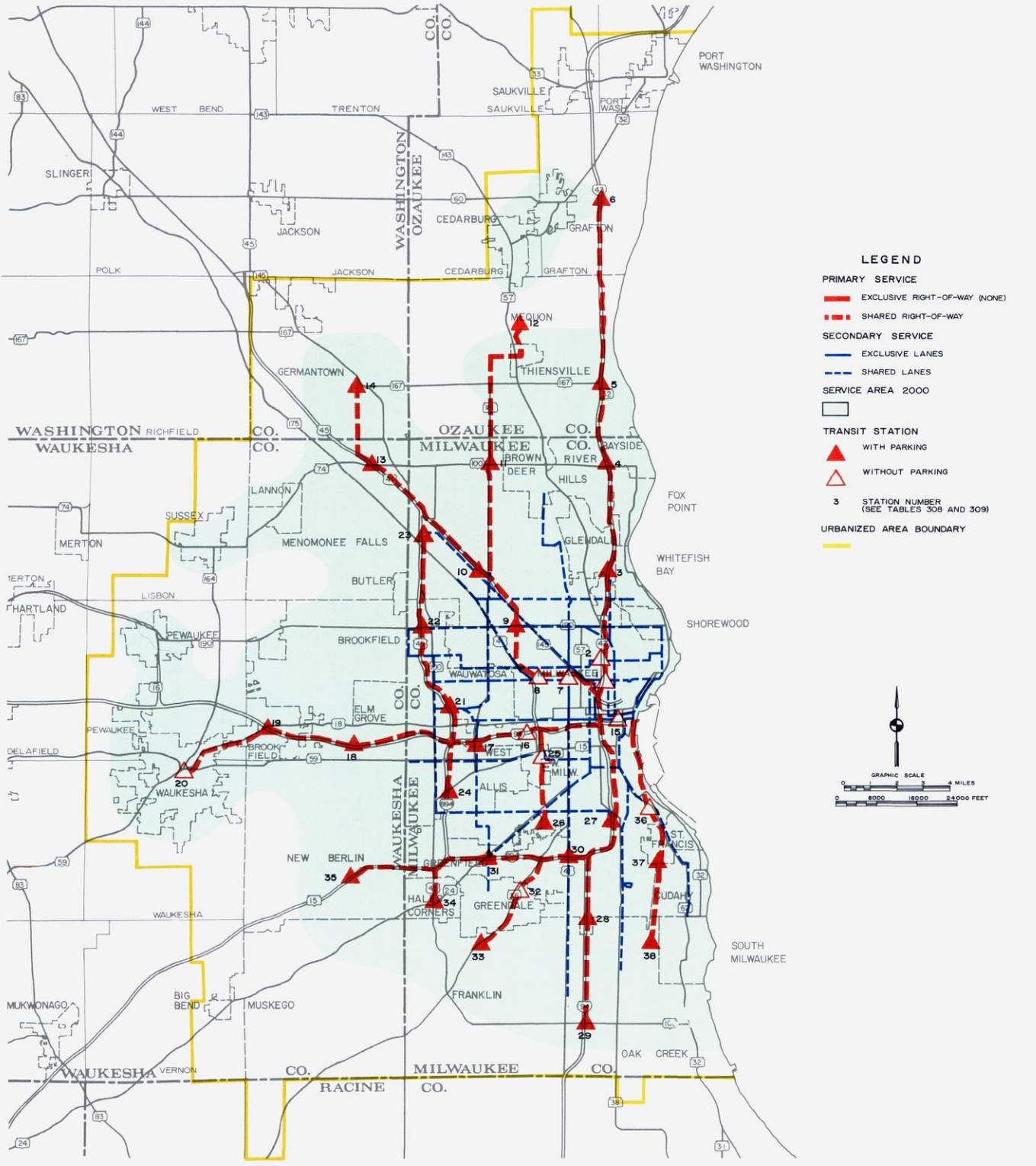


Under the preliminary recommended transportation system plan, arterial street and highway system mileage within the Region would total about 3,488 miles by the year 2000, an increase of 479 miles, or about 16 percent, over 1972. Freeways would comprise 344 miles, or 10 percent, of the total arterial system in the year 2000, an increase of 181 miles over 1972. Of this increase, 106 miles would represent 10 planned new freeways.

Source: SEWRPC.

Map 102

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 2000 PRELIMINARY RECOMMENDED TRANSPORTATION PLAN



Under the preliminary recommended transportation plan, transit service would be provided over 3,090 round-trip route miles of transit line in the Milwaukee urbanized area. Of this total, 1,092 route miles would provide primary service, 353 route miles secondary service, and 1,645 route miles tertiary service. The system would require the operation of about 1,085 buses during peak ridership periods. This would represent an increase of 2,029 round-trip route miles and 643 buses over 1972. The plan also recommends the provision of 38 public park and ride transit stations, an increase of 34 such stations over 1972.

Source: SEWRPC.

Table 349

SELECTED CHARACTERISTICS OF PRIMARY TRANSIT STATIONS IN THE MILWAUKEE URBANIZED AREA 2000 PRELIMINARY RECOMMENDED TRANSPORTATION PLAN

Primary Service Corridor	Transit Station Identification				Type of Service				Passenger Facilities		
	Number[a]	Name	Civil Division	Status	Primary	Secondary	Tertiary	Collection-Distribution	Shelter	Number of Parking Spaces	Buses per Peak Hour in Peak Direction
East Side	1	W. North Avenue	City of Milwaukee	Proposed	X	X	X		X	--	21
	2	W. Locust Street	City of Milwaukee	Proposed	X	X	X		X	--	12
	3	North Shore	City of Glendale	Existing	X	X	X	X	X	200	6
	4	W. Brown Deer Road	Village of River Hills	Existing	X		X	X	X	300	7
	5	STH 167—Mequon	City of Mequon	Proposed	X		X	X	X	350	6
	6	CTH Q—Grafton	Town of Grafton	Proposed	X		X	X	X	375	2
Northwest	7	N. 27th Steet	City of Milwaukee	Proposed	X	X	X		X	--	51
	8	N. Sherman Boulevard	City of Milwaukee	Proposed	X	X	X		X	--	10
	9	Capitol Court	City of Milwaukee	Proposed	X	X	X		X	500	41
	10	W. Silver Spring Drive	City of Milwaukee	Proposed	X	X	X	X	X	150	7
	11	Northridge	City of Milwaukee	Proposed	X	X	X	X	X	200	20
	12	MATC-Mequon	City of Mequon	Existing	X		X		X	100	4
	13	STH 74—Menomonee Falls	Village of Menomonee Falls	Proposed	X		X	X	X	375	6
	14	Mequon Road—Germantown	Village of Germantown	Proposed	X		X		X	250	8
East-West	15	Downtown Milwaukee	City of Milwaukee	Proposed	X	X	X	X	X	--	200
	16	VA Center	City of Milwaukee	Proposed	X				X	--	8
	17	State Fair Park	City of Milwaukee	Proposed	X	X	X		X	300	15
	18	Brookfield Square	City of Brookfield	Proposed	X		X	X	X	100	7
	19	Goerke's Corners	Town of Brookfield	Existing	X		X	X	X	300	11
	20	Waukesha	City of Waukesha	Proposed	X		X	X	X	--	11
Zoo Freeway North	21	Watertown Plank Road	City of Wauwatosa	Existing	X	X	X	X	X	250	13
	22	W. Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	300	8
	23	W. Good Hope Road	City of Milwaukee	Proposed	X		X	X	X	325	4
Zoo Freeway South	24	W. National Avenue	City of West Allis	Proposed	X		X	X	X	350	14
Stadium Freeway South	25	W. National Avenue	Village of West Milwaukee	Proposed	X	X	X		X	--	6
	26	W. Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	100	6
IH 94 South	27	W. Morgan Avenue	City of Milwaukee	Proposed	X	X	X	X	X	200	14
	28	W. College Avenue	City of Milwaukee	Existing	X		X	X	X	375	9
	29	W. Ryan Road	City of Oak Creek	Proposed	X		X		X	375	3
Airport Freeway	30	S. 27th Street	City of Milwaukee	Proposed	X	X	X	X	X	375	8
	31	S. 76th Street	City of Greenfield	Proposed	X	X	X	X	X	300	11
	32	W. Grange Avenue	Village of Greenfield	Proposed	X		X		X	--	3
	33	W. Rawson Avenue	City of Franklin	Proposed	X		X		X	200	3
	34	Hales Corners	Village of Hales Corners	Proposed	X		X	X	X	325	6
	35	Moorland Road—New Berlin	City of New Berlin	Proposed	X		X		X	100	2
Lake Freeway	36	E. Oklahoma Avenue	City of Milwaukee	Proposed	X	X	X		X	--	18
	37	E. Layton Avenue	City of Cudahy	Proposed	X		X	X	X	200	8
	38	E. Rawson Avenue	City of Oak Creek	Proposed	X		X	X	X	425	10

[a] *See Map 102.*

Source: SEWRPC.

Table 350

EXCLUSIVE TRANSIT LANES ON STANDARD ARTERIAL STREETS IN THE MILWAUKEE URBANIZED AREA
2000 PRELIMINARY RECOMMENDED TRANSPORTATION PLAN

Arterial Street			Exclusive Transit Lane				
	Limits					Number of Buses in	
Name	From	To	Type	Direction	Duration	Peak Hour	Remarks
N. 27th Street	W. St. Paul Avenue	W. Capitol Dirve	Curb lane	Southbound	6:00 a.m.-6:00 p.m.	23	Requires removal of curb parking.
			Curb lane	Northbound	6:00 a.m.-6:00 p.m.	30	Requires removal of curb parking.
N. Farwell Avenue	E. Ogden Avenue	E. North Avenue	Curb lane	Southbound	6:00 a.m.-9:00 a.m.	38	Requires removal of curb parking.
				Southbound	3:00 p.m.-6:00 p.m.	44	
N. Prospect Avenue	E. Kilbourn Avenue	E. North Avenue	Curb lane	Northbound	6:00 a.m.-9:00 a.m.	39	Requires removal of curb parking.
				Northbound	3:00 p.m.-6:00 p.m.	43	
Kenwood Boulevard	N. Downer Avenue	N. Oakland Avenue	Curb lane	Westbound	6:00 a.m.-6:00 p.m.	126	Requires removal of curb parking.
E. and W. Wells Street	N. Prospect Avenue	N. 10th Street	Contra-flow curb lane	Westbound	All day	65	Requires removal of curb parking and median construction
W. Wisconsin Avenue	N. 10th Street	N. 35th Street	Curb lane	Eastbound	6:00 a.m.-9:00 a.m.	84	Requires removal of curb parking.
				Westbound	3:00 p.m.-6:00 p.m.	97	

Source: SEWRPC.

at reasonable operating speeds on the existing freeway system. Such a system would consist of interconnected, demand responsive ramp meters; priority access for high occupancy vehicles; improved driver information; and accident incident management procedures. Currently, during certain periods of the day the traffic flow on the freeway system may "break down" and stop and go operating conditions may be experienced. When that occurs, both the traffic volumes carried and the average vehicle speeds are substantially reduced. There are several purposes for recommending an extensive freeway operational control system. One is to achieve better driving conditions for the freeway user during peak periods of travel.

The second purpose is intended to ensure that high occupancy vehicles—buses, vans, and carpools—can travel at reasonable speeds on the freeway system, thus averting the need to provide additional capital intensive facilities, such as exclusive transit rights-of-way. It was envisioned in the plan that such high occupancy vehicles would have preferential access to the freeway system over low occupancy automobiles via specifically designed bypasses at selected freeway entrance ramps.

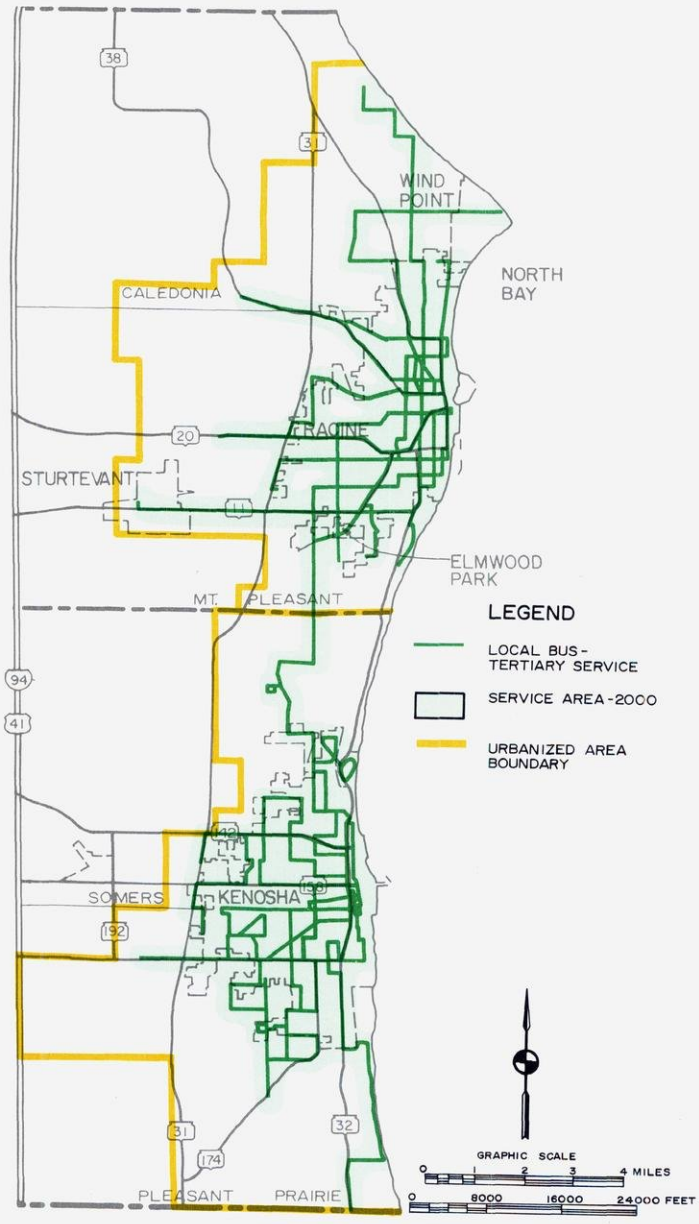
The third purpose is intended to better utilize the capacity of the existing arterial street and highway system. Commission simulation modeling of this system indicates that there is currently unused surface arterial street capacity that can be more effectively utilized through the redirection of some traffic now using freeways.

It was envisioned that the freeway control system would continuously measure traffic volumes on the freeway sytem through an interconnected series of traffic-sensing devices. As traffic volumes approach the level beyond which the operation of the freeways would deteriorate, fewer low occupancy automobiles and trucks would be permitted on the system. At times some entrance ramps could be closed entirely. To ensure the proper functioning of this system, ramp meters would be provided throughout the metropolitan area.

Parking Surcharge: The preliminary plan proposed to impose disincentives to the use of the automobile, particularly for work trips made to the Milwaukee central business district, while at the same time providing an incentive for transit use. Transit trips to the Milwaukee central business district have declined significantly from about 50,500 per day in 1963 to about 29,000 per day in 1972. The preliminary plan sought to reverse this decline and encourage increased transit use to this area. The specific automobile disincentive recommended in the preliminary plan was the imposition of a parking surcharge sufficient to ensure that the all-day parking cost is at least equivalent to a round-trip transit fare.

Map 103

TRANSIT SYSTEM IN THE KENOSHA AND RACINE URBANIZED AREAS: 2000 PRELIMINARY RECOMMENDED TRANSPORTATION PLAN



Under the preliminary recommended transportation plan, the transit system for the Kenosha and Racine urbanized areas would consist of approximately 147 round-trip route miles of transit line in the Kenosha urbanized area, and 153 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 33 buses in the Kenosha urbanized area and 38 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 88 round-trip route miles and 21 buses in the Kenosha area and 72 round-trip route miles and 28 buses in the Racine area over 1972.

Source: SEWRPC.

Since the recommended transit fare in Milwaukee is the current level—$0.50 in 1975 dollars—the recommended parking surcharge for all-day parking would be set at $1.00 in 1975 dollars.

The plan further recommended that a mechanism be found to ensure that this parking fee is paid directly by the auto user. At the present time, many all-day parkers in downtown Milwaukee received "free" or partially subsidized parking with the employer absorbing the parking cost. The recommendation to impose the parking surcharge directly on the user is intended to ensure that the direct out-of-pocket cost to the automobile driver, assuming that he drives alone, would at least equal his direct out-of-pocket cost of taking the bus to work, thus providing an incentive for greater use of the mass transit system. It was not intended by this recommendation to discourage short-term parking for trips made to downtown Milwaukee for shopping, recreation, and personal business purposes, particularly during the off-peak period; rather, it was intended that this parking surcharge deter long-term parking and increase mass transit use for work trip purposes.

Curb Parking Restrictions: The preliminary plan recommended that, as necessary, curb parking on arterial streets be prohibited during peak hours of travel in order to ensure that all available arterial street capacity is effectively used before commitments are made for additional capital investment in arterial street facilities. In some cases, such restrictions have already been placed into effect. In other cases it would be necessary for local municipalities to impose such prohibitions as traffic volumes increase over the years. The coordination of this management recommendation with the freeway control system management recommendation was seen in the plan as particularly important, since it is anticipated that some traffic may be directed from the freeways to the surface arterial street system by the waiting lines at the freeway on-ramps, and this traffic will in some cases make necessary curb parking restrictions during the peak hour on arterial streets where such parking is now permitted, in part, to ensure the free movement of local transit buses on those arterials.

Milwaukee Downtown Parking Supply: The preliminary plan recommended that parking in the Milwaukee central business district not exceed 235 spaces per 1,000 automobile destinations in the Milwaukee central business district. In 1972 this recommendation was greatly exceeded in downtown Milwaukee which had at that time 410 parking spaces per 1,000 automobile destinations. The preliminary plan recommended that a special study be undertaken to determine the manner in which the supply of off-street parking in the Milwaukee central business district could be more constrained so as not to encourage even greater automobile use to that area. An ever-expanding supply of off-street parking spaces in the Milwaukee central business district was seen as working directly against efforts to encourage work trips to that area by mass transit, and in high occupancy carpools and vanpools. It was not intended by this recommendation that the provision of new, perhaps more conveniently

located, off-street parking, particularly intended for short-term shopping, recreation, and personal business trips, be prohibited; rather, it was intended that the supply of off-street parking spaces primarily intended for all-day parking be constrained so as not to negate the other management recommendations to encourage transit use.

Plan Performance and Costs

Selected characteristics of the preliminary recommended regional transportation plan for the year 2000 are identified in Tables 351 and 352. Automobile availability could be expected to increase from 704,600 in 1972 to about 993,000 in the year 2000, an increase of about 41 percent. This is 175,100 fewer vehicles than forecast under a continuation of existing trends, representing the anticipated impact of improved levels of transit service on auto ownership patterns. The number of internal person trips generated within the Region on an average weekday could be expected to increase from 4.46 million in 1972 to about 5.74 million in the year 2000. The number of mass transit trips on an average weekday could be expected to increase from about 184,000, or about 4 percent of the total person trips in 1972, to about 347,000, or about 6 percent of the total person trips in the year 2000, representing nearly a 90 percent increase, assuming implementation of the transit system plan recommendations.

Vehicle miles of travel on an average weekday could be expected to increase from about 20.1 million in 1972 to about 30.2 million in 2000. Of this total, about 12.9 million, or 43 percent, could be expected to be made on freeways, assuming that the upper tier of the plan is fully implemented. In 1972, 31 percent of the total vehicle miles of travel within the Region were made on freeways. Arterial street and highway congestion represented by the number of miles of facilities operating over capacity would be expected to decrease from about 166 miles, or about 6 percent of the total system in 1972, to about 37 miles, or about 1 percent of the total system in 2000. The number of miles of facilities operating at design capacity, however, could be expected to increase from about 152 miles, or about 5 percent of the total system in 1972, to about 341 miles, or about 10 percent of the total system in the year 2000. Thus, the proportion of the total arterial system operating at or over design capacity would remain at about the 1972 level of 11 percent. Motor fuel consumption in the year 2000, assuming that the currently federally mandated automobile fleet efficiency requirements are fully carried out, could be expected to approximate 528 million gallons per year, or about 48 million gallons per year fewer than that consumed in the Region in 1972.

If the upper tier of the preliminary plan were to be fully carried out, it was estimated that 1,870 residential units would have to be relocated, together with 192 nonresidential structures. A total of 1,724 of these residential units and 164 of these nonresidential structures lie directly in the path of planned freeways (see Table 353). If the upper tier of the plan were not implemented in Milwaukee County, total dislocation in the Region would be reduced to 635 residential units and 58 nonresidential structures.

The total capital cost of carrying out the preliminary recommended regional transportation plan was estimated at nearly $2.2 billion. Of this total, about $702 million, or 32 percent, would be required to preserve and maintain the existing transportation system. An additional $728 million, or about 33 percent, would be required for projects which would improve the transportation system by providing additional capacity through street widening or relocation and by improving transit service where such service is already provided. The remaining $762 million, or 35 percent, would be required for system expansion projects, including the construction of new freeways and surface arterial facilities, the construction of new transit stations, and the extension of transit service into urban areas currently not served.

The average annual public cost of carrying out the preliminary recommended plan, including not only the construction of new facilities—including freeways in both the upper and lower tiers of the plan—but the operation and maintenance of the entire highway and transit system, was estimated at about $195 million expressed in constant 1975 dollars over the 25-year plan implementation period. The anticipated average annual public revenues, including transit fare box revenues, based on a projection of the historic trend of revenues from 1960 to 1972, is $218 million, also expressed in constant 1975 dollars, thus resulting in a surplus of $23 million on an average annual basis. An alternative revenue forecast that assumes that such revenues as the transit fare and the tax per gallon on gasoline do not keep pace with inflation and that takes into account the proposed increases in vehicle fuel efficiencies with concomitant reductions in motor fuel tax revenues, indicates that there will be an average annual revenue shortfall of about $9 million. Thus, to fully implement the preliminary recommended plan, it would be essential to ensure that such inflation nonresistant revenues as transit fares and motor fuel taxes do in fact keep pace with inflation.

PUBLIC REACTION TO PRELIMINARY PLAN

The preliminary recommended transportation plan was the subject of a series of four well-attended public hearings held by the Commission in the late fall of 1977. The hearings were held in accordance with the schedule set forth in Table 354. Prior to the hearings, the Commission prepared and widely distributed a SEWRPC Newsletter (Volume 17, No. 5), which presented in summary form the preliminary plan recommendations. Extensive coverage of the proposed new regional transportation plan was given by the public information media, including a major two-page feature story in the Thanksgiving Day issue of the *Milwaukee Journal*, the most widely distributed newspaper in the Region, having a circulation at that time of about 335,500 copies. The Commission Chairman participated in a special 30-minute

Table 351

SELECTED CHARACTERISTICS OF THE PRELIMINARY RECOMMENDED TRANSPORTATION SYSTEM PLAN: 2000

Plan Element	1972 Base Year	"No Build" Plan	Preliminary Recommended Regional Plan
Arterial Street and Highway System			
Freeway (Miles)	163	238	344
Standard Arterial (Miles)	2,847	3,072	3,144
Total (Miles)	3,010	3,310	3,488
Mass Transit System-Milwaukee			
Round Trip Route Miles			
Primary	150	271	1,092
Secondary	56	14	353
Tertiary	855	1,275	1,645
Total	1,061	1,560	3,090
Special Facilities			
Transitway (Miles)	--	--	--
Exclusive Lanes (Miles)	--	--	10
Stations	--	16	38
Number of Buses Required	442	436	1,085
Basic Fare	$ 0.40	$ 0.50	$ 0.50
Average Total CBD Work Trip Parking Fee	$ 0.38	$ 0.54	$ 1.00
Mass Transit System-Kenosha			
Round Trip Route Miles	59	130	147
Number of Buses Required	12	31	33
Basic Fare	$ 0.25	$ 0.25	$ 0.25
Mass Transit System-Racine			
Round Trip Route Miles	81	132	153
Number of Buses Required	10	26	38
Basic Fare	$ 0.40	$ 0.25	$ 0.25
Travel Demand Characteristics			
Automobile Availability (Thousands)	705	1,096	993
Average Weekday Internal Person Trips (Millions)	4.46	5.88	5.73
Average Weekday Transit Trips	184,200	160,900	347,100
Proportion of Trips Made by Transit (Percent)	4.1	2.7	6.1
Estimated Yearly Transit Revenue Passengers (Millions)	53.7	46.7	100.7
Historical Equivalent of Proposed Transit Utilization (Year)	--	1975	1960
Vehicle Miles of Travel			
Total (Millions)	20.12	31.41	30.24
On Freeway (Millions)	6.21	11.36	12.86
Percent of Total on Freeway	31	36	43
Arterial Street and Highway Congestion			
Over Capacity (Miles)	166	439	37
Over Capacity (Percent of Total System)	6	13	1
At Capacity (Miles)	152	369	341
At Capacity (Percent of Total System)	5	11	10
Proportion of Total Person Travel on Safest Facilities			
Freeways (Percent)	30	36	41
Mass Transit (Percent)	4	1	4
Motor Fuel Consumption (Millions of Gallons)			
Average Annual Assuming Automobile Fleet Efficiency of 19 MPG in Year 2000	576	758	737
Average Annual Assuming Automobile Fleet Efficiency of 27 MPG in Year 2000	576	537	528
Noise			
Miles of Transportation Facilities Exceeding 70 dba	712	1,011	1,274
Dislocation			
Number of Residential Units	--	9	1,870
Number of Nonresidential Units	--	4	192

Source: SEWRPC.

Table 352

COSTS AND REVENUES ASSOCIATED WITH THE PRELIMINARY RECOMMENDED REGIONAL TRANSPORTATION SYSTEM PLAN: 2000

Plan Element	"No Build" Plan	Preliminary Recommended Regional Plan
Average Annual Public Cost (Millions)		
Capital		
Highways	50.2	99.2
Transit	3.7	7.4
Subtotal	53.9	106.6
Operation and Maintenance		
Highways	40.9	43.1
Transit	23.0	44.9
Subtotal	63.9	88.0
Total	117.8	194.6
Average Annual Public Revenues—Includes Anticipated Transit Farebox Revenues (Millions)		
Historic Trend (1960-1972)	209.3	218.1
Modified Trend	183.2	185.3
Transportation System Cost/Revenue Analysis		
Historic Trend		
Average Annual Cost (Millions)	117.8	194.6
Average Annual Revenues (Millions)	209.3	218.1
Difference (Revenues minus Costs-Millions)	91.5	23.5
Modified Trend		
Average Annual Costs (Millions)	117.8	194.6
Average Annual Revenues (Millions)	183.2	185.3
Difference (Revenues minus Costs-Millions)	65.4	- 9.3
Average Annual Public Transit Subsidy Required		
Historic Trend (Millions)	9.1	25.9
Modified Trend (Millions)	14.8	38.3
Economic Analysis[a]		
Capital Costs (Millions)	690.0	1,371.0
Operation and Maintenance Costs (Millions)	995.7	1,336.5
Total (Millions)	1,685.7	2,707.5
User Costs (Millions)	43,355.2	42,265.2
Benefit/Cost Ratio	--	1.07

[a]*Present worth cumulative total 1975-2025.*

Source: SEWRPC.

Table 353

ESTIMATED CAPITAL COSTS, DISLOCATION, AND TRAVEL VOLUMES FOR PROPOSED FREEWAYS INCLUDED IN THE LOWER AND UPPER TIERS OF THE PRELIMINARY RECOMMENDED REGIONAL TRANSPORTATION PLAN

Proposed Freeway	Estimated Capital Cost (Millions 1975 Dollars)	Estimated Dislocation		Range of Average Weekday Travel Volume (Vehicles)
		Residential Units	Nonresidential Structures	
Airport Spur	15.1	9	4	12-14,000
Stadium South	76.1	91	14	55-72,000
Stadium North	132.6	1,011	100	64-99,000
Park West	54.6	3	0	66-83,000
Park East and Lake North	59.0	0	0	28-56,000
Lake South—Milwaukee County	118.0	469	21	58-75,000
Lake South—Racine and Kenosha Counties	115.2	106	8	26-53,000
USH 12	22.2	2	2	22-27,000
USH 45	15.5	7	5	10-20,000
USH 41	19.3	1	2	15-23,000
USH 16	39.0	18	8	8-26,000
IH 43 (Addition of 2 Lanes)	20.4	7	0	44-60,000
Total	687.0	1,724	164	--

Source: SEWRPC.

Table 354

PUBLIC HEARINGS HELD CONCERNING PRELIMINARY RECOMMENDED YEAR 2000 REGIONAL LAND USE AND TRANSPORTATION PLANS

Presiding Agency	Target Counties	Place of Hearing	Date and Time of Hearing
SEWRPC	Ozaukee Washington	Washington County Courthouse West Bend, Wisconsin	November 28, 1977 7:30 p.m.-9:20 p.m.
SEWRPC	Walworth	Walworth County Courthouse Elkhorn, Wisconsin	November 29, 1977 7:30 p.m.-9:00 p.m.
SEWRPC	Kenosha Racine	J. I. Case High School Racine, Wisconsin	November 30, 1977 7:30 p.m.-9:15 p.m.
SEWRPC	Milwaukee Waukesha	Wauwatosa City Hall Wauwatosa, Wisconsin	December 5, 1977 7:30 p.m.-12:05 a.m.

Source: SEWRPC.

television program concerning the preliminary regional transportation plan which was aired by WTMJ-TV just prior to the series of public hearings. The minutes of the public hearings were published by the Commission and are available at the Commission offices.[4]

[4]*See Minutes of Public Hearings, Regional Land Use and Transportation Plans for Southeastern Wisconsin—2000, November 28, 1977 to December 5, 1977.*

The following discussion summarizes the public reaction to the preliminary recommended regional transportation plan at these hearings and the Commission reaction thereto.

Ozaukee-Washington Counties

At the public hearing held for Ozaukee and Washington Counties, general support was expressed for the arterial street and highway proposals contained in the plan insofar as those proposals were consistent with the

previously adopted 1990 jurisdictional highway system plans for these two counties. At the hearing a number of citizens questioned the need for, and desirability of, the proposed USH 45 bypass of the Village of Kewaskum, a proposal that had not been included on the adopted Washington County jurisdictional highway system plan. Concern over this particular proposal related to the need for the bypass, as well as the possible impact of the bypass on the Kettle Moraine State Forest lands located to the east of the Village of Kewaskum. Also at the hearing, Ozaukee County officials expressed concern over the proposed elimination of all further planning for the Stadium Freeway-North extension through that County, but indicated that should the Commission determine to delete this freeway extension from the final plan, then the County would support significant improvements along Wauwatosa Road and CTH N as a partial substitute for that freeway.

Representatives of the Cities of West Bend and Port Washington indicated that additional local arterial street planning had taken place in recent months in those two cities and requested that the final regional plan reflect the results of this local planning. In particular, the City of Port Washington indicated it had prepared a new circulation plan for its downtown area that would require the addition of two short segments of existing streets and a new street connection to the arterial network. In the City of West Bend, it was noted that the local plan commission had been investigating the possibility of a new arterial facility to provide service between STH 144 and USH 45 on the far north side of the City.

Finally, with respect to the transit plan it was suggested by several individuals that consideration be given to the establishment of a public transit station at the interchange of CTH C and IH 43. Presently a privately owned carpooling lot is operated at that location.

Subsequent to the public hearing for Ozaukee and Washington Counties, the Ozaukee County Board of Supervisors filed a formal resolution with the Commission expressing support for the ultimate construction of the Stadium Freeway-North extension. In addition, the Common Council of the City of Cedarburg filed a resolution expressing opposition to any significant widening of STH 57 through that City. The Common Council of the City of Mequon also filed a resolution indicating its continued support for the Stadium Freeway-North extension and requesting that consideration be given to construction of a new interchange on IH 43 at Highland Road. The Mequon Common Council also asked that a previously proposed extension of W. County Line Road across the Milwaukee River be included in the new year 2000 plan.

On December 6, 1977, a special meeting was held at the Village Hall in the Village of Kewaskum to give further consideration to the proposed USH 45 bypass of the Village of Kewaskum. This meeting was attended by officials from the Village of Kewaskum and the Town of Kewaskum, as well as by interested concerned citizens. Following that meeting, formal letters were filed with the Commission by the Village Board of the Village of Kewaskum and the Town Board of the Town of Kewaskum expressing opposition to including the USH 45 bypass in the new plan.

Walworth County

Much of the discussion at the public hearing held for Walworth County centered around the long-proposed extension of the USH 12 Freeway as part of a second major interstate freeway route from Chicago to Madison. There was no significant opposition to the construction of the freeway per se; rather, a number of concerned citizens expressed the opinion that, at such time as the Wisconsin Department of Transportation proceeds with final design and construction of the proposed freeway extension, the Department minimize as much as possible right-of-way requirements in order not to adversely affect the prime agricultural and primary environmental corridor lands found in Walworth County.

Kenosha-Racine Counties

At the hearing held for Kenosha and Racine Counties, many of the comments offered related to the proposed Lake Freeway, with no public officials and only a few citizens opposing the freeway, and with many public officials and citizens addressing this question unanimously favoring immediate action by the Wisconsin Department of Transportation to acquire the right-of-way for this freeway and proceed with its construction. The Lake Freeway was supported in particular by Racine County, the City of Racine, and the Town of Mt. Pleasant, with officials from these units of government cautioning, however, that any continued delay in implementing this proposal would likely jeopardize the chances of ever seeing the facility constructed. Emphasis was placed on the fact that the private land owners affected by the proposed freeway had been very patient over the past decade, and in all fairness it was time to proceed with the right-of-way acquisition.

The preliminary plan did not include the previously proposed Racine Loop Freeway. There were no comments at the hearing expressing any support for this freeway, indicating apparent agreement with the preliminary plan recommendation.

Other significant comments made at the hearing included opposition by the Racine County Highway and Park Committee to elimination from the plan of an outer bypass of the City of Burlington. The Village Board of the Village of Rochester and the Town Board of the Town of Rochester filed resolutions opposing the STH 83 bypass of the Villages of Rochester and Waterford as that proposal was initially set forth in the adopted year 1990 Racine County jurisdictional highway system plan and carried over into the preliminary recommended year 2000 transportation plan. There was considerable private citizen support for deleting both the Waterford-Rochester and Burlington bypasses from the new plan.

Milwaukee-Waukesha Counties

Comments made at the hearing held for Milwaukee and Waukesha Counties dealt almost exclusively with the proposed completion of the freeway system in Milwaukee County together with the two-tier concept advanced by the Commission as described earlier. The hearing was particularly well attended both by elected public officials from all levels of government operating in the Milwaukee

area and by private citizens. The record of the hearing indicates both widespread support for and widespread opposition to completion of the Milwaukee County freeway system, providing further evidence of the very significant and very deep division of public opinion within that County as to the desirability of completing the freeway system as originally planned. The most significant support was given to the construction of the Stadium Freeway-South, the Lake Freeway-South, and the completion of the Milwaukee downtown freeway loop closure, although all of these freeway segments had significant opposition as well. The most significant opposition to freeway construction was given to the combination Park Freeway-West and Stadium Freeway-North "gap closure" project, although this project had a significant amount of support as well. There was virtually no support, however, for the preliminary Commission recommendation to place the Park Freeway-West and Stadium Freeway-North "gap closure" in the upper tier of the plan, thus reserving the cleared right-of-way for the Park Freeway-West in open space uses for at least 10 years. That particular recommendation was not favored by either those who favored construction of these freeways or those who favored removing the proposed freeways from the plan altogether.

Comments were also made at the hearing concerning the transportation system management proposals advanced in the preliminary plan. In general, there was reserved support for the freeway operational control system with those commenting urging a cautious approach to this proposal and urging that the question of equity to Milwaukee County residents be adequately explored. There was concern on the part of some individuals and public officials that an extensive ramp metering system would work most directly against the interests of residents of Milwaukee County who had borne a major share of the costs of constructing the freeway system now in place. The proposal to establish an all-day parking surcharge in downtown Milwaukee equivalent to a round-trip transit fare generated considerable opposition, as did the proposal to restrict the supply of all-day parking in the downtown Milwaukee area. These two proposals were opposed in particular by a Milwaukee alderman and by the Metropolitan Milwaukee Chamber of Commerce, with great concern being expressed over the possible impact of these proposals on the economic health of the Milwaukee central business district.

With respect to Waukesha County, considerable concern was expressed over proposals to widen and extend East Avenue in the City of Waukesha, as well as the widening of Pilgrim Road in the City of Brookfield. Support was voiced for deletion of the Belt Freeway from the plan and for continuing to plan for the completion of the USH 16 Freeway, including the bypass around Oconomowoc.

Regional Planning Commission Action in Response to Public Hearings

The Commission met on December 19, 1977, to deliberate on the public reaction to the preliminary recommended regional transportation plan. After considerable discussion and debate focusing primarily on the question of whether or not to continue to plan for the completion of the Milwaukee County freeway system, the Commission directed the staff to prepare a final recommended plan that would include all the uncompleted Milwaukee County freeways. The Commission further directed that a study be made of the impacts on the regional freeway and surface arterial system if the Stadium Freeway-North "gap closure" were ultimately to be removed from the plan. On December 28, 1977, the Commission met and received a communication from the Secretary of the Wisconsin Department of Transportation that state and federal funds for the study called for by the Commission on December 19, 1977, would likely not be available. After receiving this information and after further debate and discussion, the Commission directed that the staff prepare a final recommended regional transportation system plan that would be the same as the preliminary plan that went to public hearing with the following exceptions:

1. The Park Freeway-West and the Stadium Freeway-North "gap closure" would be removed entirely from the new long-range plan. In taking this action, the Commission recognized that the deletion of such a major new facility would have a considerable impact upon the travel habits and patterns in the North-West travel corridor of Milwaukee County. Accordingly, the Commission further directed that, following completion of the new regional plan, a supplemental subregional study be undertaken to determine what surface arterial facility and transit improvements, if any, should be substituted for the Park Freeway-West and the Stadium Freeway-North "gap closure."

2. The proposed management actions relating to the imposition of an all-day parking surcharge in downtown Milwaukee and the restriction of the downtown parking supply would be removed in their entirety from the plan.

3. A public transit station would be included in the plan at the interchange of IH 43 and Pioneer Road in the City of Mequon.

4. A new interchange on IH 43 at Highland Road in the City of Mequon would be added to the plan.

5. Wisconsin Avenue from Grand Avenue to Pier Street and a new facility connecting Wisconsin Avenue to Franklin Street in the City of Port Washington would be added to the plan.

6. The USH 45 bypass of the Village of Kewaskum would be removed in its entirety from the plan.

7. The STH 83 bypass of the Villages of Rochester and Waterford in Racine County would be removed in its entirety from the plan.

8. The proposed improvement of STH 20 from Ohio Street to Lathrop Avenue in the City of Racine would be deleted in its entirety from the plan.

9. The proposed extension of East Avenue in the City of Waukesha across the Fox River to

STH 164, as well as the proposed widening of East Avenue from Sunset Drive to Main Street, would be removed in their entirety from the plan.

In addition, the Commission directed that before completing and publishing the final regional transportation plan for 2000, meetings be held with each of the county jurisdictional highway system planning advisory committees to review in detail the system improvement and system expansion recommendations contained in the preliminary plan with respect to the surface arterial street and highway system and to explore any other arterial issues raised at the hearings.

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN

In accordance with the Commission directives noted above, the Commission staff proceeded with the preparation of the final recommended regional transportation plan for the year 2000. Meetings were held with each of the seven county technical and intergovernmental coordinating and advisory committees on jurisdictional highway planning. At these meetings each change from the adopted design year 1990 plan, both with respect to function and jurisdiction, was considered by the appropriate county committee. The final plan recommended herein, therefore, represents the consensus of the seven county committees as well as the Technical Coordinating and Advisory Committee on Regional Land Use-Transportation Planning.

Freeways

The final recommended freeway system plan for the year 2000 is shown on Map 104, and attendant mileage data for the existing, committed, and proposed freeways shown on the plan are set forth in Table 355. As of January 1, 1978, there were nearly 231 miles of freeway open to traffic within the Region. An additional eight miles of freeway were considered to be fully committed, consisting of the Airport Spur Freeway—1.4 miles—and the conversion of existing USH 16 to a freeway near Pewaukee and from STH 83 to Oconomowoc—7 miles.

The final recommended plan, like the preliminary recommended plan, includes both a lower tier and an upper tier with respect to proposed freeways. The lower tier of the final plan includes 60 miles of proposed freeways. These are the West Bend Freeway (USH 45) in Washington County from STH 145 to existing USH 45 north of the City of West Bend—12.7 miles; the completion of the conversion of existing USH 41 in Washington County from an expressway to a freeway—21 miles; the completion of the USH Freeway in Walworth County from Elkhorn to Whitewater—17 miles; the USH 16 Freeway bypass of Oconomowoc—5.4 miles; the extension of the existing Stadium Freeway-South in Milwaukee County to W. Lincoln Avenue—0.8 mile; and the extension of the Lake Freeway (IH 794) from the south end of the Daniel Webster Hoan Memorial Bridge to E. Layton Avenue—3.1 miles. In addition, the lower tier of the final plan includes the provision of two additional travel lanes on IH 43 from W. Henry Clay Street in the City of Glendale to STH 167 in the City of Mequon—7.7 miles; two additional travel lanes on the existing Stadium Freeway from the Stadium Interchange south to the existing terminus at W. National Avenue—0.7 mile; and two additional lanes on IH 94 west from the Goerkes Corners Interchange with USH 18 to USH 16—3.2 miles. Finally, the lower tier of the plan recommends the acquisition of the right-of-way required to ultimately construct the Lake Freeway-South from E. Layton Avenue in Milwaukee County through Racine and Kenosha Counties to the Illinois state line. The lower tier of the plan recommends that once this right-of-way is acquired, a standard surface arterial facility be constructed on the right-of-way in such a manner that would enable the ready conversion of this facility to a freeway at such time as a decision may be made to implement the upper-tier plan recommendation discussed below.

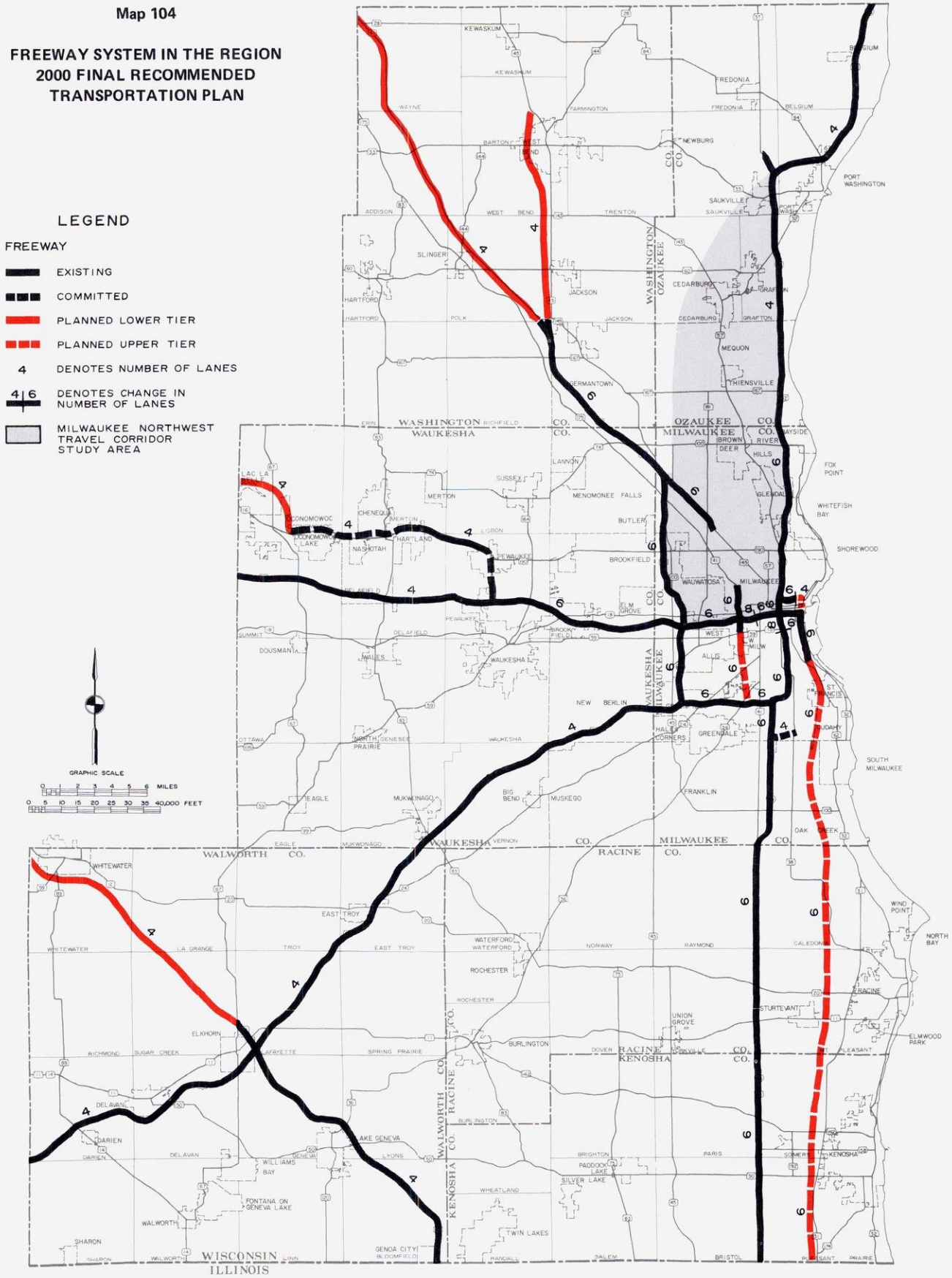
The upper tier of the final plan contains about 37 miles of proposed freeways, consisting of the completion of the Stadium Freeway-South from W. Lincoln Avenue to IH 894—3.3 miles; the completion of the Park Freeway-East from Milwaukee Street to the Lake Freeway—0.5 mile; the completion of the Lake Freeway-North from the current terminus at the East-West Freeway to the proposed Park Freeway-East, thus completing the "downtown loop closure" in Milwaukee County—0.8 mile; and the completion of the Lake Freeway-South from E. Layton Avenue in Milwaukee County through Milwaukee, Racine, and Kenosha Counties to the Illinois state line—32.5 miles.

In total, then, the year 2000 regional freeway system would approximate 336 miles, or 97 miles more than the existing and committed system, if all planned freeways included in the lower and upper tiers of the final plan were completed and opened to traffic. If only those freeway facilities included in the lower tier of the plan were ultimately constructed, the total mileage in the regional freeway system would be reduced to about 299 miles, or about 60 miles more than the existing and committed system.

The lower tier of the plan further recommends that a series of special studies be undertaken to deal with traffic congestion problems at the "stub ends" of currently uncompleted freeway segments, and that a special study be conducted of arterial street and highway and transit travel needs and facilities in the northwest travel corridor of Milwaukee County extending up into southern Ozaukee County. This latter study is needed to determine what transportation facility improvements, if any, should be included in the regional transportation plan to accommodate the travel demand that was to have been accommodated on the previously proposed Park Freeway-West and Stadium Freeway-North. The Stadium Freeway-North consisted not only of the "gap closure" of the Stadium Freeway-North between the existing terminus of that freeway and the Fond du Lac Freeway but also of the previously proposed Stadium Freeway-North extension in the N. 76th Street travel corridor of

Map 104

FREEWAY SYSTEM IN THE REGION 2000 FINAL RECOMMENDED TRANSPORTATION PLAN



The freeway system proposed under the final recommended transportation system plan consisted of about 336 miles of facilities, or about 9 percent of the total arterial street and highway system. About 231 miles, or 78 percent, of this proposed freeway system, would be comprised of freeways open to traffic as of January 1978; about 8 miles, or nearly 3 percent of the proposed system, would be comprised of facilities considered to be committed to construction; and about 97 miles, or about 29 percent of the proposed system, would be comprised of planned new facilities. Under the new plan, the proposed freeway system would be comprised of two categories: a lower tier, for which implementation should proceed immediately, and an upper tier, for which implementation would not proceed beyond the phase of right-of-way preservation for at least a decade and until the effectiveness of low-capital intensive improvements proposed in lieu of these freeways has been demonstrated. The proposed lower-tier facilities would total about 60 miles, or nearly 18 percent of the total freeway system. The upper-tier facilities would total about 37 miles, or 11 percent of the total freeway system.

Source: SEWRPC.

Table 355

EXISTING, COMMITTED, AND PLANNED FREEWAYS IN THE REGION: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Freeway	Existing January 1, 1978	Number of Miles			Total
		Committed	Planned		
			Lower Tier	Upper Tier	
Airport	5.1	--	--	--	5.1
Airport Spur	--	1.4	--	--	1.4
East-West	33.5	--	--	--	33.5
Fond du Lac	4.5	--	--	--	4.5
Lake	2.6	--	3.1	33.3	39.0
North-South	78.0	--	--	--	78.0
Park	1.2	--	--	0.5	1.7
Rock	48.7	--	--	--	48.7
Stadium	2.7	--	0.8	3.3	6.8
USH 12	19.1	--	17.0	--	36.1
USH 16	8.3	7.0	5.4	--	20.7
USH 41	11.3	--	21.0	--	32.3
West Bend	1.0	--	12.7	--	13.7
Zoo	14.5	--	--	--	14.5
Total	230.5	8.4	60.0	37.1	336.0

Source: SEWRPC.

Milwaukee and Ozaukee Counties. The lower tier of the plan recommends that this special northwest travel corridor study be undertaken immediately upon adoption of the new regional transportation plan. It is envisioned that this study would result in recommendations as to how the transportation needs of northwestern Milwaukee and southern Ozaukee Counties can best be met in the absence of the Park Freeway-West and Stadium Freeway-North. Careful consideration would have to be given in the study to transit, as well as to highway facilities. The report to be submitted at the completion of this special corridor study should be suitable for adoption by the Commission as a formal amendment to the new year 2000 regional transportation plan.

The Milwaukee northwest corridor study should have as a component special design studies with respect to two of the current freeway "stub ends." These two are the existing terminus of the Stadium Freeway-North near N. 47th Street and W. Lloyd Street and the currently uncompleted Hillside Interchange on IH 43. Thus, the northwest travel corridor study report will include specific recommendations as to how best to alleviate traffic congestion problems at these two "stub ends."

In addition, the lower tier of the plan recommends that special "stub end" design studies be undertaken at the following locations:

1. At the current terminus of the Park Freeway-East;
2. At the current northerly terminus of the Daniel Webster Hoan Memorial Bridge portion of the Lake Freeway, including specific consideration of how best to reopen the War Memorial Bridge to arterial traffic, assuming that the extension of the Lake Freeway-North and the consequent completion of the downtown freeway loop as included in the upper tier of the plan may or may not be carried out;
3. At the proposed south end of the Lake Freeway-South near E. Layton Avenue. This "stub end" study would be conducted in conjunction with the final design of the proposed extension of the Lake Freeway-South to E. Layton Avenue. The terminus of the Lake Freeway-South at E. Layton Avenue should be coordinated with the lower-tier plan recommendation to construct a surface arterial highway on the Lake Freeway right-of-way south from E. Layton Avenue to the Illinois state line; and
4. At the proposed south end of the Stadium Freeway-South at W. Lincoln Avenue. This "stub end" study would be conducted in conjunction with the final design of the proposed extension of the Stadium Freeway-South to W. Lincoln Avenue.

As discussed earlier in this chapter in the description of the preliminary recommended plan, the two-tier plan concept envisions that, if at some future date it is determined that actions to maximize the utilization of the capacity of the existing transportation system and to modify travel demand have been effective, and that the freeway "stub end" and associated surface arterial improvements are adequately accommodating travel demand, then the freeway proposals included in the upper tier of the plan can be removed from the plan. On the other hand, if it is determined at such time that travel demand modification efforts have not worked well, and that the freeway "stub end" and associated improvements do not provide the needed transportation service, then work could proceed again toward the design and construction of the freeways concerned. In the meantime, the final plan recommends that all right-of-way currently cleared for those freeway segments included in the upper tier of the plan be held in a transportation land bank, with appropriate consideration given to the interim use of the land for open space purposes. The plan envisions that these lands would be landscaped and well-maintained and made available for play areas and other open space activities that do not involve heavy capital investment. The plan also recommends that any currently undeveloped lands needed to accommodate construction of those freeways included in the upper tier of the plan continue to be held in open use. This would be done through official mapping on the part of the state, county, and local units of government involved, supplemented as necessary by public purchase of lands in special hardship cases. Concomitantly, the plan recommends that lands previously acquired for freeways not now included in either the upper or lower tiers of the recommended plan be returned to the private sector after appropriate consideration is given to alternative public land uses.

The estimated dislocation associated with freeways included in both the lower and upper tiers of the final plan is summarized in Table 356. A total of 710 residential units and 64 nonresidential structures would be dislocated if all of the proposed freeways in both the lower and upper tiers of the plan were ultimately to be constructed. The final plan recommends the following with respect to relocation procedures in connection with any dislocation associated with the proposed freeway construction:

1. That a review be undertaken of current relocation laws, practices, and procedures with a view toward modifying as necessary those laws, practices, and procedures to take into account relocation deficiencies believed by the Citizens Advisory Committee to exist and discussed earlier in this chapter. In particular, this review should determine whether or not the current relocation laws, practices, and procedures adequately compensate homeowners for repairs and renovations undertaken during a five-year period prior to public acquisition. In addition, this review should determine whether or not it would be in the public interest to provide for a cash payment to dislocatees for "pain and suffering" incurred as a result of the public taking of the land. It is envisioned that such "pain and suffering" payments would be above and beyond the appraised value of the property and should in part compensate a dislocatee for the time and trouble involved in relocation.

2. That a review be undertaken of current relocation laws, practices, and procedures to determine what steps may be taken to enable an owner to retain use of his building through physical removal to a new building site. The Citizens Advisory Committee concerns in this regard were also addressed earlier in this chapter. The proposed review of relocation laws, practices, and procedures should determine what changes are necessary to make it more attractive to homeowners to physically relocate their homes within the same neighborhood or community. It is envisioned that this review could extend to the payment of additional costs to undertake such relocation over and above the fair market value of the property, together with any current relocation benefits. The payment of such additional costs would be in lieu of the payment of "pain and suffering" benefits described above to those homeowners who choose not to physically relocate their homes.

Standard Surface Arterial Streets and Highways

The additions and changes to the standard surface arterial street and highway system in the Region under the final recommended plan are summarized in Table 357 by county and by arterial facility type. The total proposed arterial street and highway system in the Region, including both surface arterials and freeways, is shown on Map 105. In 1972 the surface arterial system in the Region consisted of 2,847 miles of facilities. By the year 2000 this surface arterial system would be increased by about 343 miles under the recommended plan. The additional mileage proposed reflects, in part, the addition of existing nonarterial facilities to the arterial system, and, in part, the construction of new surface arterial facilities. The latter would total about 150 miles under the recommended plan.

The total recommended year 2000 arterial street and highway system for the Region is identified on a large map included in the pocket attached to the back cover of this volume. Each link in the arterial street system is identified on this map, together with the proposed number of through travel lanes to be provided on that link. Freeways are identified as having either four, six, or eight lanes. Standard surface arterials are identified as having either two, four, or six lanes. In a departure from a precedent established by the Commission under the series of 1990 county jurisdictional highway system plans, no typical cross-sections are identified on this map. Rather, only the number of lanes recommended to be provided on each link in the arterial network is indicated. The number of lanes identified refers to

Table 356

ESTIMATED CAPITAL COSTS, DISLOCATION, AND TRAVEL VOLUMES FOR PROPOSED FREEWAYS INCLUDED IN THE LOWER AND UPPER TIERS OF THE 2000 FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN

Proposed Freeway	Estimated Capital Cost (millions 1975 dollars)	Estimated Dislocation		Range of Average Weekday Travel Volume (vehicles)
		Residential Units	Nonresidential Structures	
Airport Spur	15.1	9	4	13,000-14,000
Stadium South	76.1	91	14	48,000-68,000
Park East and Lake North	59.0	0	0	18,000-23,000[a]
Lake South—Milwaukee County	118.0	469	21	54,000-68,000
Lake South—Racine and Kenosha Counties	115.2	106	8	27,000-55,000
USH 12	22.2	2	2	21,000-30,000
USH 45	15.5	7	5	10,000-19,000
USH 41	19.3	1	2	15,000-22,000
USH 16	39.0	18	8	8,000-26,000
IH 43 (addition of 2 lanes)	20.4	7	0	47,000-69,000
IH 94 (addition of 2 lanes)	3.9	0	0	49,000-52,000
Total	503.7	710	64	--

[a] *It should be noted that the anticipated average weekday traffic volumes for the entire Park Freeway-East and Lake Freeway-North range from 18,000 to 34,000 vehicles per day.*

Source: SEWRPC.

through travel lanes; that is, those lanes that would be provided to carry traffic directly through the intersection. Thus, the number does not include any auxiliary traffic lanes to be provided for left and right turning movements or vehicle parking. It was assumed in the regional systems analysis that such right- and left-turn lanes will be provided where the volumes of turning vehicles would adversely affect the movement of vehicles through the intersection. The provision of turn lanes would, therefore, follow a design investigation in connection with a given improvement project. In addition to determining whether or not right- and/or left-turn lanes should be provided at intersections, the design investigation should determine whether or not a given arterial street improvement should be made on a divided or an undivided section of roadway. Thus, the precise cross-section to be selected for a given improvement project should be determined by the state and local implementing agencies following appropriate design study.

Table 358 summarizes by county the improvements proposed under the entire arterial street and highway system—freeways and surface arterials—as set forth in the final recommended plan. The improvements are categorized as either system preservation, system improvement, or system expansion. The location of these improvements by county is shown on Maps 106 through 112. System preservation includes all arterial improvement projects required to maintain the structural adequacy and serviceability of the existing system without significantly increasing the capacity of that system. Generally, these are projects classified as resurfacing and reconstruction for the same capacity—the latter including nonsignificant street-widening projects. System improvement includes all projects which would significantly increase the capacity of the existing system through street widening or relocation. System expansion includes all projects which would significantly increase the capacity of the existing system through the construction of new facilities.

Under the final plan, about 2,621 miles of the total proposed 3,526-mile arterial system would fall under the system preservation category, representing about 75 percent of the total arterial system. This includes 196 miles, or 6 percent of the total system, on which no work would be required; 1,545 miles, or 44 percent of the total system, on which only resurfacing would be required; and 880 miles, or 25 percent of the total system, on which reconstruction but to the same capacity would be required. About 721 miles, or about 20 percent of the total proposed system, is included in the system improvement category. About 677 miles, or about 19 percent of the total system, would be reconstructed for additional capacity; and 44 miles, or about 1 percent of the total system would involve construction of replace-

Table 357

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

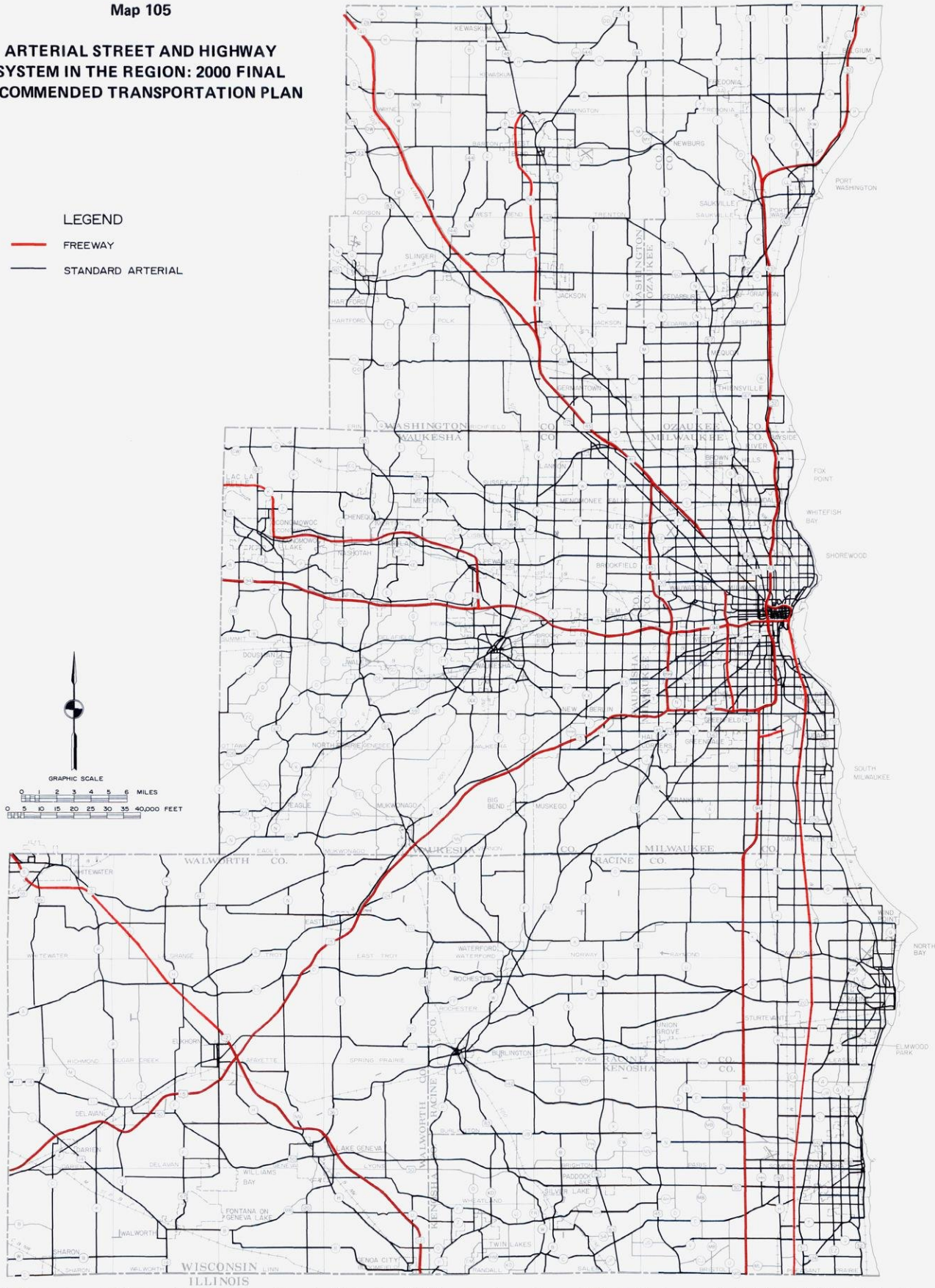
Arterial Facility Type	Miles of Arterial Facilities		
	1972	Planned Increment	2000
Kenosha County			
Freeway			
4-lane	--	--	--
6-lane	12.1	12.2	24.3
8-lane	--	--	--
Subtotal	12.1	12.2	24.3
Standard Arterial			
2-lane	243.6	- 2.9	240.7
4-lane	24.1	61.7	85.8
6-lane	--	8.8	8.8
Subtotal	267.7	67.6	335.3
County Total	279.8	79.8	359.6
Milwaukee County			
Freeway			
4-lane	12.7	- 1.9	10.8
6-lane	49.0	23.9	72.9
8-lane	2.1	--	2.1
Subtotal	63.8	22.0	85.8
Standard Arterial			
2-lane	339.5	- 131.6	207.9
4-lane	268.7	143.9	412.6
6-lane	62.2	6.6	68.8
Subtotal	670.4	18.9	689.3
County Total	734.2	40.9	775.1
Ozaukee County			
Freeway			
4-lane	10.8	14.8	25.6
6-lane	--	2.0	2.0
8-lane	--	--	--
Subtotal	10.8	16.8	27.6
Standard Arterial			
2-lane	233.0	19.9	252.9
4-lane	6.5	23.9	30.4
6-lane	--	--	--
Subtotal	239.5	43.8	283.3
County Total	250.3	60.6	310.9
Racine County			
Freeway			
4-lane	--	--	--
6-lane	12.0	12.1	24.1
8-lane	--	--	--
Subtotal	12.0	12.1	24.1
Standard Arterial			
2-lane	303.5	18.4	321.9
4-lane	28.0	56.5	84.5
6-lane	5.9	5.9	11.8
Subtotal	337.4	80.8	418.2
County Total	349.4	92.9	442.3

Arterial Facility Type	Miles of Arterial Facilities		
	1972	Planned Increment	2000
Walworth County			
Freeway			
4-lane	19.1	48.1	67.2
6-lane	--	--	--
8-lane	--	--	--
Subtotal	19.1	48.1	67.2
Standard Arterial			
2-lane	379.4	10.7	390.1
4-lane	9.7	16.2	25.9
6-lane	--	--	--
Subtotal	389.1	26.9	416.0
County Total	408.2	75.0	483.2
Washington County			
Freeway			
4-lane	0.4	35.6	36.0
6-lane	6.4	--	6.4
8-lane	--	--	--
Subtotal	6.8	35.6	42.4
Standard Arterial			
2-lane	305.6	61.8	367.4
4-lane	26.8	1.0	27.8
6-lane	--	--	--
Subtotal	332.4	62.8	395.2
County Total	339.2	98.4	437.6
Waukesha County			
Freeway			
4-lane	29.1	19.4	48.5
6-lane	8.7	7.4	16.1
8-lane	--	--	--
Subtotal	37.8	26.8	64.6
Standard Arterial			
2-lane	565.5	- 55.9	509.6
4-lane	41.3	80.6	121.9
6-lane	3.9	17.4	21.3
Subtotal	610.7	42.1	652.8
County Total	648.5	68.9	717.4
Southeastern Wisconsin Region			
Freeway			
4-lane	72.1	116.0	188.1
6-lane	88.2	57.6	145.8
8-lane	2.1	--	2.1
Subtotal	162.4	173.6	336.0
Standard Arterial			
2-lane	2,370.1	- 79.6	2,290.5
4-lane	405.1	383.8	788.9
6-lane	72.0	38.7	110.7
Subtotal	2,847.2	342.9	3,190.1
Region Total	3,009.6	516.5	3,526.1

Source: SEWRPC.

Map 105

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN



Under the final recommended transportation system plan, arterial street and highway system mileage within the Region would total about 3,526 miles by the year 2000, an increase of about 516 miles, or about 17 percent, over 1972. Freeways would comprise 336 miles, or about 9 percent, of the total arterial system in the year 2000, an increase of 174 miles over 1972. Such freeways would, however, be expected to carry about 42 percent of the average daily traffic load. Of this increase, 97 miles represent seven planned new freeways. Of this total system about 2,621 miles, or about 75 percent, would fall into the system preservation category, including facilities for which no work, resurfacing, or reconstruction for same capacity is proposed; about 721 miles, or 20 percent, would fall into the system improvement category, for which reconstruction for additional capacity or new construction of replacement facilities is proposed; and about 184 miles, or 5 percent, would fall into the system expansion category, wherein the construction of new facilities is proposed.

Source: SEWRPC.

Table 358

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Arterial Facility Type	System Preservation				System Improvement			System Expansion		Total (miles)
	No Work Required (miles)	Resurface (miles)	Reconstruct for Same Capacity (miles)	Percent of Total	Reconstruct for Additional Capacity (miles)	New Construction—Replacement Facility (miles)	Percent of Total	New Construction—New Facility	Percent of Total	
Kenosha County										
Freeway	--	12.1	--	49.8	--	--	--	12.2	50.2	24.3
Standard Arterial	0.9	128.2	114.2	72.6	70.0	9.7	23.8	12.3	3.7	335.3
Subtotal	0.9	140.3	114.2	71.0	70.0	9.7	22.2	24.5	6.8	359.6
Milwaukee County										
Freeway	9.8	53.0	--	73.5	5.4	--	6.3	17.6	20.6	85.4
Standard Arterial	62.5	319.0	72.5	65.9	219.7	3.7	32.4	11.9	1.7	689.3
Subtotal	72.3	372.0	72.5	66.7	225.1	3.7	29.5	29.5	3.8	774.7
Ozaukee County										
Freeway	16.8	8.8	--	92.8	2.0	--	7.2	--	--	27.6
Standard Arterial	4.0	145.3	89.8	84.4	38.6	2.0	14.3	3.6	1.3	283.3
Subtotal	20.8	154.1	89.8	85.1	40.6	2.0	13.7	3.6	1.2	310.9
Racine County										
Freeway	--	12.0	--	49.8	--	--	--	12.1	50.2	24.1
Standard Arterial	5.7	119.7	182.3	73.6	81.7	5.9	20.9	22.9	5.5	418.2
Subtotal	5.7	131.7	182.3	72.3	81.7	5.9	19.8	35.0	7.9	442.3
Walworth County										
Freeway	50.3	--	--	74.9	--	--	--	16.9	25.1	67.2
Standard Arterial	9.3	226.8	133.9	88.9	22.0	10.2	7.8	13.8	3.3	416.0
Subtotal	59.6	226.8	133.9	87.0	22.0	10.2	6.6	30.7	6.4	483.2
Washington County										
Freeway	2.2	6.4	--	20.3	21.1	--	49.8	12.7	29.9	42.4
Standard Arterial	1.8	218.7	112.8	84.3	40.2	6.8	11.9	14.9	3.8	395.2
Subtotal	4.0	225.1	112.8	78.7	61.3	6.8	15.6	27.6	6.3	437.6
Waukesha County										
Freeway	14.1	35.6	--	76.9	8.8	--	13.6	6.1	9.5	64.6
Standard Arterial	18.5	259.7	174.9	69.4	167.0	6.0	26.5	26.7	4.1	652.8
Subtotal	32.6	295.3	174.9	70.1	175.8	6.0	25.3	32.8	4.6	717.4
Southeastern Wisconsin Region										
Freeway	93.2	127.9	--	65.8	37.3	--	11.1	77.6	23.5	336.0
Standard Arterial	102.7	1,417.4	880.4	75.3	639.2	44.3	21.4	106.1	3.3	3,190.1
Total	195.9	1,545.3	880.4	74.3	676.5	44.3	20.4	183.7	5.3	3,526.1

Source: SEWRPC.

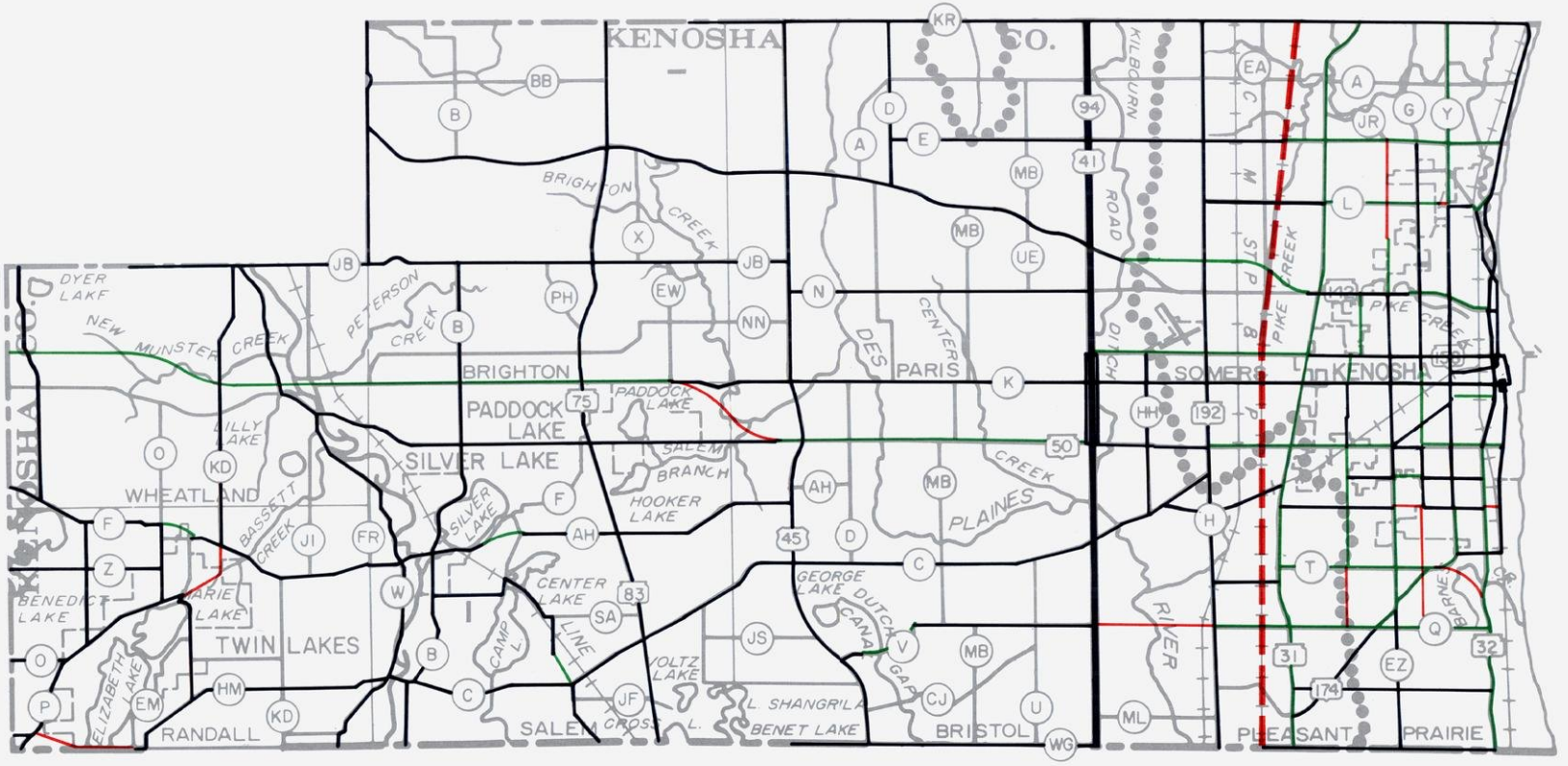
ment facilities. The remaining 184 miles, or 5 percent of the total proposed system, is included in the system expansion category, and would involve the construction of new facilities.

Mass Transit Facilities and Services

The final recommended regional transportation plan includes transit system development proposals for the three urbanized areas of the Region—Kenosha, Milwaukee, and Racine. The base transit fare is recommended to remain at $0.50 in the Milwaukee urbanized area and at $0.25 in the Kenosha and Racine urbanized areas, the fares being expressed in 1975 dollars. Should general price inflation continue, increases in the base transit fare should be expected to occur in order to offset the effects of such inflation and maintain the actual fare box revenues at the relative levels envisioned in the plan.

Map 106

RECOMMENDED ARTERIAL STREET AND HIGHWAY SYSTEM IN KENOSHA COUNTY: 2000



LEGEND

SYSTEM PRESERVATION

- FREEWAY
- STANDARD ARTERIAL

SYSTEM IMPROVEMENT

- FREEWAY
- STANDARD ARTERIAL

SYSTEM EXPANSION

- FREEWAY -- LOWER TIER
- FREEWAY -- UPPER TIER
- STANDARD ARTERIAL

GRAPHIC SCALE

0 1 2 3 4 MILES

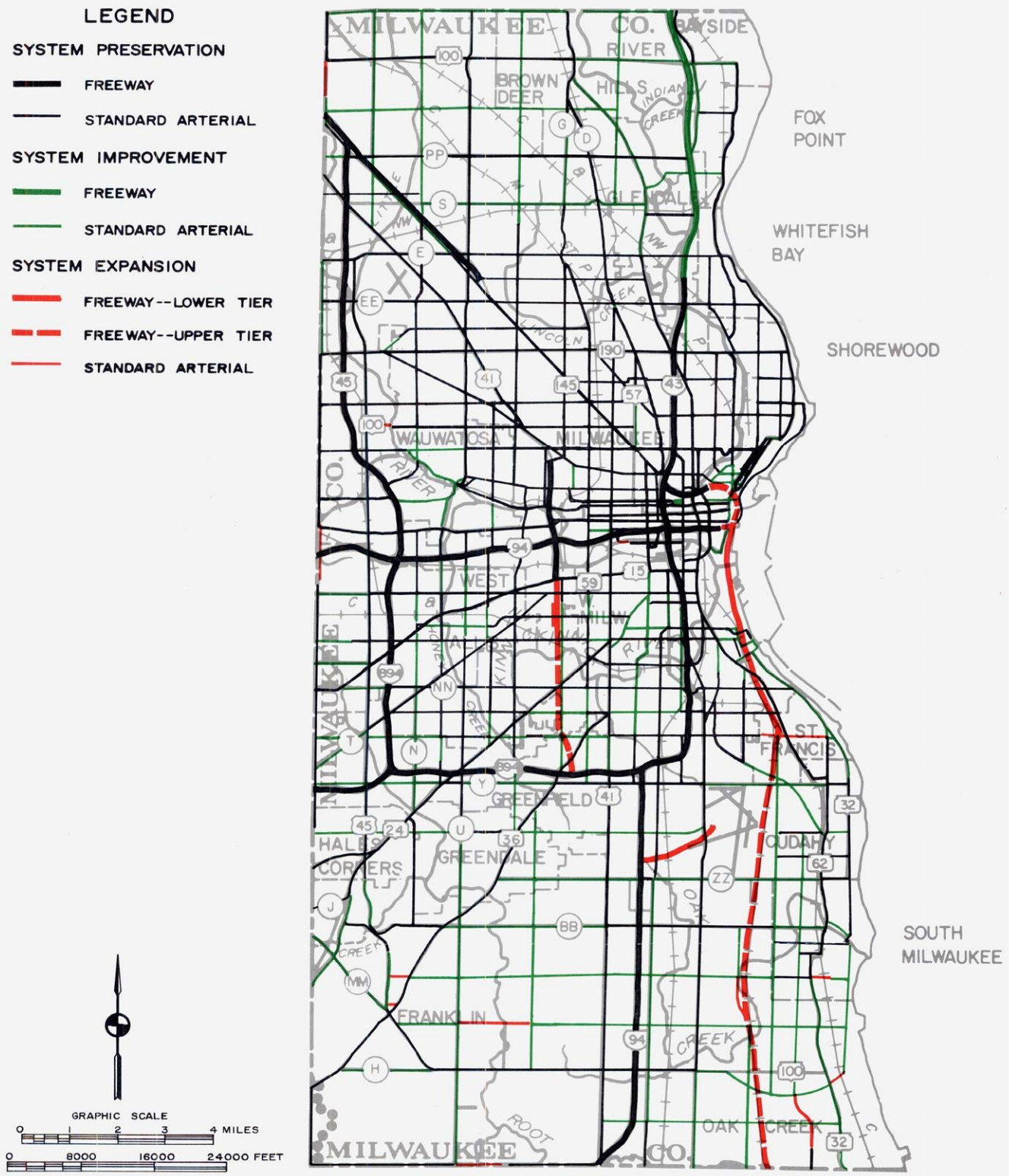
0 8000 16000 24000 FEET

Under the recommended transportation system plan, arterial street and highway system mileage within Kenosha County would total about 360 miles by the year 2000, an increase of 80 miles, or about 29 percent, over 1972. Freeways would comprise about 24 miles, or 7 percent, of the total arterial system in the year 2000, an increase of 12 miles over 1972. Of this total system, about 255 miles, or 71 percent, would fall into the system preservation category, including facilities for which no work, resurfacing, or reconstruction for same capacity is proposed; about 80 miles, or 22 percent, would fall into the system improvement category, for which reconstruction for additional capacity or new construction of replacement facilities is proposed; and about 25 miles, or 7 percent, would fall into the system expansion category wherein the new construction of new facilities is proposed.

Source: SEWRPC.

Map 107

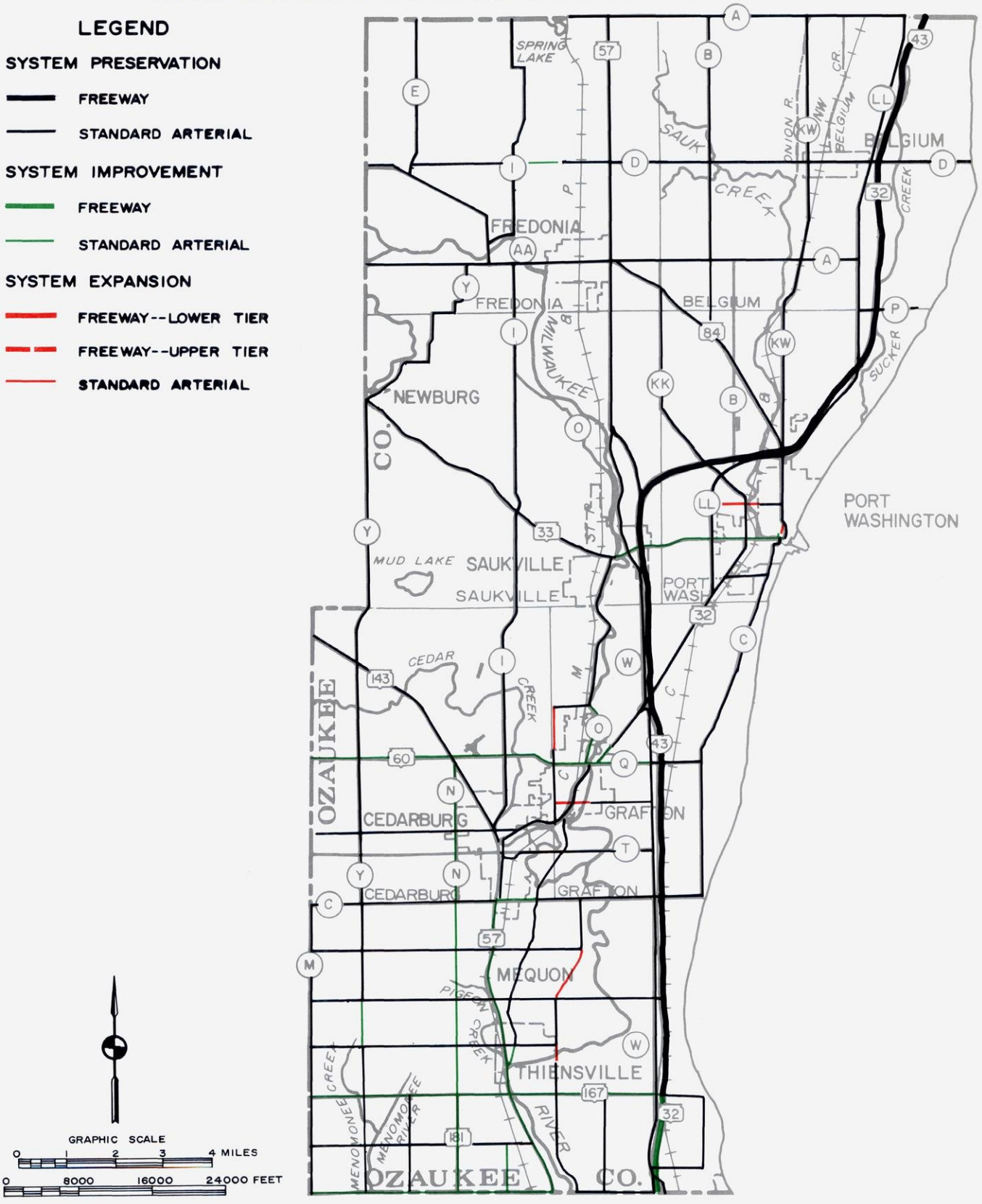
RECOMMENDED ARTERIAL STREET AND HIGHWAY SYSTEM IN MILWAUKEE COUNTY: 2000



Under the recommended transportation system plan, arterial street and highway system mileage within Milwaukee County would total about 775 miles by the year 2000, an increase of 41 miles, or about 6 percent, over 1972. Freeways would comprise about 86 miles, or 11 percent, of the total arterial system in the year 2000, an increase of 22 miles over 1972. Of this total system, about 517 miles, or 67 percent, would fall into the system preservation category including facilities for which no work, resurfacing, or reconstruction for same capacity is proposed; about 229 miles, or 29 percent, would fall into the system improvement category for which reconstruction for additional capacity or new construction of replacement facilities is proposed; and about 29 miles, or 4 percent, would fall into the system expansion category wherein the new construction of new facilities is proposed.

Source: SEWRPC.

RECOMMENDED ARTERIAL STREET AND HIGHWAY SYSTEM IN OZAUKEE COUNTY: 2000

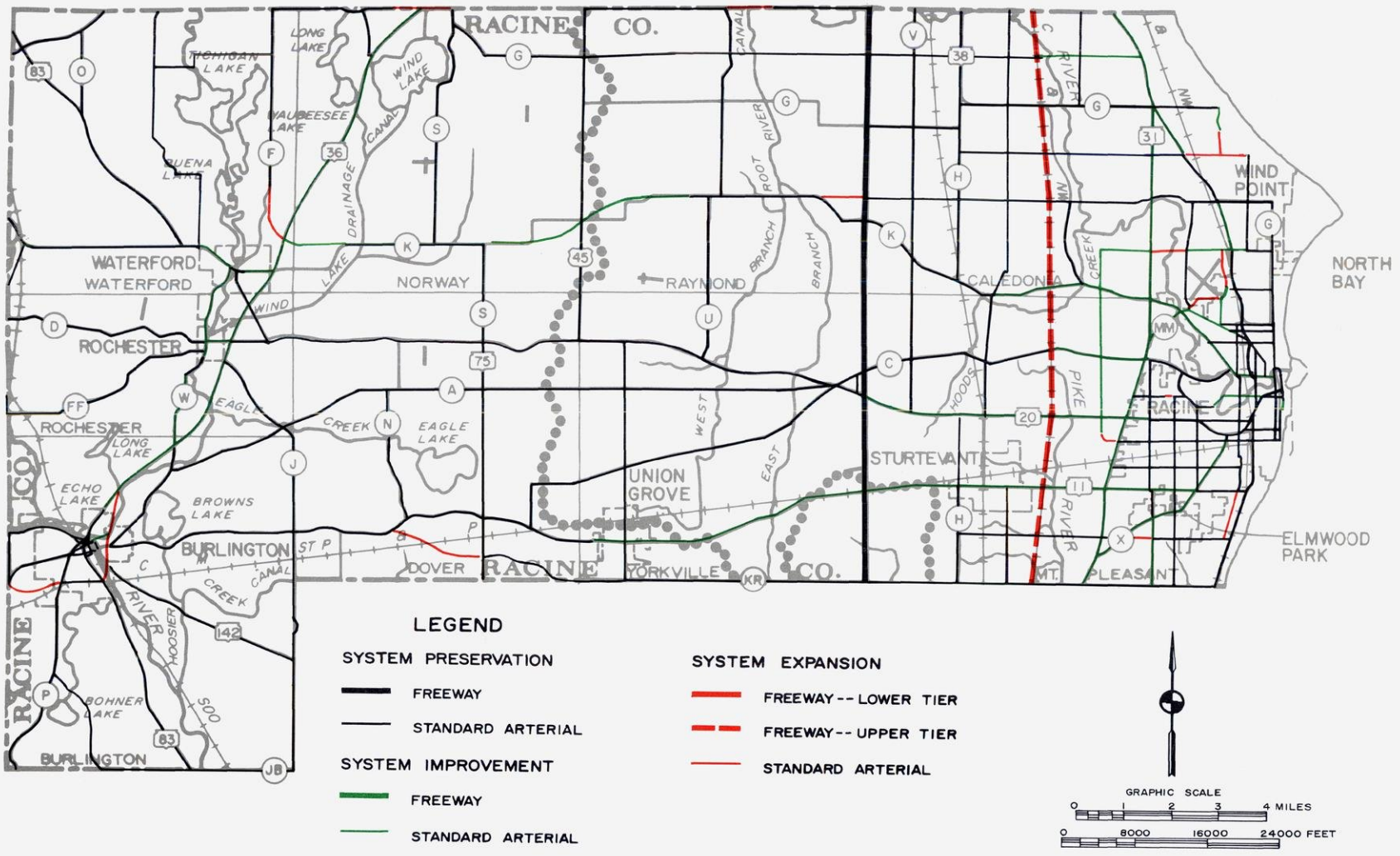


Under the recommended transportation system plan, arterial street and highway system mileage within Ozaukee County would total about 311 miles by the year 2000, an increase of 61 miles, or about 20 percent, over 1972. Freeways would comprise about 28 miles, or 9 percent, of the total arterial system in the year 2000, an increase of 17 miles over 1972. Of this total system, about 264 miles, or 85 percent, would fall into the system preservation category including facilities for which no work, resurfacing, or reconstruction for same capacity is proposed; about 43 miles, or 14 percent, would fall into the system improvement category for which reconstruction for additional capacity or new construction of replacement facilities is proposed; and about 4 miles, or 1 percent, would fall into the system expansion category wherein the new construction of new facilities is proposed.

Source: SEWRPC.

Map 109

RECOMMENDED ARTERIAL STREET AND HIGHWAY SYSTEM IN RACINE COUNTY: 2000

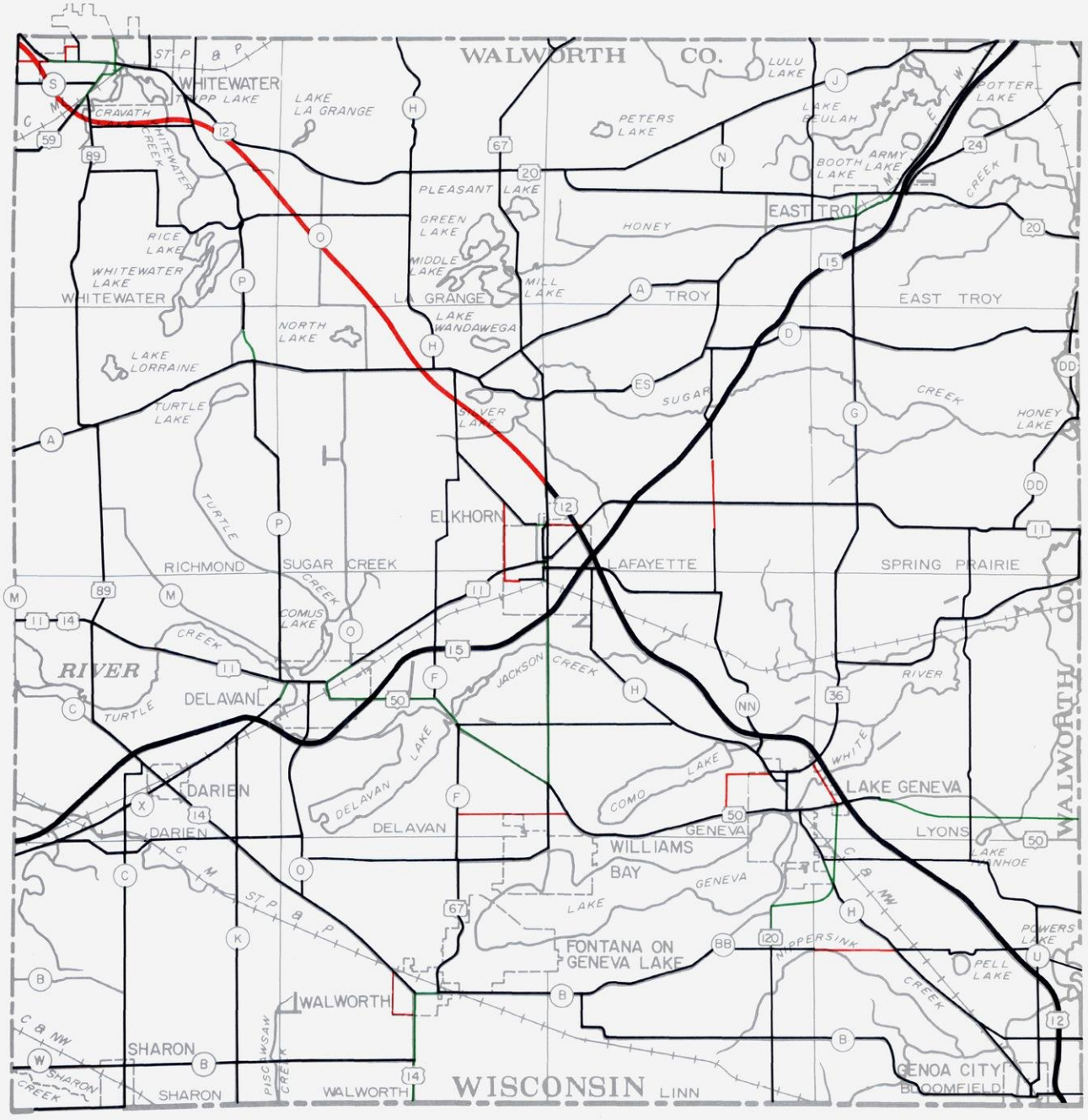


Under the recommended transportation system plan, arterial street and highway system mileage within Racine County would total about 442 miles by the year 2000, an increase of 93 miles, or about 27 percent, over 1972. Freeways would comprise about 24 miles, or 5 percent, of the total arterial system in the year 2000, an increase of 12 miles over 1972. Of this total system, about 319 miles, or 72 percent, would fall into the system preservation category including facilities for which no work, resurfacing, or reconstruction for same capacity is proposed; about 88 miles, or 20 percent, would fall into the system improvement category for which reconstruction for additional capacity or new construction of replacement facilities is proposed; and about 35 miles, or 8 percent, would fall into the system expansion category wherein the new construction of new facilities is proposed.

Source: SEWRPC.

Map 110

RECOMMENDED ARTERIAL STREET AND HIGHWAY SYSTEM IN WALWORTH COUNTY: 2000



LEGEND

SYSTEM PRESERVATION

- FREEWAY
- STANDARD ARTERIAL

SYSTEM IMPROVEMENT

- FREEWAY
- STANDARD ARTERIAL

SYSTEM EXPANSION

- FREEWAY -- LOWER TIER
- FREEWAY -- UPPER TIER
- STANDARD ARTERIAL

GRAPHIC SCALE

0 1 2 3 4 MILES

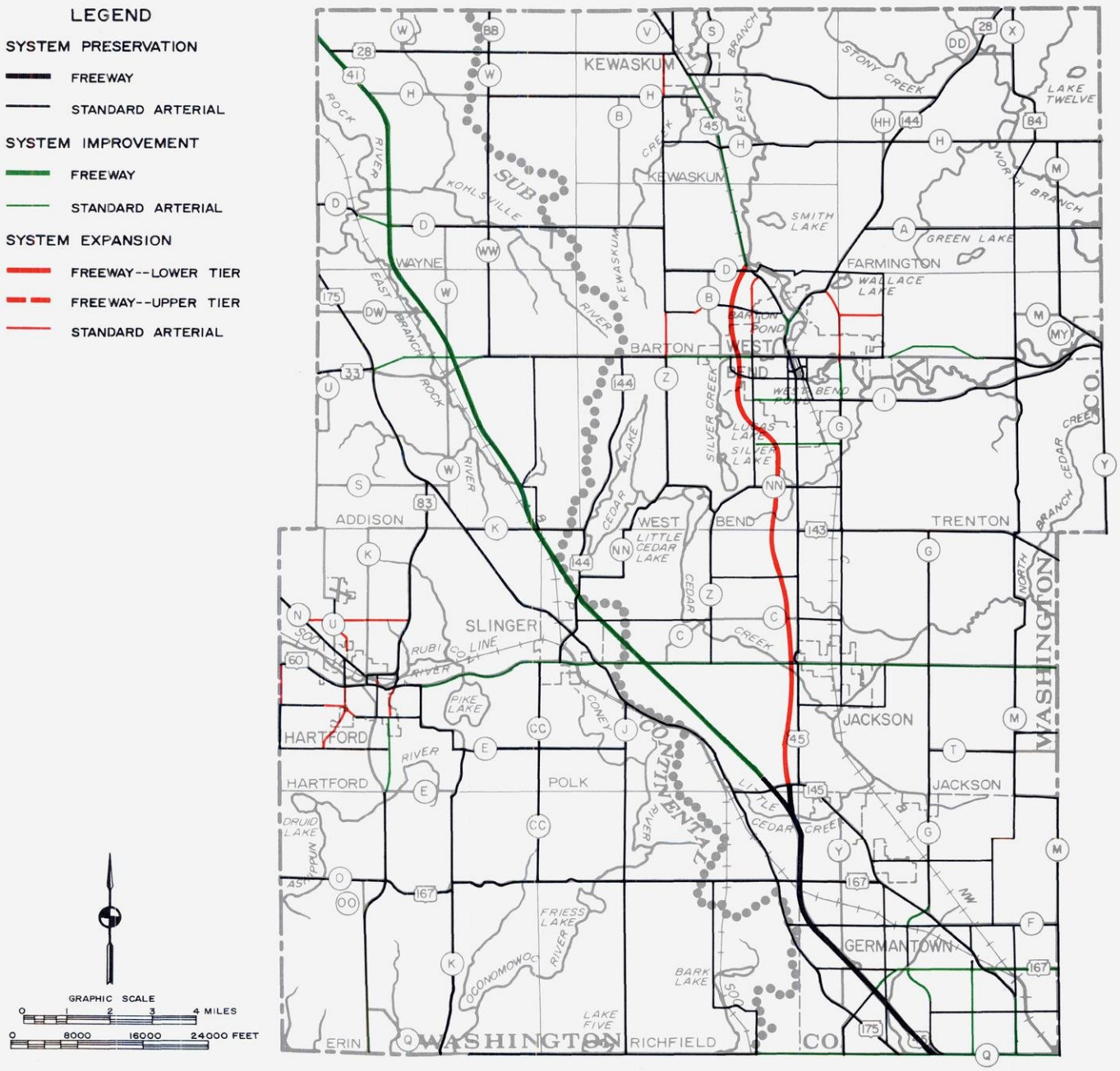
0 8000 16000 24000 FEET

Under the recommended transportation system plan, arterial street and highway system mileage within Walworth County would total about 483 miles by the year 2000, an increase of 75 miles, or about 18 percent, over 1972. Freeways would comprise about 67 miles, or 14 percent, of the total arterial system in the year 2000, an increase of 48 miles over 1972. Of this total system, about 420 miles, or 87 percent, would fall into the system preservation category including facilities for which no work, resurfacing, or reconstruction for same capacity is proposed; about 32 miles, or 7 percent, would fall into the system improvement category for which reconstruction for additional capacity or new construction of replacement facilities is proposed; and about 31 miles, or 6 percent, would fall into the system expansion category wherein the new construction of new facilities is proposed.

Source: SEWRPC.

Map 111

RECOMMENDED ARTERIAL STREET AND HIGHWAY SYSTEM IN WASHINGTON COUNTY: 2000

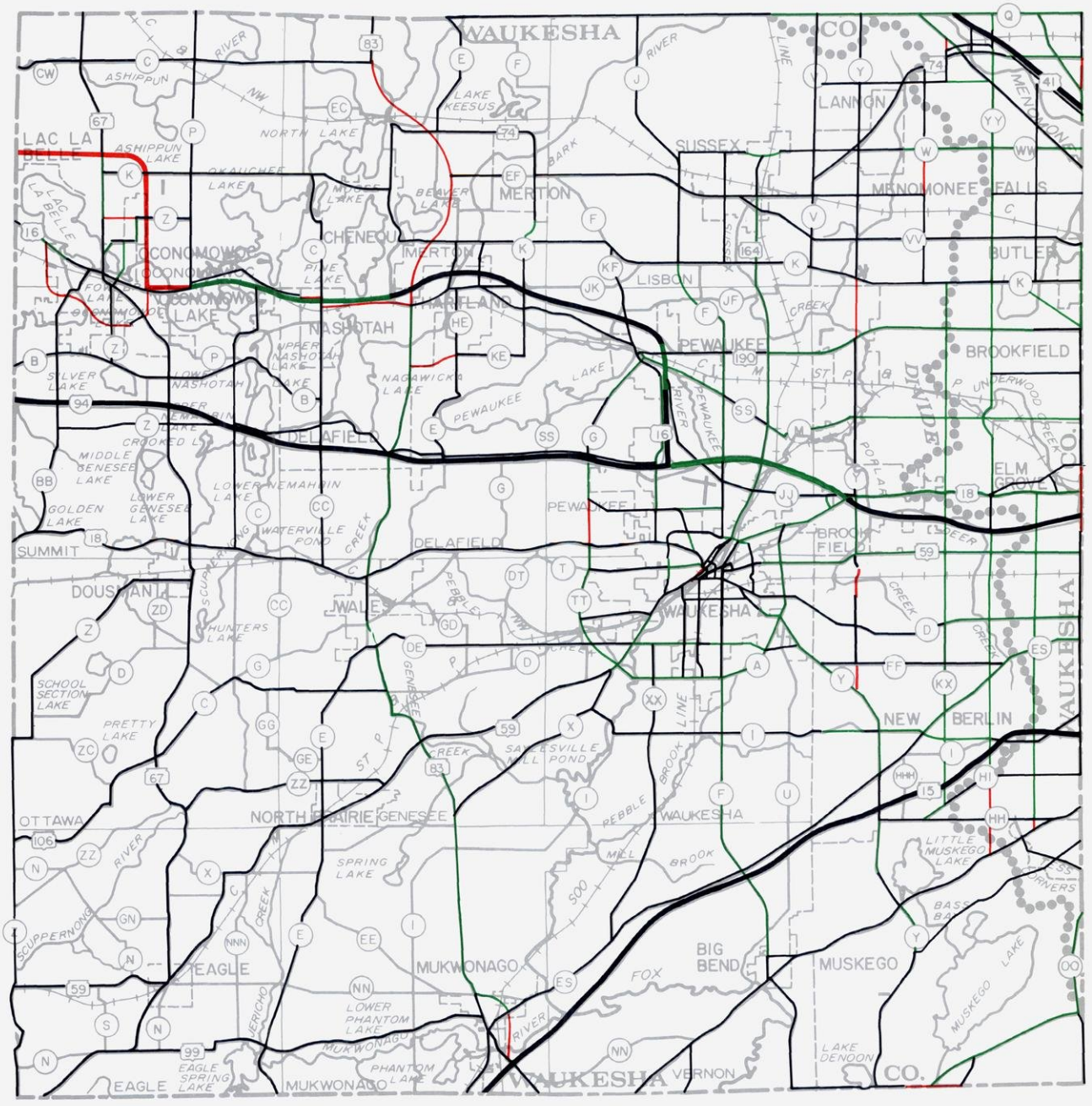


Under the recommended transportation system plan, arterial street and highway system mileage within Washington County would total about 438 miles by the year 2000, an increase of 98 miles, or about 22 percent, over 1972. Freeways would comprise about 42 miles, or 10 percent, of the total arterial system in the year 2000, an increase of 36 miles over 1972. Of this total system, about 342 miles, or 78 percent, would fall into the system preservation category including facilities for which no work, resurfacing, or reconstruction for same capacity is proposed; about 68 miles, or 16 percent, would fall into the system improvement category for which reconstruction for additional capacity or new construction of replacement facilities is proposed; and about 28 miles, or 6 percent, would fall into the system expansion category wherein the new construction of new facilities is proposed.

Source: SEWRPC.

Map 112

RECOMMENDED ARTERIAL STREET AND HIGHWAY SYSTEM IN WAUKESHA COUNTY: 2000



Under the recommended transportation system plan, arterial street and highway system mileage within Waukesha County would total about 717 miles by the year 2000, an increase of 69 miles, or about 11 percent, over 1972. Freeways would comprise about 65 miles, or 9 percent, of the total arterial system in the year 2000, an increase of 27 miles over 1972. Of this total system, about 502 miles, or 70 percent, would fall into the system preservation category including facilities for which no work, resurfacing, or reconstruction for same capacity is proposed; about 182 miles, or 25 percent, would fall into the system improvement category for which reconstruction for additional capacity or new construction of replacement facilities is proposed; and about 33 miles, or 5 percent, would fall into the system expansion category wherein the new construction of new facilities is proposed.

Source: SEWRPC.

Like the preliminary recommended plan, the final plan includes in the Milwaukee urbanized area the provision of three levels of transit service—primary, secondary, and tertiary. Anticipated mass transit facility requirements for the Milwaukee area are identified in Table 359. The primary transit network proposed in the final plan is shown in red on Map 113. All of the primary service in the plan would be of the modified rapid transit type, consisting of the operation of motor buses in mixed traffic on freeways and over connecting surface arterials. Unlike the 1990 plan, which recommended the construction of a fully grade-separated exclusive right-of-way for motor buses in the East-West travel corridor in Milwaukee County, the new plan recommends the development of no true rapid transit facilities. Instead, the plan recommends the development of a freeway control system in the Milwaukee urbanized area—a system designed to permit the provision of a high level of primary transit service over the freeway system. Should the freeway control system not be implemented or prove to be inadequate in terms of achieving this objective, it will be necessary at some future date to again consider such alternative solutions as the institution of contra-flow lanes or the provision of exclusive transit rights-of-way in the area.

Under the plan, primary transit service would be provided over a total of 80 miles of freeway facility, with 27 miles of connecting surface arterials. A total of 38 public transit stations would be established along the primary transit system, six of which are already in existence (see Table 360). The primary transit system recommended under the final plan differs significantly from that recommended under the preliminary plan due to the deletion from the final plan of the previously proposed Park Freeway-West and Stadium Freeway-North facilities. Without these two freeway facilities, it is not possible to provide primary transit service in the northwest travel corridor of the Milwaukee area. Consequently, a number of adjustments had to be made in the transit system configuration, including the routing of primary transit service from the Mequon and Milwaukee-Northridge stations over the North-South Freeway; the routing of other primary transit service over the Zoo and East-West Freeways; and the addition of a new "primary" transit route over the existing Stadium Freeway-North stub, W. Lloyd Street, N. Sherman Boulevard, and W. Fond du Lac Avenue to N. 76th Street. It must be recognized that the proposed Milwaukee northwest travel corridor study discussed earlier may result in refinements and changes to these transit recommendations.

Table 359

MASS TRANSIT FACILITIES IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Transit Facility Characteristic	Existing 1972	Planned Increment	Total 2000
Round-Trip Route Miles			
Primary	150	902	1,052
Secondary	56	305	361
Tertiary	855	805	1,660
Total	1,061	2,012	3,073
Miles of Special Facilities			
Exclusive Rights-of-Way	--	--	--
Exclusive Lanes on Streets	--	9.5	9.5
Vehicle Requirements (Number of Buses)			
Peak Period	442	585	1,027
Midday Period	220	407	627

Source: SEWRPC.

The secondary level of transit service included in the final plan is nearly identical to that provided in the preliminary plan. Secondary service consists of express bus routes on arterial streets with stops generally located at intersecting transit routes. Under the final plan, secondary service would be provided on 14 individual transit routes operating over 156 miles of surface arterials. Exclusive transit lanes—that is, traffic lanes reserved for the operation of buses only during specified hours of the day—would be provided on eight individual transit routes over 10 miles of surface arterials (see Table 361). The exclusive transit lanes would provide about 20 round-trip route miles of secondary transit service, or 6 percent of all secondary round-trip route miles of service

The tertiary level of mass transit service included in the final recommended plan consists of local transit service provided over arterial and collector streets with frequent stops for passenger boarding and alighting. Under the final plan, extensive additions to the tertiary or local transit service routes would be provided. The plan envisions the ultimate extension of tertiary transit service to all of the Milwaukee urbanized area, including areas of urban development in southern Ozaukee and Washington Counties, eastern Waukesha County, and southern Milwaukee County not now served.

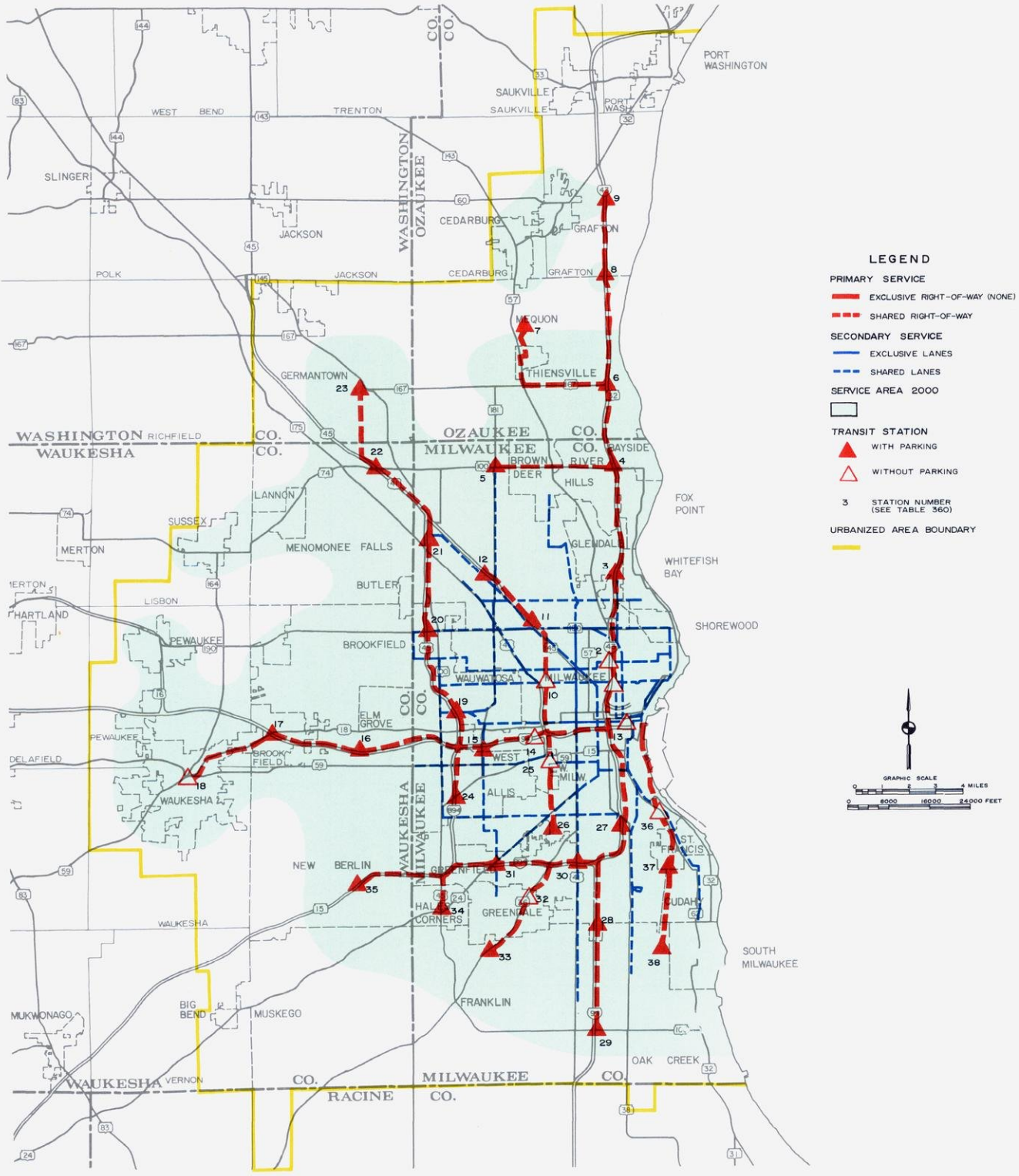
In the Kenosha and Racine urbanized areas, the plan recommends only the provision of the tertiary level of transit service. Given the significant improvements in mass transit service in these two urbanized areas that have taken place in recent years, the final recommended plan for the year 2000 envisions only relatively minor route extensions and changes to reflect the anticipated expansion of these two urbanized areas to the design year of the plan. Map 114 identifies the proposed transit service areas and suggested transit system routing for the year 2000 in the Kenosha and Racine areas. Table 362 identifies the estimated number of round-trip route miles and the number of buses required by the year 2000 in the Kenosha and Racine urbanized areas.

Transportation System Management Recommendations

In addition to the arterial street and highway and transit facility and service recommendations described above, the final recommended regional transportation plan for the year 2000 includes three major transportation system management recommendations. These management recommendations consist of the expansion of the

Map 113

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN



Under the final recommended transportation plan, transit service would be provided over 3,073 round-trip route miles of transit line in the Milwaukee urbanized area. Of this total, 1,052 route miles would provide primary service, 361 route miles secondary service, and 1,660 route miles tertiary service. The system would require the operation of about 1,027 buses during peak ridership periods. This would represent an increase of 2,012 round-trip route miles and 585 buses over 1972. The plan also recommends the provision of 38 public park and ride transit stations, an increase of 34 stations over 1972.

Source: SEWRPC.

Table 360

SELECTED CHARACTERISTICS OF PRIMARY TRANSIT STATIONS IN THE MILWAUKEE URBANIZED AREA: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Transit Station Identification					Type of Service				Passenger Facilities		
Primary Service Corridor	Number[a]	Name	Civil Division	Status	Primary	Secondary	Tertiary	Collection-Distribution	Shelter	Number of Parking Spaces	Buses per Peak Hour in Peak Direction
East Side	1	W. North Avenue	City of Milwaukee	Proposed	X	X	X		X	--	24
	2	W. Locust Street	City of Milwaukee	Proposed	X	X	X		X	--	14
	3	Northshore	City of Glendale	Existing	X	X	X	X	X	200	6
	4	W. Brown Deer Road	Village of River Hills	Existing	X		X	X	X	325	8
	5	Northridge	City of Milwaukee	Proposed	X	X	X		X	150	4
	6	STH 167—Mequon	City of Mequon	Proposed	X		X	X	X	300	6
	7	MATC—Mequon	City of Mequon	Existing	X		X		X	100	6
	8	CTH C—Grafton	Town of Grafton	Proposed	X				X	100	4
	9	CTH Q—Grafton	Town of Grafton	Proposed	X		X	X	X	325	4
Northwest	10	N. Sherman Boulevard	City of Milwaukee	Proposed	X	X	X		X	--	9
	11	Capitol Court	City of Milwaukee	Proposed	X	X	X		X	200	9
	12	W. Silver Spring Drive	City of Milwaukee	Proposed	X	X	X		X	150	5
East-West	13	Downtown Milwaukee	City of Milwaukee	Proposed	X	X	X	X	X	--	159
	14	VA Center	City of Milwaukee	Proposed	X				X	--	7
	15	State Fair Park	City of Milwaukee	Proposed	X	X	X		X	300	14
	16	Brookfield Square	City of Brookfield	Proposed	X		X	X	X	100	6
	17	Goerke's Corners	Town of Brookfield	Existing	X		X	X	X	300	10
	18	Waukesha	City of Waukesha	Proposed	X		X	X	X	--	10
Zoo Freeway-North	19	Watertown Plank Road	City of Wauwatosa	Existing	X	X	X	X	X	250	12
	20	W. Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	300	8
	21	W. Good Hope Road	City of Milwaukee	Proposed	X		X	X	X	300	3
	22	STH 74—Menomonee Falls	Village of Menomonee Falls	Proposed	X		X	X	X	300	4
	23	Mequon Road—Germantown	Town of Germantown	Proposed	X		X		X	150	2
Zoo Freeway-South	24	W. National Avenue	City of West Allis	Proposed	X	X	X	X	X	350	14
Stadium Freeway-South	25	W. National Avenue	Village of West Milwaukee	Proposed	X	X	X		X	--	6
	26	W. Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	100	6
IH 94-South	27	W. Morgan Avenue	City of Milwaukee	Proposed	X	X	X	X	X	200	14
	28	W. College Avenue	City of Milwaukee	Existing	X		X	X	X	375	9
	29	W. Ryan Road	City of Oak Creek	Proposed	X		X		X	375	3
Airport Freeway	30	S. 27th Street	City of Milwaukee	Proposed	X	X	X	X	X	375	8
	31	S. 76th Street	City of Greenfield	Proposed	X	X	X	X	X	300	11
	32	W. Grange Avenue	Village of Greendale	Proposed	X		X		X	--	3
	33	W. Rawson Avenue	City of Franklin	Proposed	X		X		X	200	3
	34	Hales Corners	Village of Hales Corners	Proposed	X		X	X	X	325	6
	35	Moorland Road—New Berlin	City of New Berlin	Proposed	X		X		X	100	2
Lake Freeway	36	E. Oklahoma Avenue	City of Milwaukee	Proposed	X	X	X		X	--	17
	37	E. Layton Avenue	City of Cudahy	Proposed	X		X	X	X	200	8
	38	E. Rawson Avenue	City of Oak Creek	Proposed	X		X	X	X	425	9

[a] *See Map 113.*

Source: SEWRPC

Table 361

EXCLUSIVE TRANSIT LANES ON STANDARD ARTERIAL STREETS IN THE MILWAUKEE URBANIZED AREA: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Arterial Street			Exclusive Transit Lane				
	Limits					Number of Buses in	
Name	From	To	Type	Direction	Duration	Peak Hour	Remarks
N. 27th Street	W. St. Paul Avenue	W. Capitol Drive	Curb Lane	Southbound	6:00 a.m.-6:00 p.m.	19	Requires removal of curb parking.
			Curb Lane	Northbound	6:00 a.m.-6:00 p.m.	26	Requires removal of curb parking.
N. Farwell Avenue	E. Ogden Avenue	E. North Avenue	Curb Lane	Southbound	6:00 a.m.-9:00 a.m.	37	Requires removal of curb parking.
				Southbound	3:00 p.m.-6:00 p.m.	44	
N. Prospect Avenue	E. Kilbourn Avenue	E. North Avenue	Curb Lane	Northbound	6:00 a.m.-9:00 a.m.	38	Requires removal of curb parking.
				Northbound	3:00 p.m.-6:00 p.m.	44	
Kenwood Boulevard	N. Downer Avenue	N. Oakland Avenue	Curb Lane	Westbound	6:00 a.m.-6:00 p.m.	119	Requires removal of curb parking.
E. and W. Wells Street	N. Prospect Avenue	N. 10th Street	Contra-flow Curb Lane	Westbound	All day	68	Requires removal of curb parking, median construction, and replacement of Wells Street Bridge over Milwaukee River.
W. Wisconsin Avenue	N. 10th Street	N. 35th Street	Curb Lane	Eastbound	6:00 a.m.-9:00 a.m.	75	Requires removal of curb parking.
				Westbound	3:00 p.m.-6:00 p.m.	98	

Source: SEWRPC.

freeway operational control system in the Milwaukee area, the expansion of curb parking restrictions on major surface arterials during peak-hour travel periods, and the establishment of a continuing carpooling promotional program. These recommendations flow out of the long-range transportation systems planning effort and have also been included in the transportation systems management plan adopted by the Commission for the three urbanized areas in the Region.[5] The management recommendations are designed to accomplish several objectives, including ensuring that maximum use is made of existing transportation facilities before commitments are made to new capital investment; encouraging the use of high occupancy vehicles, including buses, vans, and carpools; effecting motor fuel savings; and reducing vehicle miles of travel in congested areas.

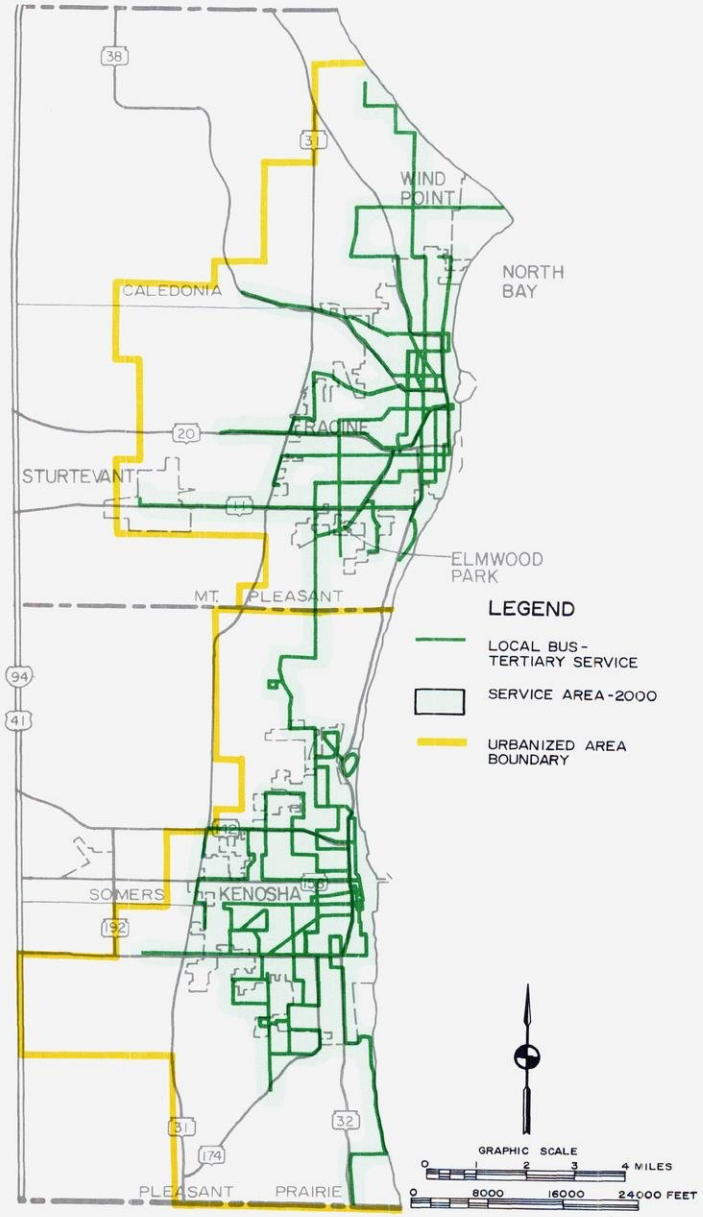
[5] *See SEWRPC Community Assistance Planning Report No. 21, A Transportation Systems Management Plan for the Kenosha, Milwaukee, and Racine Urbanized Areas in Southeastern Wisconsin—1978.*

Freeway Operational Control System: The freeway operational control system recommended in the final plan for the Milwaukee urbanized area is the same as that described earlier under the preliminary recommended plan. The control system would be operated to constrain access to the freeway system during peak hours, thereby seeking to ensure high rates of traffic flow at reasonable operating speeds on the freeway system. The system would consist of interconnected demand responsive ramp meters, priority access for high occupancy vehicles, improved driver information, and improved accident incident management procedures. The system would be operated to achieve better driving conditions for the freeway user during peak periods of travel, as well as to permit the provision of a relatively high level of primary transit service on the freeway system. The plan recommends that a preliminary engineering study be conducted to determine the feasibility costs and benefits, as well as configuration, of the proposed freeway operational control system as soon as possible.

Curb Parking Restrictions: Like the preliminary recommended plan, the final plan recommends that curb parking be prohibited during peak hours of travel on

Map 114

TRANSIT SYSTEM IN THE KENOSHA AND RACINE URBANIZED AREAS: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN



Under the preliminary recommended transportation plan, the transit system for the Kenosha and Racine urbanized areas would consist of approximately 147 round-trip route miles of transit line in the Kenosha urbanized area, and 153 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 33 buses in the Kenosha urbanized area and 38 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 88 round-trip route miles and 21 buses in the Kenosha area and 72 round-trip route miles and 28 buses in the Racine area over 1972.

Source: SEWRPC.

Table 362

MASS TRANSIT FACILITIES IN THE KENOSHA AND RACINE URBANIZED AREAS: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Transit Facility Characteristic	Existing 1972	Planned Increment	Total 2000
Kenosha Urbanized Area			
Round-Trip Route Miles . .	59	88	147
Vehicle Requirements (Number of Buses)			
Peak Period	12	21	33
Midday Period.	6	16	22
Racine Urbanized Area			
Round-Trip Route Miles . .	81	72	153
Vehicle Requirements (Number of Buses)			
Peak Period	10	28	38
Midday Period.	10	17	27

Source: SEWRPC.

certain surface arterials in order to ensure that all available arterial street capacity is effectively used before commitments are made for additional capital investment in arterial street capacity. The implementation of this recommendation will also facilitate the movement of local transit buses on those arterials traversed by transit routes. Maps 115 through 121 identify for each county those arterial street facilities where it is envisioned that curb parking restrictions will be necessary by the year 2000. In some cases, such restrictions have already been placed into effect. In other cases, it will be necessary for local municipalities to impose appropriate parking prohibitions as traffic volumes increase to the capacity of the existing facility parking.

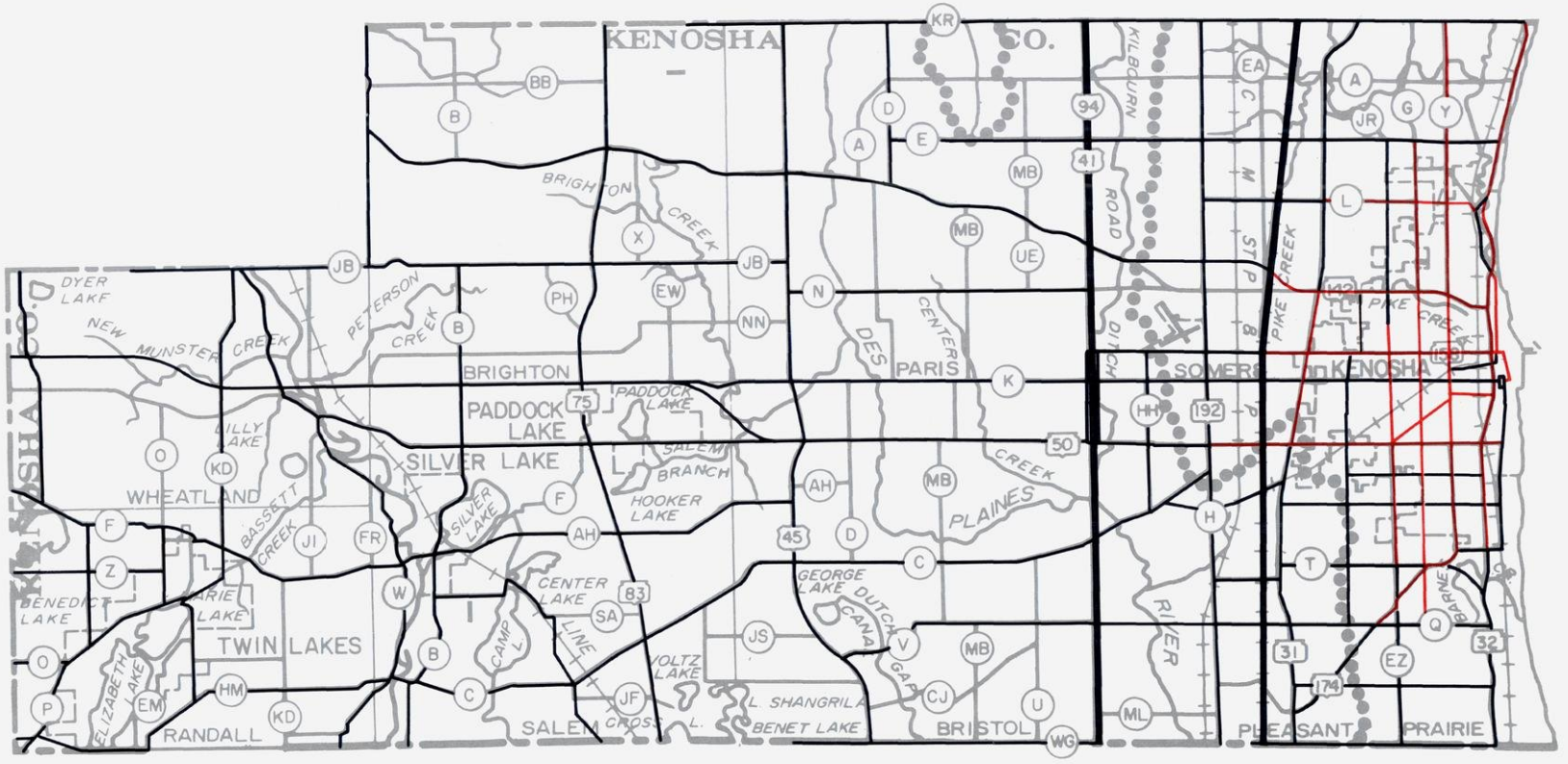
Carpool Facilities and Promotion: The final plan recommends that a continuing carpooling promotional program be established in the Milwaukee area. It is envisioned that this continuing program will build upon the pioneer carpooling demonstration effort undertaken by Milwaukee County from 1975 through 1977.[6]

The provision of offstreet parking facilities in fringe areas can aid in the promotion of carpooling. There were six carpool parking lots in operation at key freeway interchanges in the outlying areas of the Region in 1978. These are shown on Map 122 and are located at the following intersections: IH 43 and STH 57 in Ozaukee County; IH 94 and STH 164 in Waukesha County; IH 94 and STH 67 in Waukesha County; STH 15 and CTH Y in

[6] *For a report on the extent of carpooling in the Milwaukee area, see SEWRPC Technical Report No. 20, Carpooling in the Metropolitan Milwaukee Area.*

Map 115

LOCATION OF ANTICIPATED CURB PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN KENOSHA COUNTY: 2000



LEGEND

FREEWAY

STANDARD ARTERIAL

CURB PARKING RESTRICTIONS REQUIRED

CURB PARKING RESTRICTIONS NOT REQUIRED

GRAPHIC SCALE

0 1 2 3 4 MILES

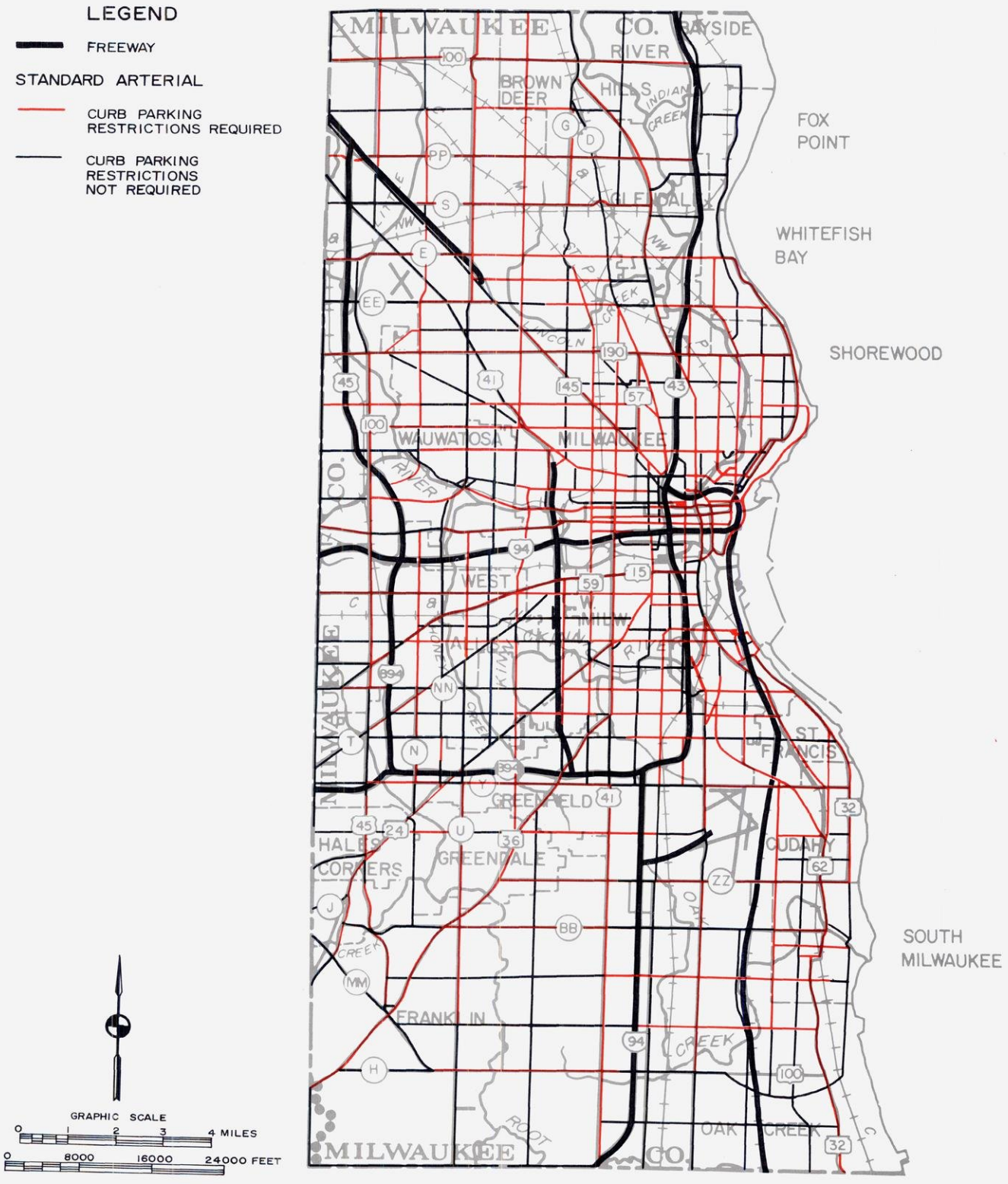
0 8000 16000 24000 FEET

It is anticipated that curb parking restrictions will be required on about 54 miles of urban arterial streets, or about 16 percent of such streets within Kenosha County by the year 2000. It is envisioned that such parking restrictions, in some cases already in effect, will ensure the full use of all available street capacity, thus reducing the need for additional capital investment in arterial street facilities.

Source: SEWRPC.

Map 116

LOCATION OF ANTICIPATED CURB PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN MILWAUKEE COUNTY: 2000

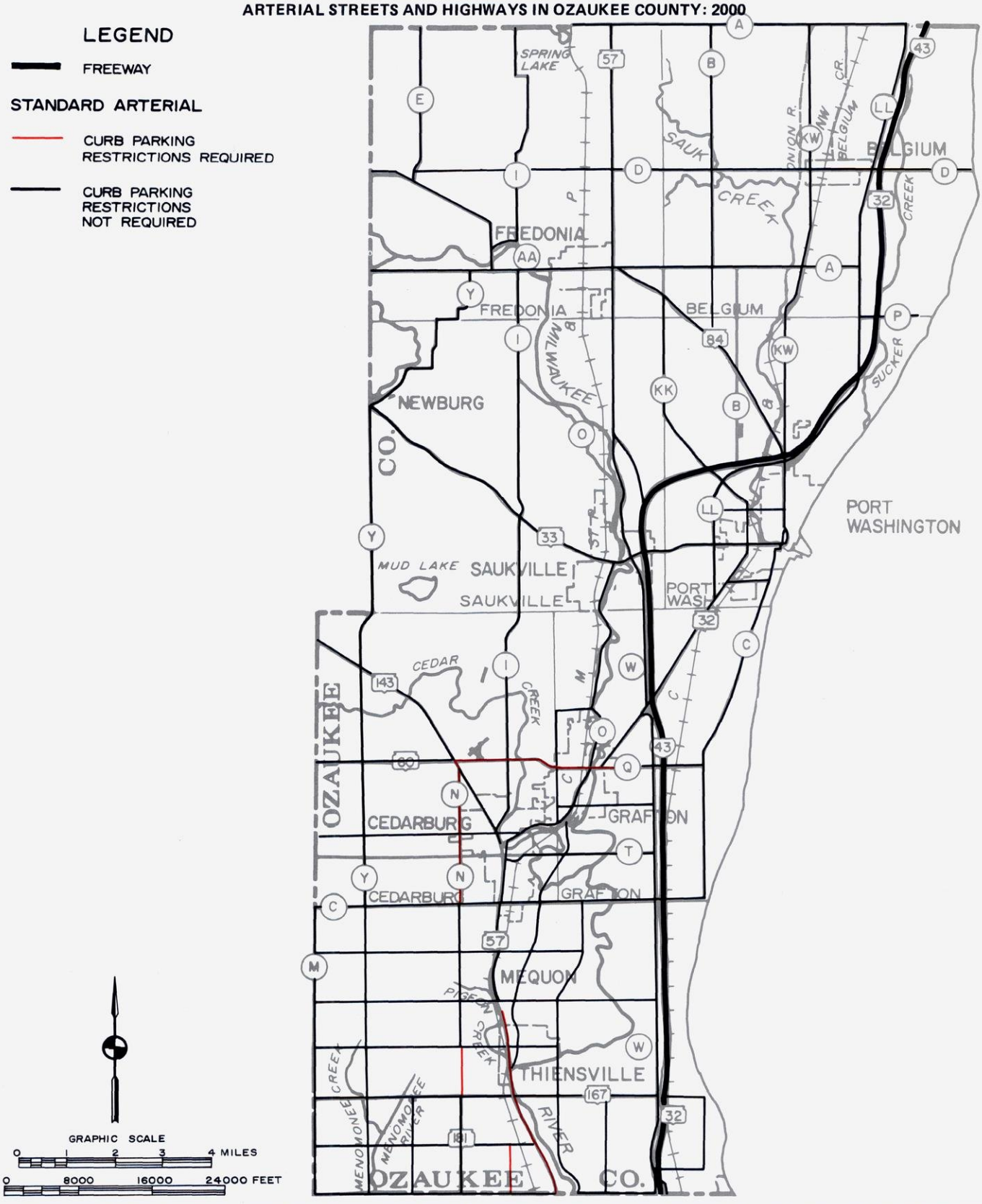


It is anticipated that curb parking restrictions will be required on about 377 miles of urban arterial streets, or about 55 percent of such streets within Milwaukee County by the year 2000. It is envisioned that such parking restrictions, in some cases already in effect, will ensure the full use of all available street capacity, thus reducing the need for additional capital investment in arterial street facilities.

Source: SEWRPC.

Map 117

LOCATION OF ANTICIPATED CURB PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN OZAUKEE COUNTY: 2000

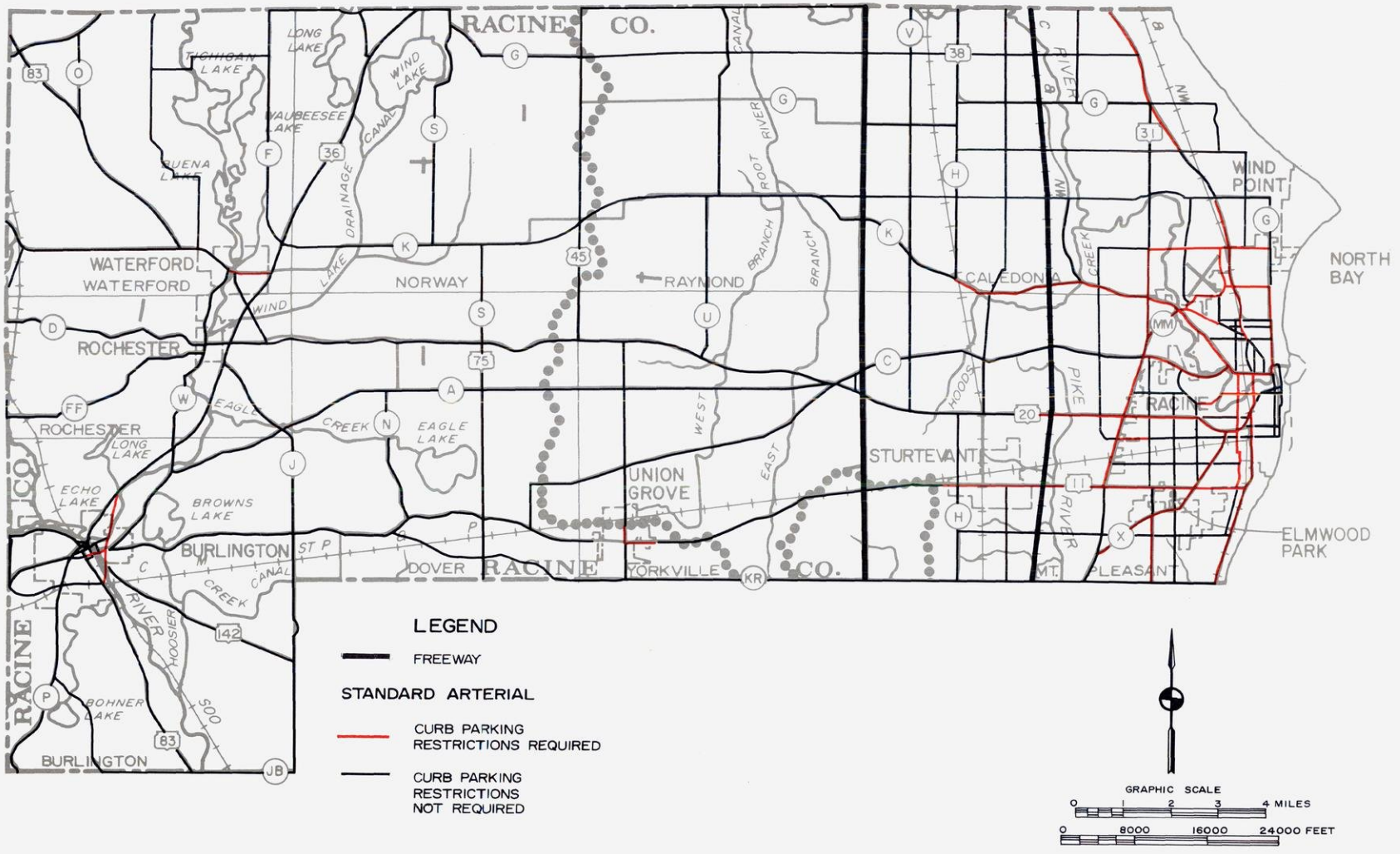


It is anticipated that curb parking restrictions will be required on about 12 miles of urban arterial streets, or about 14 percent of such streets within Ozaukee County by the year 2000. It is envisioned that such parking restrictions, in some cases already in effect, will ensure the full use of all available street capacity, thus reducing the need for additional capital investment in arterial street facilities.

Source: SEWRPC.

Map 118

LOCATION OF ANTICIPATED CURB PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN RACINE COUNTY: 2000

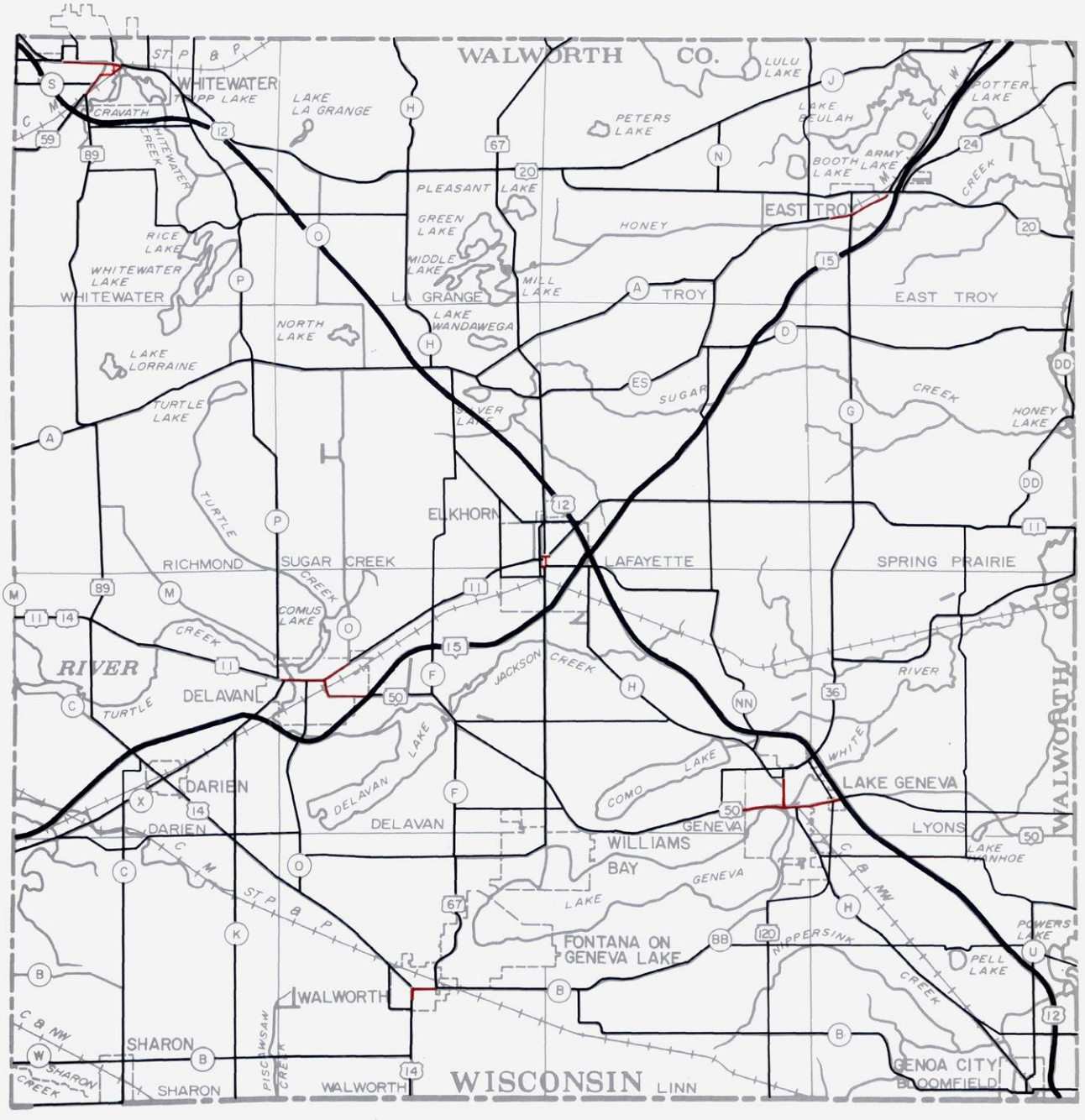


It is anticipated that curb parking restrictions will be required on about 61 miles of urban arterial streets or about 15 percent of such streets within Racine County by the year 2000. It is envisioned that such parking restrictions, in some cases already in effect, will ensure the full use of all available street capacity, thus reducing the need for additional capital investment in arterial street facilities.

Source: SEWRPC.

Map 119

LOCATION OF ANTICIPATED CURB PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN WALWORTH COUNTY: 2000



LEGEND

FREEWAY

STANDARD ARTERIAL

CURB PARKING RESTRICTIONS REQUIRED

CURB PARKING RESTRICTIONS NOT REQUIRED

GRAPHIC SCALE

0 1 2 3 4 MILES

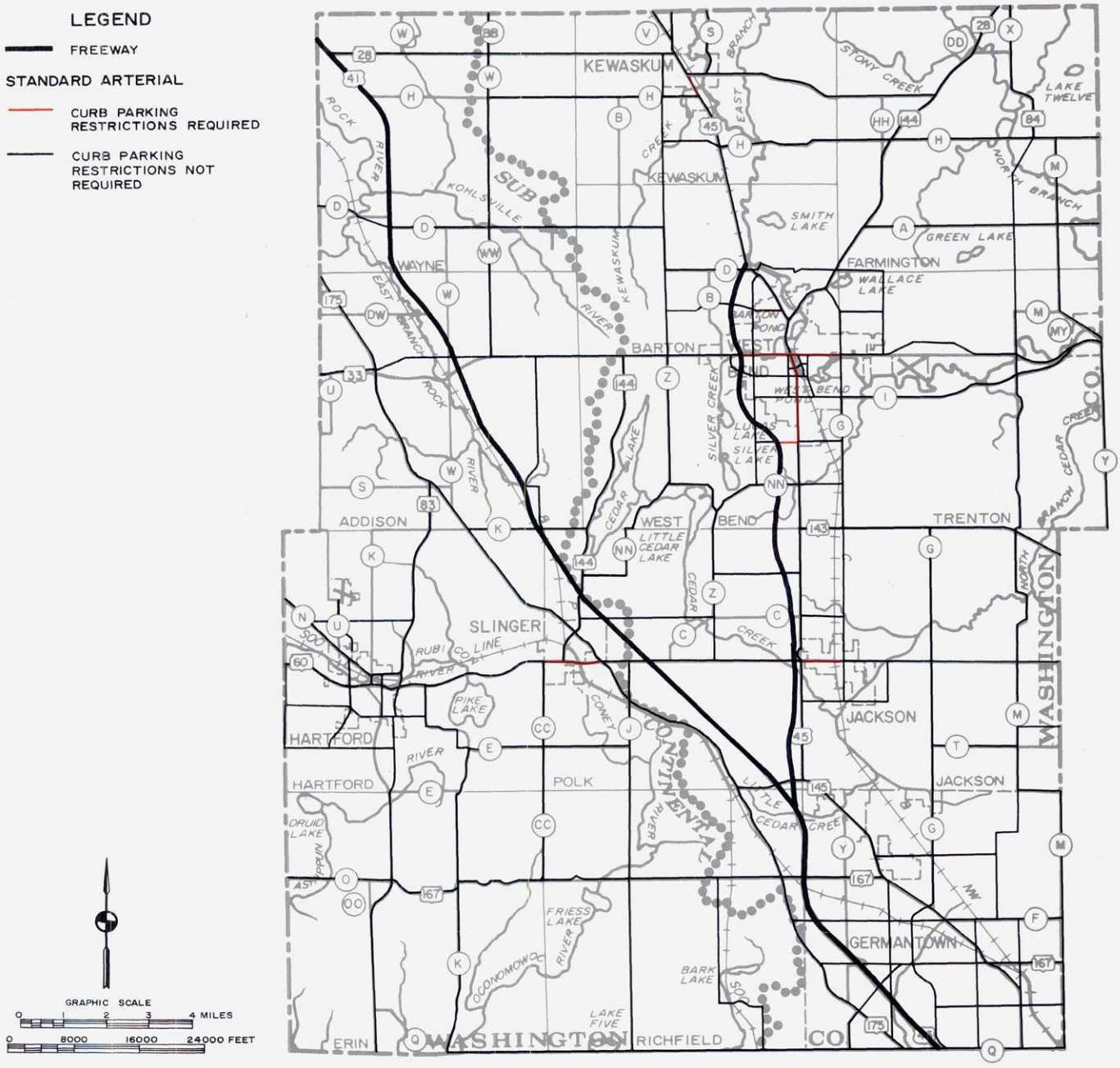
0 8000 16000 24000 FEET

It is anticipated that curb parking restrictions will be required on about 12 miles of urban arterial streets, or about 3 percent of such streets within Walworth County by the year 2000. It is envisioned that such parking restrictions, in some cases already in effect, will ensure the full use of all available street capacity, thus reducing the need for additional capital investment in arterial street facilities.

Source: SEWRPC.

Map 120

LOCATION OF ANTICIPATED CURB PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN WASHINGTON COUNTY: 2000

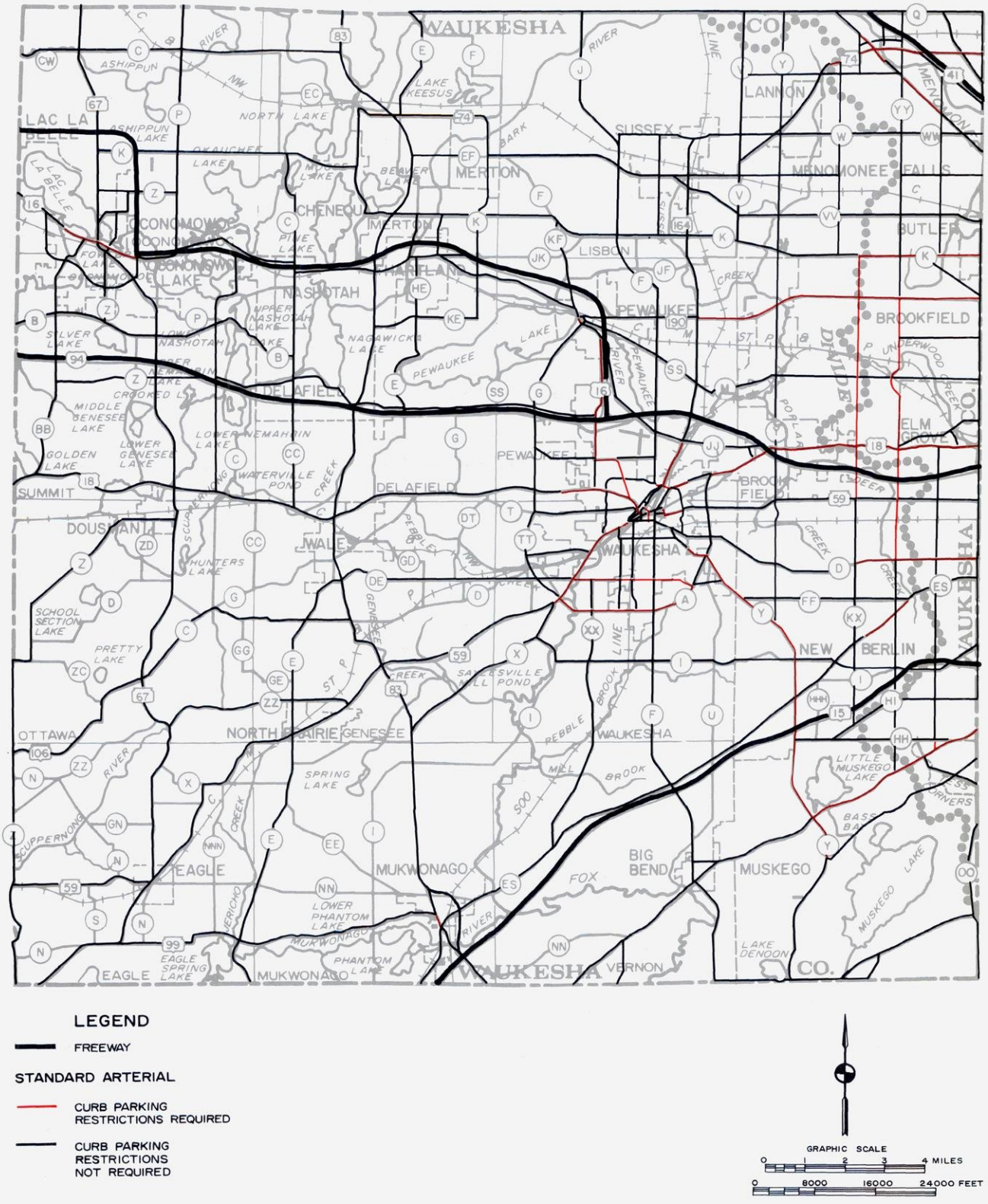


It is anticipated that curb parking restrictions will be required on about 8 miles of urban arterial streets, or about 2 percent of such streets within Washington County by the year 2000. It is envisioned that such parking restrictions, in some cases already in effect, will ensure the full use of all available street capacity, thus reducing the need for additional capital investment in arterial street facilities.

Source: SEWRPC.

Map 121

LOCATION OF ANTICIPATED CURB PARKING RESTRICTIONS ON ARTERIAL STREETS AND HIGHWAYS IN WAUKESHA COUNTY: 2000

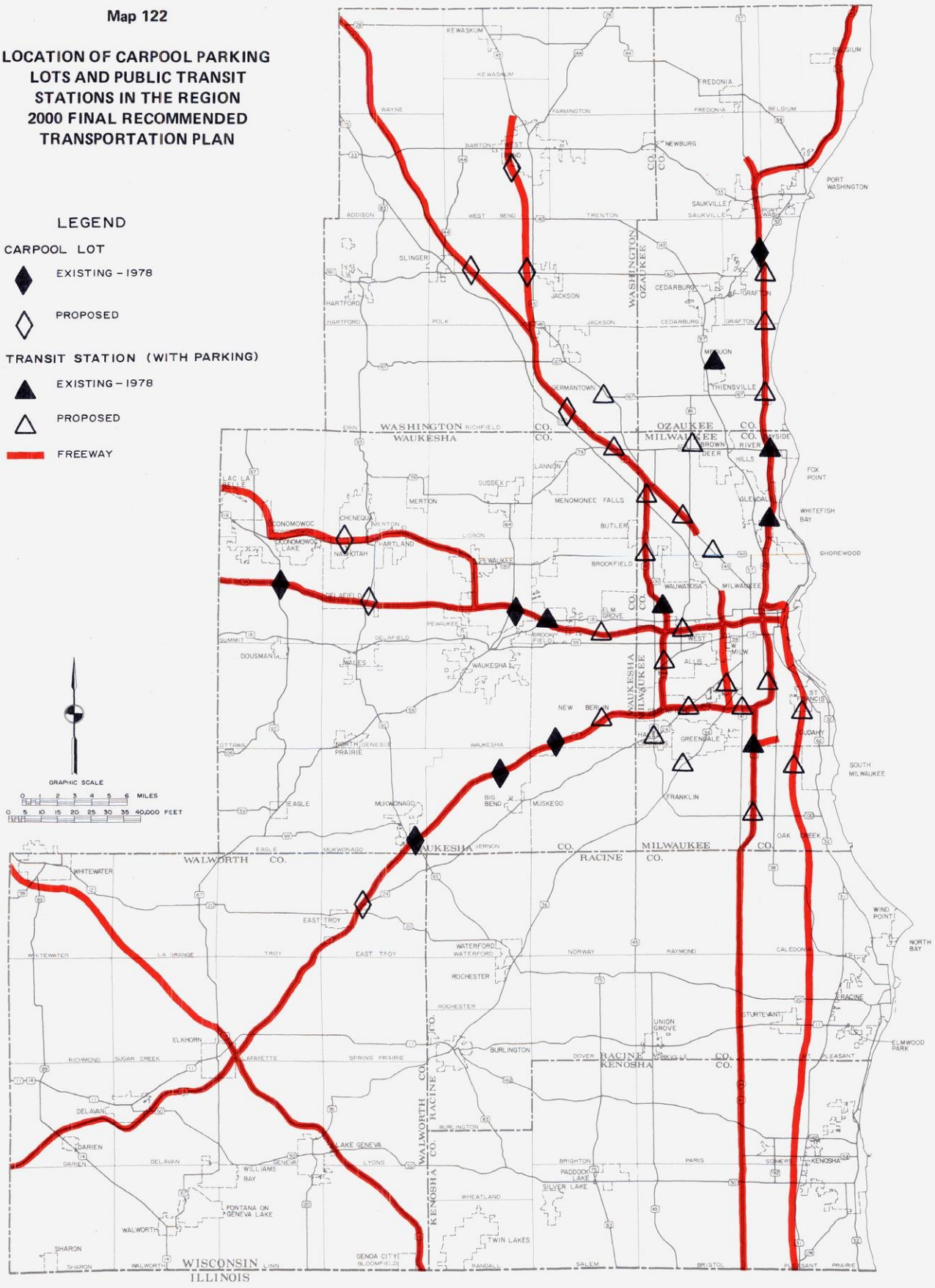


It is anticipated that curb parking restrictions will be required on about 73 miles of urban arterial streets, or about 11 percent of such streets within Waukesha County by the year 2000. It is envisioned that such parking restrictions, in some cases already in effect, will ensure the full use of all available street capacity, thus reducing the need for additional capital investment in arterial street facilities.

Source: SEWRPC.

Map 122

LOCATION OF CARPOOL PARKING LOTS AND PUBLIC TRANSIT STATIONS IN THE REGION 2000 FINAL RECOMMENDED TRANSPORTATION PLAN



The final recommended transportation system plan proposes the continued promotion of carpooling to reduce vehicular travel demand, thereby saving valuable motor fuel resources and reducing the demand for capital investment in arterial facility improvements. To this end, the plan recommends the provision of offstreet parking facilities at 13 key freeway interchanges, an increase of seven facilities over the six provided in 1978, in addition to the parking facilities provided at the 29 transit stations located througnout the Milwaukee urbanized area.

Source: SEWRPC.

Waukesha County; STH 15 and CTH F in Waukesha County; and STH 15 and STH 83 in Waukesha County. The final plan recommends that carpool lots continue to be established throughout the metropolitan area as demand may warrant. Suggested locations to be considered for such lots are shown on Map 122. These include proposed lots at the following interchanges: USH 41-45 and Lannon Road, USH 41 and STH 60, USH 45 and STH 60, and USH 45 and Paradise Road, all in Washington County; USH 16 and CTH C, and IH 94 and STH 83, all in Waukesha County; and STH 15 and STH 20 in Walworth County. The enumeration of the foregoing additional interchanges as possible locations for carpooling parking lots is not meant to preclude the establishment of such lots at other locations. In this respect the plan envisions that these lots would be developed wherever needed, preferably on available excess highway right-of-way.

Plan Performance and Costs

All of the data and analyses necessary to properly relate the final recommended plan to the objectives and standards set forth in Chapter II of this volume were developed so that comparisons could be made between the final regional transportation plan and all of the alternative transportation plans considered and previously presented in this report. The detailed plan evaluation data are set forth in a series of tables in Appendix L. Summary data are presented in Tables 363 through 371.

Under the final recommended plan, automobile availability is expected to increase from 704,600 in 1972 to about 1 million in the year 2000, an increase of about 42 percent. This is 165,600 fewer vehicles than forecast under a continuation of existing trends, representing the anticipated combined impact of a more centralized land use development pattern and improved levels of mass transit on auto ownership patterns. The number of internal person trips generated in the Region on an average weekday is expected to increase from 4.46 million in 1972 to about 5.75 million in the year 2000, an increase of about 1.29 million trips per day, or nearly 29 percent. The number of mass transit trips on an average weekday is expected to increase from about 184,000 in 1972 to about 335,000 in the year 2000, an increase of nearly 151,000, or 82 percent. This increase in transit trip making assumes full implementation of both the recommended land use plan and the recommended transit system plan. Even given this large increase in transit trip making, transit trips could be expected to comprise only about 6 percent of the total internal person trips made on an average weekday in the Region by the year 2000. Achieving a level of transit ridership approximating 335,000 trips per average weekday would mean a return to the level of transit ridership that existed within the Region in 1963.

Under the final recommended plan, vehicle miles of travel are expected to increase from about 20.1 million per average weekday in 1972 to about 30.1 million per average weekday by the year 2000, an increase of nearly 50 percent. Of the total in the design year, about 12.6 million, or 42 percent, could be expected to be made on freeways, assuming that the upper tier of the plan is fully implemented. Anticipated traffic volumes on the arterial street and highway system in the design year are shown on Map 123. Anticipated transit travel volumes in the design year are shown on Map 124 for the Milwaukee urbanized area and on Map 125 for the Kenosha and Racine urbanized areas.

Arterial street and highway congestion represented by the number of miles of facilities operating over capacity is expected to decrease from about 166 miles, or about 6 percent of the total system in 1972, to about 39 miles, or about 1 percent of the total system in the design year. The number of miles of facilities operating at design capacity, however, is expected to increase from about 152 miles, or about 5 percent of the total system in 1972, to about 344 miles, or about 10 percent of the total system in the design year. The locations of those segments of the arterial street and highway system expected to operate at or over design capacity in the design year are shown on Map 126.

In 1972 motor fuel consumption approximated 576 million gallons per year. Assuming that the currently federally mandated automobile fleet efficiency requirements are carried out, by the design year motor fuel consumption may be expected to approximate 526 million gallons per year, or about 50 million gallons fewer than consumed in the Region in 1972.

If the upper tier of the plan is fully carried out, it is estimated that 777 residential units would have to be relocated, together with 87 nonresidential structures. A total of 710 of these residential units and 64 of these nonresidential structures lie directly in the path of planned freeways. If the upper tier of the plan is not implemented in Milwaukee County, total dislocation in the Region would be reduced to 686 residential units and 73 nonresidential structures.

The total capital cost of carrying out the final recommended regional transportation plan is estimated at about $2 billion in 1975 dollars. Of this total, about $707 million, or 35 percent, would be required to preserve and maintain the existing transportation system. An additional $740 million, or about 37 percent, would be required for projects which would improve the transportation system by providing additional capacity through street widening or relocation, and by improving transit service in those locations of the Region where such service is already provided. The remaining $574 million, or 28 percent, would be required for system expansion projects, including the construction of new freeways and surface arterial facilities, and new transit stations, and the extension of transit service into urban areas currently not served.

The average annual public cost of carrying out the recommended plan, including not only the construction of new facilities but the operation and maintenance of the entire highway and transit system, is estimated at about $187 million in 1975 dollars. The anticipated average annual public revenue, including transit fare box

Table 363

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN SELECTED SYSTEM CHARACTERISTICS FOR THE SOUTHEASTERN WISCONSIN REGION

Plan Element	1972	Change 1972-2000 Number	Change 1972-2000 Percent	2000
Arterial Street and Highway System				
Freeway (miles)	163	173	106.1	336
Standard Arterial (miles)	2,847	343	12.0	3,190
Total (miles)	3,010	516	17.1	3,526
Mass Transit System-Milwaukee				
Round-Trip Route Miles				
Primary	150	902	601.3	1,052
Secondary	56	305	544.6	361
Tertiary	855	805	94.2	1,660
Total	1,061	2,012	189.6	3,073
Special Facilities				
Transitway (miles)	--	--	--	--
Exclusive Lanes (miles)	--	9.5	--	9.5
Stations	--	38	--	38
Number of Buses Required	442	585	132.4	1,027
Basic Fare	$0.40	$0.10	25.0	$0.50
Average Total CBD Work Trip Parking Free	$0.38	$0.03	7.9	$0.41
Mass Transit System-Kenosha				
Round-Trip Route Miles	59	88	149.2	147
Number of Buses Required	12	21	175.0	33
Basic Fare	$0.25	--	--	$0.25
Mass Transit System-Racine				
Round-Trip Route Miles	81	72	88.9	153
Number of Buses Required	10	28	280.0	38
Basic Fare	$0.40	- $0.15	- 37.5	$0.25
Travel Demand Characteristics				
Automobile Availability (thousands)	705	298	42.3	1,003
Average Weekday Internal Person Trips (millions)	4.46	1.29	28.9	5.75
Average Weekday Transit Trips	184,200	150,800	81.9	335,000
Proportion of Trips Made by Transit (percent)	4.1	1.7	--	5.8
Estimated Yearly Transit Revenue Passengers (millions)	53.7	43.2	80.4	96.9
Historical Equivalent of Proposed Transit Utilization (year)	--	--	--	1963
Vehicle Miles of Travel				
Total (millions)	20.12	10.01	49.7	30.13
On Freeway (millions)	6.21	6.40	102.9	12.61
Percent of Total on Freeway	31	63.9	--	41.9
Arterial Street and Highway Congestion				
Over Capacity (miles)	166	- 127	- 77	39
Over Capacity (percent of total system)	6	- 5	--	1
At Capacity (miles)	152	192	126	344
At Capacity (percent of total system)	5	5	--	10
Proportion of Total Person Travel on Safest Facilities				
Freeways (percent)	30	10	33.3	40
Mass Transit (percent)	4	--	--	4
Motor Fuel Consumption (millions of gallons)				
Average Annual, Assuming Automobile Fleet Efficiency of 19 MPG in Year 2000	576	158	27.4	734
Average Annual, Assuming Automobile Fleet Efficiency of 27 MPG in Year 2000	576	- 50	- 8.7	526
Noise				
Miles of Transportation Facilities Exceeding 70 dba	712	557	78.2	1,269
Dislocation				
Number of Residential Units	--	777	--	777
Number of Nonresidential Structures	--	87	--	87

Source: SEWRPC.

Table 364

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN COSTS AND REVENUES FOR THE SOUTHEASTERN WISCONSIN REGION

Plan Element	Recommended Plan
Average Annual Public Cost (millions)	
Capital	
Highways	92.7
Transit	7.0
Subtotal	99.7
Operation and Maintenance	
Highways	43.4
Transit	43.9
Subtotal	87.3
Total	187.0
Average Annual Public Revenues—Includes Anticipated Transit Farebox Revenues (millions)	
Historic Trend (1960-1972)	217.5
Modified Trend	185.2
Transportation System Cost/Revenue Analysis	
Historic Trend	
Average Annual Costs (millions)	187.0
Average Annual Revenues (millions)	217.5
Difference (revenue minus costs-millions)	30.5
Modified Trend	
Average Annual Costs (millions)	187.0
Average Annual Revenues (millions)	185.2
Difference (revenue minus costs-millions)	- 1.8
Average Annual Public Transit Subsidy Required	
Historic Trend (millions)	25.1
Modified Trend (millions)	37.0
Economic Analysis[a]	
Capital Costs (millions)	1,281.9
Operation and Maintenance Costs (millions)	1,325.7
Total (millions)	2,607.6
User Costs (millions)	42,064.4
Benefit/Cost Ratio	1.40

[a] *Present worth cumulative total 1975-2025.*

Source: SEWRPC.

revenue, based on a projection of the historic trend of revenues from 1960 to 1972, is $218 million, indicating that the recommended plan is financially attainable. An alternative revenue forecast that assumes that such revenues as the transit fare and the tax per gallon on motor fuel will not keep pace with general price inflation, and that takes into account the effects of anticipated increases in fuel efficiencies for automobiles, indicates that there would be about $185.2 million available annually, resulting in an average annual revenue shortfall of about $1.8 million. Accordingly, to fully implement the recommended plan, it will be necessary to ensure that such inflation nonresistant revenues as transit fares and per-gallon fuel taxes do, in fact, keep pace with inflation.

Plan Staging

The recommended regional transportation plan was staged for the year 1985 in order to coordinate the regional transportation planning with the regional air quality maintenance planning and regional water quality management planning, as well as to facilitate plan implementation. Arterial street and highway and transit projects included in the 1985 stage of the plan were drawn from the lower tier of the plan with respect to freeways, and from the latest five-year transportation improvement program for the Region as endorsed by the Commission in December 1977.[7] Staging recommendations were thus made for all components of the plan, including freeways, surface arterials, mass transit facilities and services, and transportation system management actions.

With respect to freeways, the 1985 stage includes completion of the following facilities and improvements:

1. Construction of the Stadium Freeway-South from its current terminus at W. National Avenue to W. Lincoln Avenue.

2. Construction of the Lake Freeway-South from its current terminus at Carferry Drive to E. Layton Avenue.

3. Completion of the conversion of the USH 16 Freeway to Oconomowoc.

4. Construction of the West Bend Freeway (USH 45).

5. Acquisition of the freeway right-of-way needed for the ultimate construction of the Lake Freeway from E. Layton Avenue to the Illinois state line, together with the construction of a surface arterial facility on that right-of-way.

6. Execution of all the "stub end" studies noted earlier in this chapter and the undertaking of appropriate improvements to effect better transition of traffic from the freeway system to the surface street system at these locations.

Completion of the construction of the freeway facilities included in the 1985 stage would result in a total 1985 freeway system of 255.5 miles (see Table 372).

The total proposed 1985 arterial street and highway system in the Region, including both surface arterials and freeways, is shown on Map 127. In 1972, the surface

[7] *See A Transportation Improvement Program for the Kenosha, Milwaukee, and Racine Urbanized Areas in Southeastern Wisconsin 1978-1982.*

Table 365

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN: KENOSHA COUNTY

Plan Element	1972	Change 1972-2000 Number	Percent	2000
Arterial Street and Highway System Freeway (miles)	12	12	100.0	24
2-Lane Standard Arterial (miles)	244	- 3	- 1.2	241
4-Lane Standard Arterial (miles)	24	62	258.3	86
6-Lane Standard Arterial (miles)	--	9	--	9
Total (miles)	280	80	28.6	360
Mass Transit System—Kenosha				
Round-Trip Route Miles	59	88	149.2	147
Number of Buses Required	12	21	175.0	33
Basic Fare	$0.25	--	--	$0.25
Automobile Availability (thousands)	49	38	77.6	87
Vehicle Miles of Travel				
Total (millions)	1.43	1.40	98.1	2.83
On Freeway (millions)	0.38	0.50	130.6	0.88
Percent of Total on Freeway	27	4	--	31
Arterial Street and Highway Congestion				
Over Capacity Miles	22	- 19	- 86	3
Over Capacity (percent of total system)	8	- 7	--	1
At Capacity (miles)	14	35	250	49
At Capacity (percent of total system)	5	9	--	14
Noise				
Miles of Transportation Facilities Exceeding 70 dba	46	60	130.4	106
Dislocation				
Number of Residential Units	--	41	--	41
Number of Nonresidential Structures	--	2	--	2

Source: SEWRPC.

arterial system in the Region consisted of 2,847 miles of facilities. This system would be increased by about 293 miles under the 1985 stage of the recommended plan. This additional mileage reflects the addition of 252 miles of existing nonarterial facilities to the arterial system and the construction of 41 miles of new surface arterial streets and highways.

Under the 1985 stage, about 3,231 miles, or 95 percent of the total arterial street and highway system, fall into the system preservation category, consisting of facilities wherein no work, resurfacing, or reconstruction for the same capacity is anticipated. An additional 105 miles, or 3 percent, fall into the system improvement category, consisting of facilities reconstructed for additional capacity and new construction involving a replacement arterial. The remaining 59 miles, or 2 percent, fall into the system expansion category, where the new construction of new facilities is required. The miles of arterial facilities included in the 1985 stage of the recommended plan are identified by county in Table 373.

The 1985 stage of the recommended transit plan in the Milwaukee urbanized area is graphically summarized on Map 128. By 1985, it is envisioned that primary transit service would be provided over a total of 53 miles of freeway facilities, with 17 miles of connecting surface arterials. A total of 21 public transit stations would be established along the primary transit system, six of which are already in operation (see Table 374). Also under the 1985 stage of the plan, secondary service would be provided on seven individual transit routes operating

Table 366

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN: MILWAUKEE COUNTY

Plan Element	1972	Change 1972-2000 Number	Change 1972-2000 Percent	2000
Arterial Street and Highway System Freeway (miles)	64	22	34.4	86
2-Lane Standard Arterial (miles)	339	- 131	- 38.6	208
4-Lane Standard Arterial (miles)	269	143	53.5	412
6-Lane Standard Arterial (miles)	62	7	11.3	69
Total (miles)	734	41	5.6	775
Mass Transit System—Milwaukee				
Round-Trip Route Miles				
Primary	150	902	601.3	1,052
Secondary	56	305	544.6	361
Tertiary	855	805	94.2	1,660
Total	1,061	2,012	189.6	3,073
Special Facilities				
Transitway (miles)	--	--	--	--
Exclusive Lanes (miles)	--	9.5	--	9.5
Stations	--	38	--	38
Number of Buses Required	442	585	132.4	1,027
Basic Fare	$0.40	$0.10	25.0	$0.50
Average Total CBD Work Trip Parking Fee	$0.38	$0.03	7.9	$0.41
Automobile Availability (thousands)	387	42	10.9	429
Vehicle Miles of Travel				
Total (millions)	10.70	1.67	15.7	12.37
On Freeway (millions)	3.98	1.92	48.2	5.89
Percent of Total on Freeway	37	11	--	48
Arterial Street and Highway Congestion				
Over Capacity Miles	61	- 34	- 56	27
Over Capacity (percent of total system)	8	- 5	--	3
At Capacity (miles)	72	59	82	131
At Capacity (percent of total system)	10	7	--	17
Noise				
Miles of Transportation Facilities Exceeding 70 dba	368	149	40.5	517
Dislocation				
Number of Residential Units	--	593	--	593
Number of Nonresidential Structures	--	44	--	44

Source: SEWRPC.

Table 367

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN: OZAUKEE COUNTY

Plan Element	1972	Change 1972-2000 Number	Change 1972-2000 Percent	2000
Arterial Street and Highway System Freeway (miles)	11	17	154.5	28
2-Lane Standard Arterial (miles)	233	20	8.6	253
4-Lane Standard Arterial (miles)	7	23	328.6	30
6-Lane Standard Arterial (miles)	--	--	--	--
Total (miles)	251	60	23.9	311
Mass Transit System—Milwaukee				
Round-Trip Route Miles				
Primary	150	902	601.3	1,052
Secondary	56	305	544.6	361
Tertiary	855	805	94.2	1,660
Total	1,061	2,012	189.6	3,073
Special Facilities				
Transitway (miles)	--	--	--	--
Exclusive Lanes (miles)	--	9.5	--	9.5
Stations	--	38	--	38
Number of Buses Required	442	585	132.4	1,027
Basic Fare	$0.40	$0.10	25.0	$0.50
Average Total CBD Work Trip Parking Fee	$0.38	$0.03	7.9	$0.41
Automobile Availability (thousands)	27	31	114.8	58
Vehicle Miles of Travel				
Total (millions)	0.85	0.67	78.7	1.52
On Freeway (millions)	0.22	0.46	205.8	0.68
Percent of Total on Freeway	26	19	--	45
Arterial Street and Highway Congestion				
Over Capacity Miles	6	-6	-100	0
Over Capacity (percent of total system)	2	-2	--	0
At Capacity (miles)	10	2	20	12
At Capacity (percent of total system)	4	1	--	5
Noise				
Miles of Transportation Facilities Exceeding 70 dba	42	4	9.5	46
Dislocation				
Number of Residential Units	--	16	--	16
Number of Nonresidential Structures	--	5	--	5

Source: SEWRPC.

Table 368

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN: RACINE COUNTY

Plan Element	1972	Change 1972-2000 Number	Percent	2000
Arterial Street and Highway System Freeway (miles)	12	12	100.0	24
2-Lane Standard Arterial (miles)	304	18	5.9	322
4-Lane Standard Arterial (miles)	28	56	200.0	84
6-Lane Standard Arterial (miles)	6	6	100.0	12
Total (miles)	350	92	26.3	442
Mass Transit System—Racine				
Round-Trip Route Miles	81	72	88.9	153
Number of Buses Required	10	28	280.0	38
Basic Fare	$0.40	-$0.15	- 37.5	$0.25
Automobile Availability (thousands)	71	31	43.7	102
Vehicle Miles of Travel				
Total (millions)	1.81	1.27	69.9	3.08
On Freeway (millions)	0.42	0.76	183.6	1.18
Percent of Total on Freeway	23	15	--	38
Arterial Street and Highway Congestion				
Over Capacity Miles	20	- 20	- 100	0
Over Capacity (percent of total system)	6	- 6	--	0
At Capacity (miles)	19	4	21	23
At Capacity (percent of total system)	5	0	--	5
Noise				
Miles of Transportation Facilities Exceeding 70 dba	39	90	230.8	129
Dislocation				
Number of Residential Units	--	84	--	84
Number of Nonresidential Structures	--	18	--	18

Source: SEWRPC.

over 69 miles of surface arterials. Exclusive transit lanes would be provided on two arterial streets, Kenwood Boulevard and W. Wisconsin Avenue (see Table 361), over four individual secondary transit routes, and over 2.3 miles of surface arterials. The tertiary level of transit service would be extended by 1985 to provide service to that portion of the Milwaukee urbanized area identified on Map 128. In the Kenosha and Racine urbanized areas, some modifications to the existing tertiary level of transit service would be provided by 1985. The 1985 planned service area is identified on Map 129.

Importantly, the 1985 stage of the plan recommends the institution of the freeway operational control system described earlier, should preliminary engineering studies indicate the feasibility of the system. It is important that the necessary preliminary engineering studies be completed as soon as possible in order to determine whether or not the control system should be implemented. If the studies indicate the system should not be implemented, or if actual implementation on a demonstration program basis indicates the system will not meet its objectives, a reevaluation of the upper tier of the plan will be necessary. The transportation systems management plan adopted by the Commission in December 1977 calls for the completion of a planning and preliminary engineering study prospectus concerning the freeway operational control system during 1978.

Table 369

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN: WALWORTH COUNTY

Plan Element	1972	Change 1972-2000 Number	Change 1972-2000 Percent	2000
Arterial Street and Highway System Freeway (miles)	19	48	252.6	67
2-Lane Standard Arterial (miles)	379	11	2.9	390
4-Lane Standard Arterial (miles)	10	16	160.0	26
6-Lane Standard Arterial (miles)	--	--	--	--
Total (miles)	408	75	18.4	483
Automobile Availability (thousands)	32	17	53.1	49
Vehicle Miles of Travel				
Total (millions)	0.87	1.58	180.6	2.45
On Freeway (millions)	0.06	1.18	2,107.1	1.24
Percent of Total on Freeway	6	45	--	51
Arterial Street and Highway Congestion				
Over Capacity Miles	5	- 5	- 100	--
Over Capacity (percent of total system)	1	- 1	--	--
At Capacity (miles)	3	7	233	10
At Capacity (percent of total system)	1	1	--	2
Noise				
Miles of Transportation Facilities Exceeding 70 dba	49	46	93.9	95
Dislocation				
Number of Residential Units	--	3	--	3
Number of Nonresidential Structures	--	2	--	2

Source: SEWRPC.

The 1985 stage of the plan also recommends that local communities continue to monitor traffic flow during peak hours of travel in order to determine where additional curb parking prohibitions should be instituted by 1985. Finally, the 1985 stage of the plan recommends that carpool promotional activities be undertaken and that remote carpool parking lot facilities be established on a continuation basis as required.

ANALYSIS OF PLAN SENSITIVITY TO RESTRICTED MOTOR FUEL AVAILABILITY

The recommended year 2000 regional transportation plan was designed to accommodate a traffic demand, the derivation of which assumed continued ready availability of motor fuel at a relative price similar to that which existed within the Region in 1972. Because of the uncertainty which is believed by some elements of the public to exist over the future cost and availability of motor fuel, it was considered desirable to attempt to evaluate the probable effects of restricted motor fuel availability and increased prices on the need for major facility improvements proposed in the new plan. To this end, the Commission travel demand forecasting process was modified to reflect the probable reaction of residents of the Region to restrictions on motor fuel availability and price increases. Thus, new traffic assignments were made to the proposed arterial street and highway and transit systems; the need for proposed major facility improvements under the altered traffic demand conditions was analyzed; and a revised estimate of annual motor fuel consumption was prepared. The results of the sensitivity analysis are discussed in the following sections.

Findings of Special Survey of Household Response to Motor Fuel Shortages and Higher Prices

In the preparation for the major reevaluation of its adopted regional land use and transportation plans, the results of which are reported herein, the Commission in 1972 undertook surveys of travel and of public opinion

Table 370

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN: WASHINGTON COUNTY

Plan Element	1972	Change 1972-2000 Number	Percent	2000
Arterial Street and Highway System Freeway (miles)	7	35	500.0	42
2-Lane Standard Arterial (miles)	306	62	20.3	368
4-Lane Standard Arterial (miles)	27	1	3.7	28
6-Lane Standard Arterial (miles)	--	--	--	--
Total (miles)	340	98	28.9	438
Mass Transit System—Milwaukee				
Round-Trip Route Miles				
Primary	150	902	601.3	1,052
Secondary	56	305	544.6	361
Tertiary	855	805	94.2	1,660
Total	1,061	2,012	189.6	3,073
Special Facilities				
Transitway (miles)	--	--	--	--
Exclusive Lanes (miles)	--	9.5	--	9.5
Stations	--	38	--	38
Number of Buses Required	442	585	132.4	1,027
Basic Fare	$0.40	$0.10	25.0	$0.50
Average Total CBD Work Trip Parking Fee	$0.38	$0.03	7.9	$0.41
Automobile Availability (thousands)	29	44	151.7	73
Vehicle Miles of Travel				
Total (millions)	1.15	0.85	73.7	2.00
On Freeway (millions)	0.19	0.66	348.4	0.85
Percent of Total on Freeway	17	26	--	43
Arterial Street and Highway Congestion				
Over Capacity Miles	9	-9	-100	0
Over Capacity (percent of total system)	3	-3	--	0
At Capacity (miles)	10	8	80	18
At Capacity (percent of total system)	3	1	--	4
Noise				
Miles of Transportation Facilities Exceeding 70 dba	40	50	125.0	90
Dislocation				
Number of Residential Units	--	12	--	12
Number of Nonresidential Structures	--	7	--	7

Source: SEWRPC.

Table 371

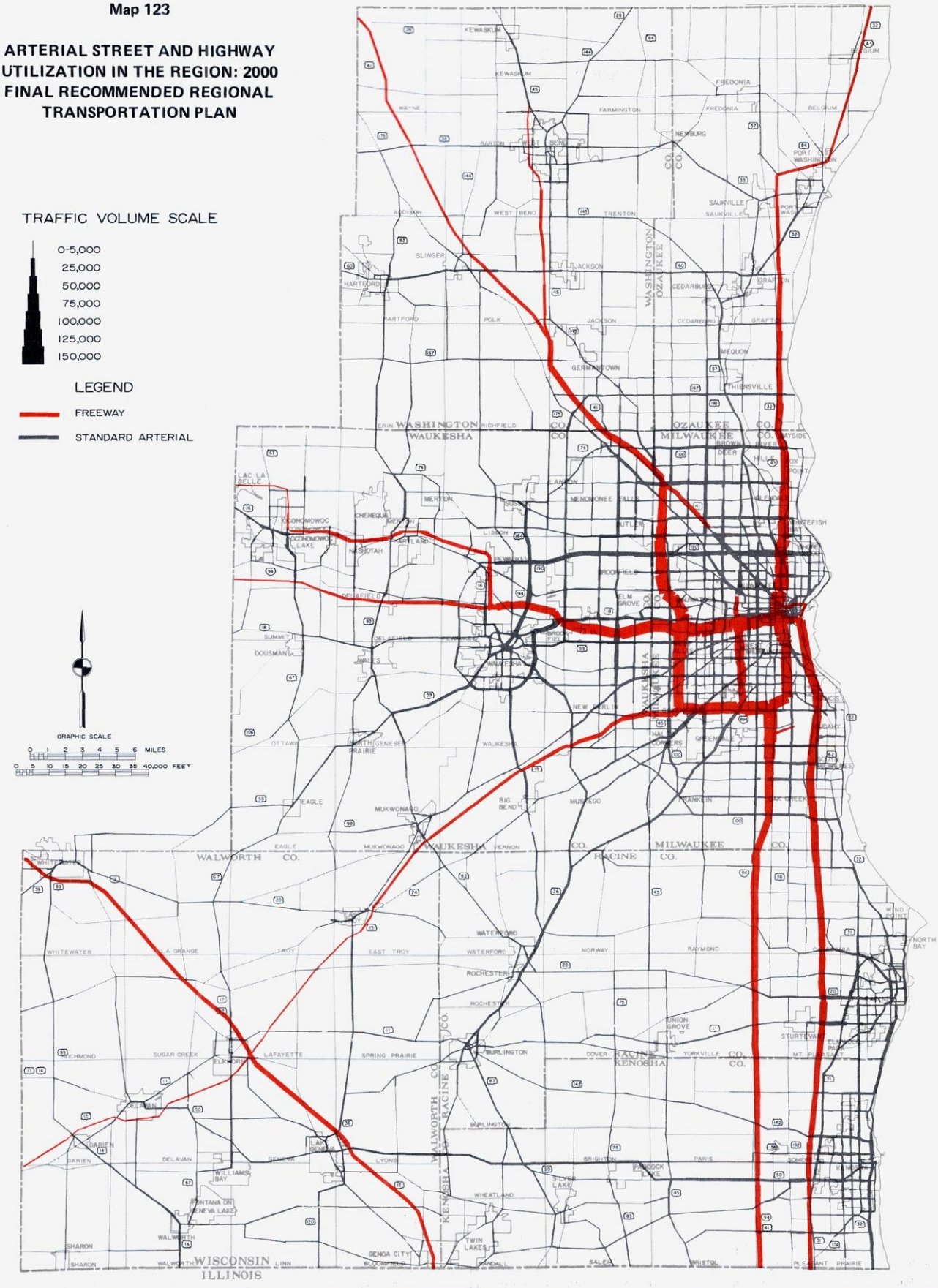
FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN: WAUKESHA COUNTY

Plan Element	1972	Change 1972-2000 Number	Change 1972-2000 Percent	2000
Arterial Street and Highway System Freeway (miles)	38	27	71.1	65
2-Lane Standard Arterial (miles)	566	- 57	- 10.1	509
4-Lane Standard Arterial (miles)	41	81	197.6	122
6-Lane Standard Arterial (miles)	4	17	425.6	21
Total (miles)	649	68	10.5	717
Mass Transit System—Milwaukee				
Round-Trip Route Miles				
Primary	150	902	601.3	1,052
Secondary	56	305	544.6	361
Tertiary	855	805	94.2	1,660
Total	1,061	2,012	189.6	3,073
Special Facilities				
Transitway (miles)	--	--	--	--
Exclusive Lanes (miles)	--	9.5	--	9.5
Stations	--	38	--	38
Number of Buses Required	442	585	132.4	1,027
Basic Fare	$0.40	$0.10	25.0	$0.50
Average Total CBD Work Trip Parking Fee	$0.38	$0.03	7.9	$0.41
Automobile Availability (thousands)	110	95	86.4	205
Vehicle Miles of Travel				
Total (millions)	3.31	2.57	77.5	5.88
On Freeway (millions)	0.97	0.92	94.5	1.89
Percent of Total on Freeway	29	3	--	32
Arterial Street and Highway Congestion				
Over Capacity Miles	43	- 34	- 79	9
Over Capacity (percent of total system)	7	- 6	--	1
At Capacity (miles)	24	77	321	101
At Capacity (percent of total system)	4	10	--	14
Noise				
Miles of Transportation Facilities Exceeding 70 dba	128	158	123.4	286
Dislocation				
Number of Residential Units	--	28	--	28
Number of Nonresidential Structures	--	9	--	9

Source: SEWRPC.

Map 123

ARTERIAL STREET AND HIGHWAY UTILIZATION IN THE REGION: 2000 FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN

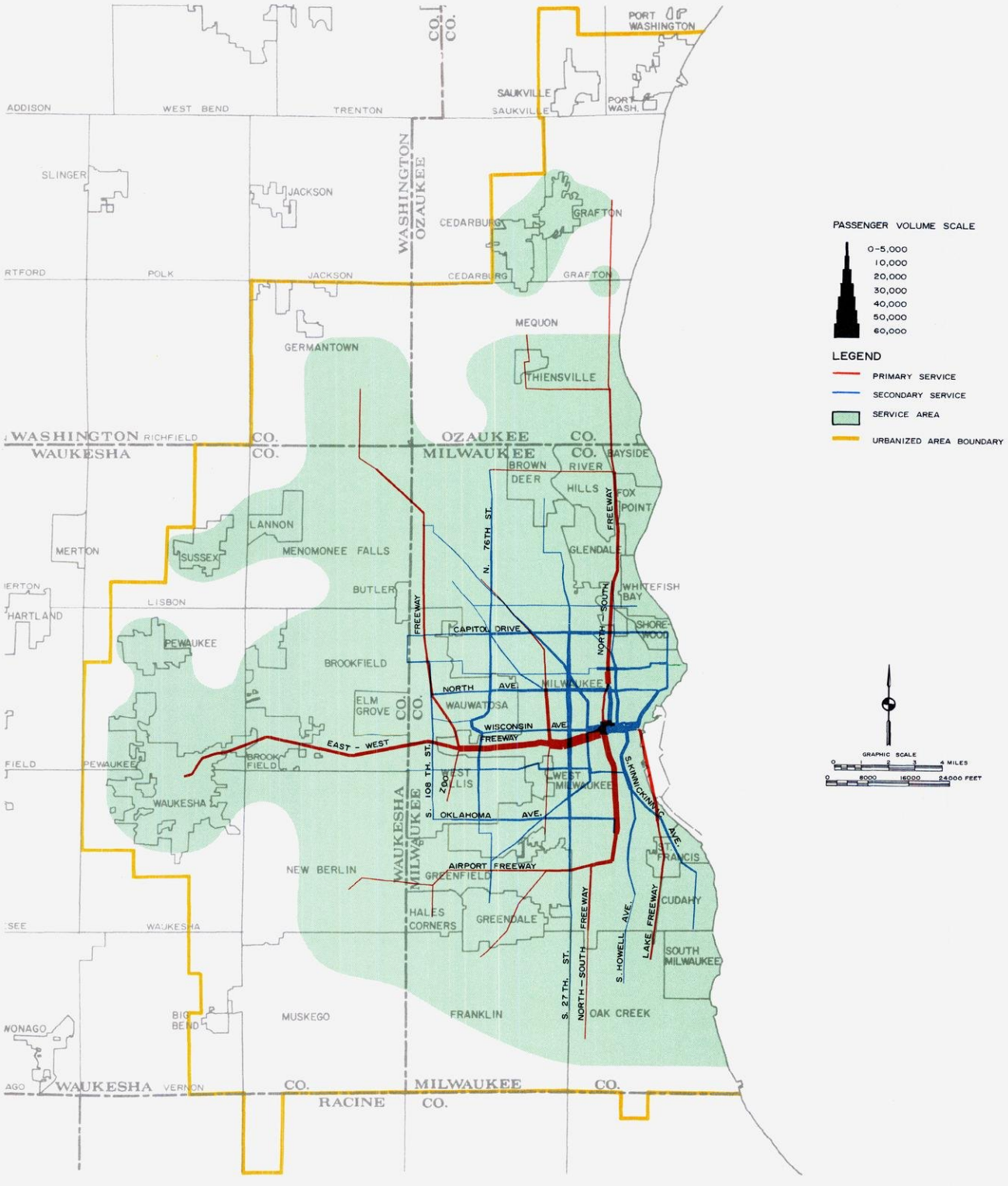


Weekday arterial street and highway system utilization in the Region may be expected to increase to 30.1 million vehicle miles of travel by the year 2000 under the final recommended transportation system plan, an increase of 10 million vehicle miles, or about 50 percent, over the 1972 level of 20.1 million vehicle miles. About 12.6 million vehicle miles of travel, or nearly 42 percent of the total, could be expected to occur on the freeway system, as compared with 31 percent in 1972.

Source: SEWRPC.

Map 124

TRANSIT SYSTEM UTILIZATION IN THE MILWAUKEE URBANIZED AREA 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

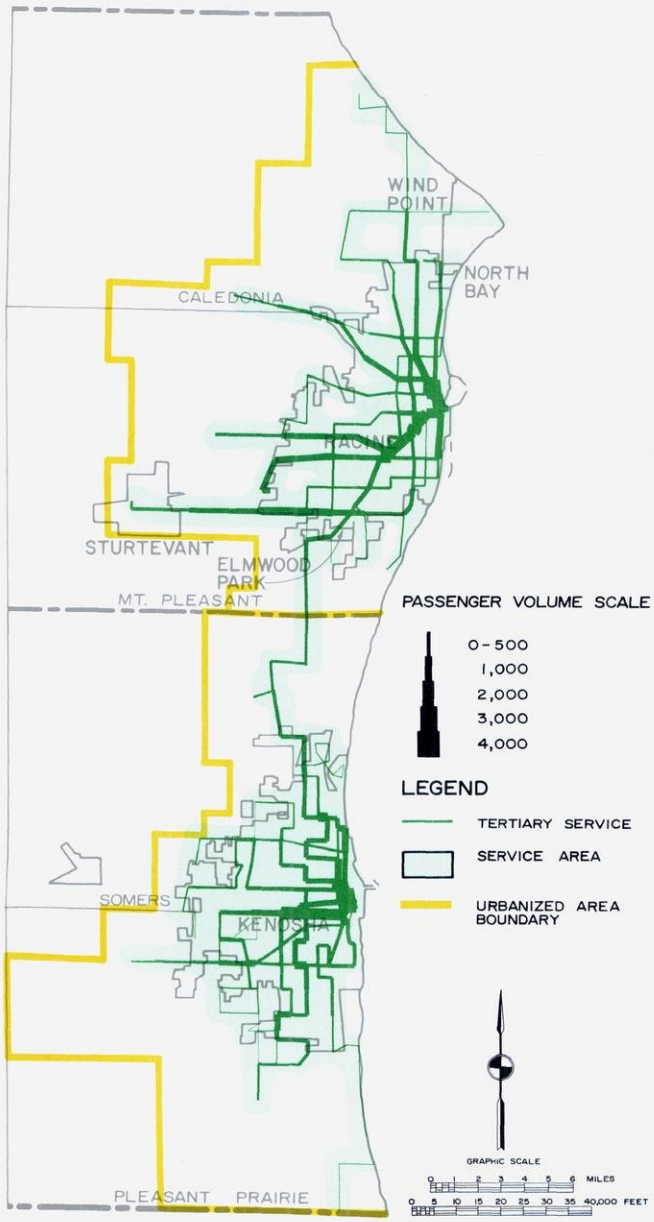


Under the final recommended transportation system plan, transit utilization in the Milwaukee area could be expected to increase from about 1.2 million passenger miles per average weekday in 1972 to about 1.6 million in the plan design year. About 37 percent of the transit travel could be expected to take place on the primary system, about 40 percent on the secondary system, and about 23 percent on the tertiary system. The base transit fare in Milwaukee would be $0.50 under the final recommended plan.

Source: SEWRPC.

Map 125

TRANSIT SYSTEM UTILIZATION IN THE KENOSHA AND RACINE URBANIZED AREAS: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN



Under the final recommended transportation system plan, transit utilization in the Kenosha and Racine urbanized areas could be expected to increase significantly over the 1972 levels. In the Kenosha area, the expected increase would be from about 9,600 passenger miles per average weekday in 1972 to nearly 42,000 by the year 2000. In the Racine area, transit travel could be expected to increase from about 10,900 passenger miles per average weekday in 1972 to about 46,300 by the year 2000. Under the recommended plan, the base transit fare in Kenosha and Racine is assumed to remain at $0.25.

Source: SEWRPC.

concerning land use and transportation system development within the Region. These behavioral and attitudinal surveys were undertaken shortly before the motor fuel shortages of 1973 created by the Organization of Petroleum Exporting Countries (OPEC) cartel embargo on oil exports to the United States, which made the public aware of potential shortages and rising costs of motor fuel. In order to provide some measure of the changes in travel habits and patterns and in public attitudes toward transportation facility development which this new public awareness may have fostered, the Commission, in cooperation with the University of Wisconsin-Milwaukee, undertook a special survey designed to determine actual past and probable future response of households to increases in the cost of motor fuel and to restrictions on its supply. The survey findings, which provide valuable information about a phenomenon that was the subject of much speculation, were reported in SEWRPC Technical Report No. 15, Household Response to Motor Fuel Shortages and Higher Prices in Southeastern Wisconsin, August 1976.

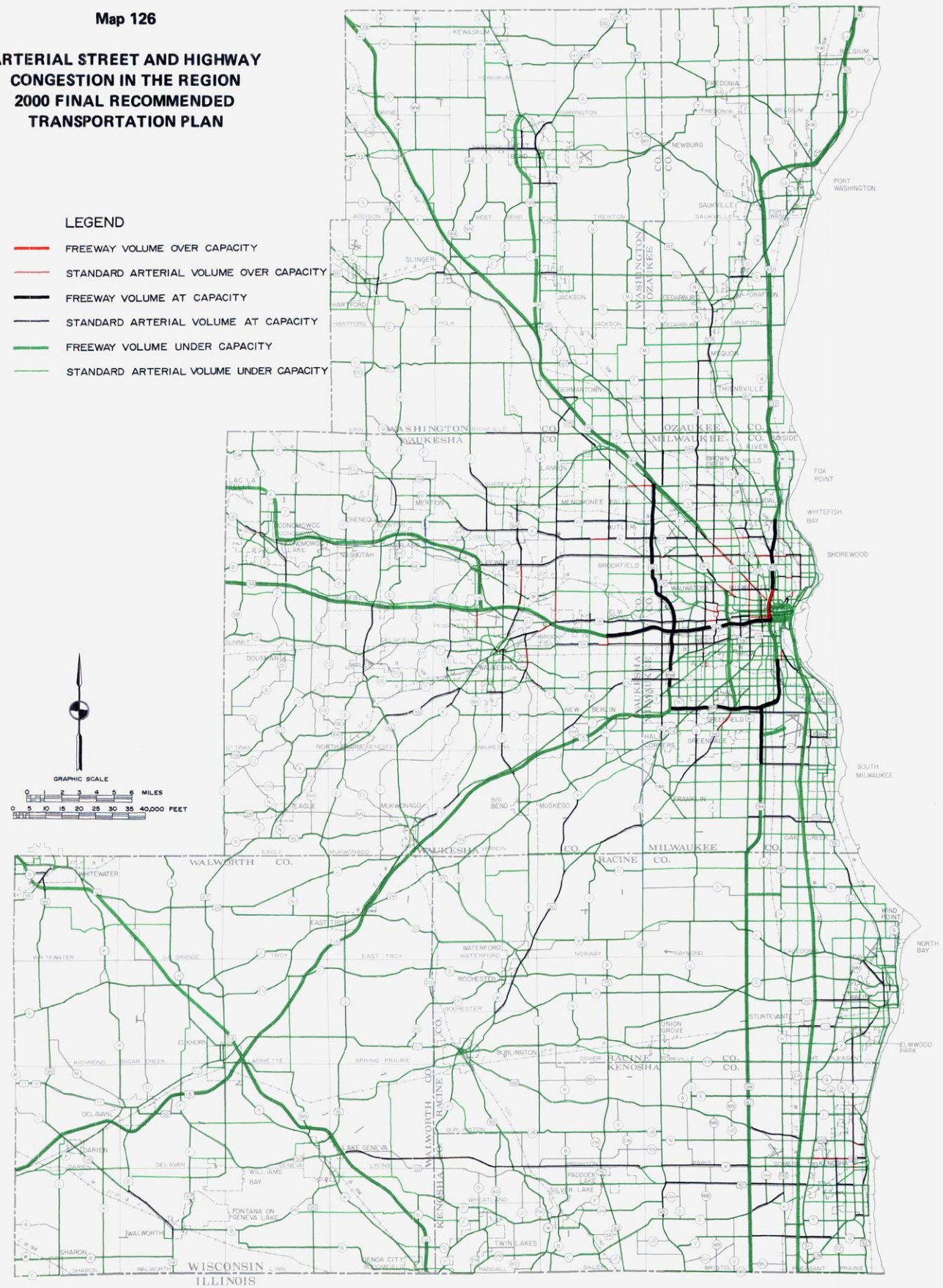
The survey findings indicated that households within the Region were very reluctant to change their travel patterns and habits and that no significant shifts in such habits and patterns could be expected on the basis of foreseeable increases in the cost of motor fuel alone. The survey findings further indicated that households were even more reluctant to consider residential relocation in response to higher motor fuel prices. Consequently, under the alternative of higher motor fuel prices, the basic pattern of trip generation and distribution within the Region may be expected to vary little from the estimates used in the design of the new plan. The survey further indicated that restricted motor fuel availability may be expected to produce some modest changes in residential location and travel patterns. The results of the survey indicated that restricted motor fuel availability could be expected to influence the choice of mode for the journey to work and to reduce somewhat the number of trips for shopping purposes, and to change somewhat the pattern of trip mode for shopping purposes. With respect to the former, increasing motor fuel prices can be expected to only slightly increase carpooling and transit use. Only under severely restricted motor fuel availability can a substantial increase in carpooling and transit use be expected, each mode approximately doubling under severe constraints. Based upon these survey findings, specific recommendations were made with respect to the modifications that should be made in the Commission's travel demand forecasting procedure to reflect the possible effects of restrictions on the availability of motor fuel and of rising prices in such fuel and thereby permit the sensitivity of the recommended plan to motor fuel availability to be evaluated.

Modifications in Travel Demand Forecasting Procedure

The above-referenced survey results led to the following changes in the Commission simulation modeling process to reflect the results of the special survey of household response to motor fuel shortages and higher prices.

Map 126

ARTERIAL STREET AND HIGHWAY CONGESTION IN THE REGION 2000 FINAL RECOMMENDED TRANSPORTATION PLAN



Under the final recommended transportation system plan, 383 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, could be expected to be operating at or over design capacity by the year 2000. In 1972, 318 miles of arterial street and highway facilities, or about 11 percent of the total arterial system, were operating at or over design capacity.

Source: SEWRPC.

Table 372

EXISTING, COMMITTED, AND PROPOSED FREEWAYS IN THE REGION
1985 STAGE OF THE FINAL RECOMMENDED TRANSPORTATION PLAN

Freeway	Number of Miles			
	January 1, 1978	Committed	Planned	Total
Airport	5.1	--	--	5.1
Airport Spur	--	1.4	--	1.4
East-West	33.5	--	--	33.5
Fond du Lac	4.5	--	--	4.5
Lake	2.6	--	3.1	5.7
North-South	78.0	--	--	78.0
Park	1.2	--	--	1.2
Rock	48.7	--	--	48.7
Stadium	2.7	--	0.8	3.5
USH 12	19.1	--	--	19.1
USH 16	8.3	7.0	--	15.3
USH 41	11.3	--	--	11.3
West Bend	1.0	--	12.7	13.7
Zoo	14.5	--	--	14.5
Total	230.5	8.4	16.6	255.5

Source: SEWRPC.

Trip Generation: The survey indicated that changes in trip generation rates for all trip purposes except shopping could be expected to be reduced by less than 10 percent under conditions of increased motor fuel costs and/or restricted motor fuel availability. Accordingly, for the purposes of the sensitivity analysis, the household trip production model was modified only for home-based shopping trips, Table 375, reducing the generation rate for such trips from an average weekday level of 1.14 trips per household to a level of 0.87 trips per household.

Trip Distribution: The survey further indicated that no significant change in the pattern of residential location within the Region could be expected under conditions of higher fuel prices and/or restricted fuel availability, so little change in trip desire lines can be anticipated. The survey indicated that trip lengths for shopping can be expected to be reduced under the future alternatives. Accordingly, the trip distribution model was adjusted for the purposes of the sensitivity analysis by reducing the average trip length for home-based shopping trips from 11 minutes, or about four miles, to nine minutes, or about 2.3 miles. More importantly, the percentage of shopping trips that are 12 or more minutes in travel time duration was reduced from 33 percent to 15 percent of the total.

Modal Split and Auto Occupancy: The survey indicated that households within the Region could be expected to change their mode of travel somewhat in response to higher motor fuel prices and/or restricted fuel availability, with the shift being to carpools and mass transit. In order to reflect the shift to carpooling, auto occupancy rates for home-based work trips were increased at rates varying by the geographic area of trip production and by the trip length, with the net modification being an increase in overall average auto occupancy from 1.1 to 1.2 persons per auto. In order to reflect the shift to transit, the perceived cost of operating an automobile was increased by one-third from six to eight cents per mile. This resulted in an increase in transit use of from 335,000 trips per average weekday to 432,600 such trips, a 29 percent increase.

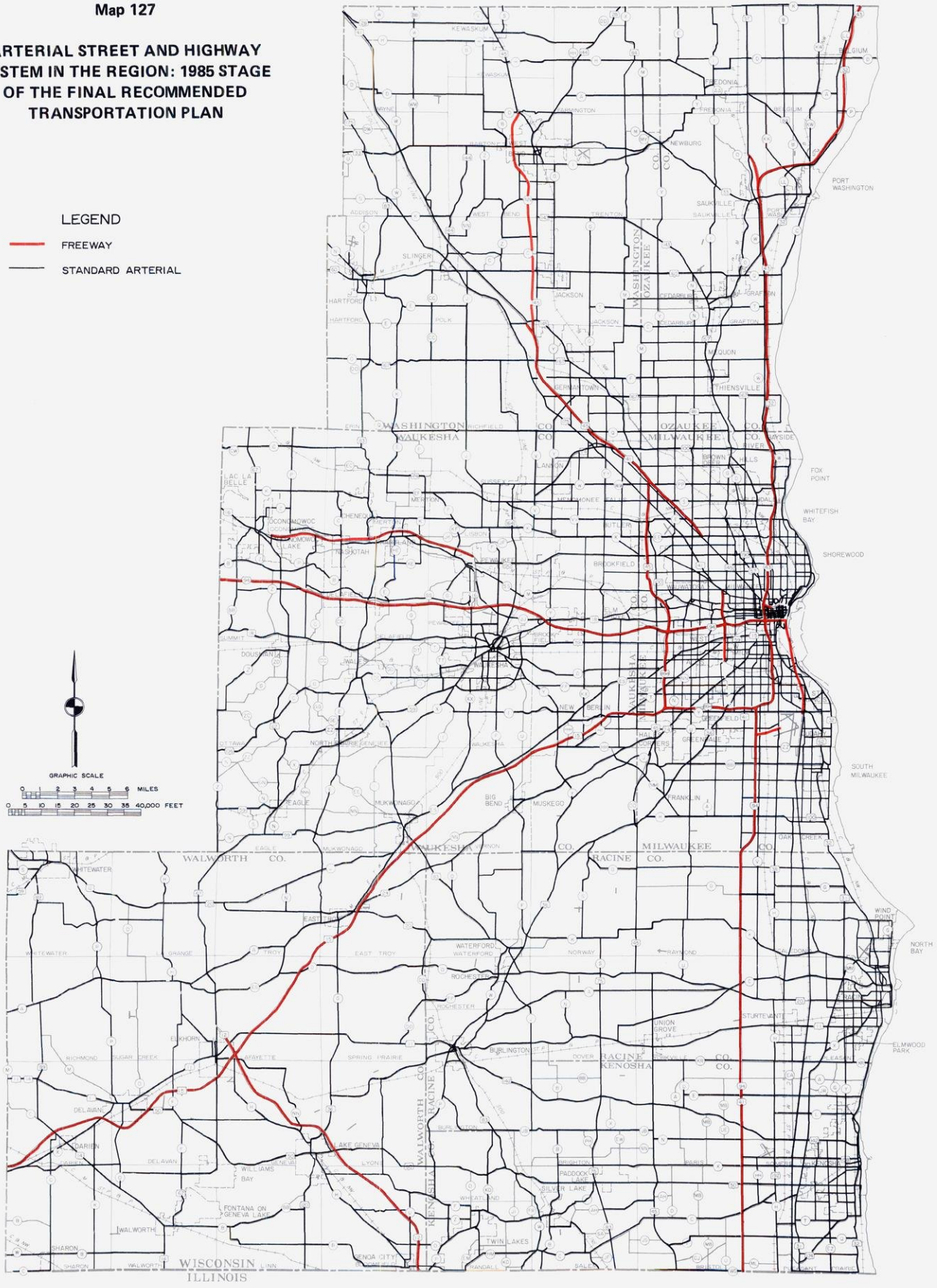
Traffic Assignment: No changes were made in the traffic assignment model since the survey did not indicate that tripmakers would alter the manner by which they choose the path of travel between origins and destinations. The assignment model assumes that auto drivers will choose routes involving the shortest travel time.

Sensitivity Analysis Results

The forecasts of design-year travel demand produced by the modified travel simulation models are summarized in Table 376. Under conditions of restricted fuel availability, total person trips generated within the Region on an average weekday could be expected to approximate 5.56 million, about 195,600 trips, or 3.4 percent less than under unrestricted conditions. This decrease in total tripmaking would be primarily the result of a reduction in the number of home-based shopping trips. As a result of a shift in mode, an approximate 29 percent

Map 127

ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION: 1985 STAGE OF THE FINAL RECOMMENDED TRANSPORTATION PLAN



Under the 1985 stage of the final recommended transportation system plan, arterial street and highway system mileage within the Region would total about 3,395 miles by the year 1985, an increase of about 386 miles, or nearly 13 percent over 1972. Freeways would comprise about 255 miles, or almost 8 percent, of the total arterial system in the year 1985, an increase of 93 miles over 1972. Of this increase, nearly 17 miles represent planned new freeways.

Source: SEWRPC.

Table 373

ARTERIAL STREET AND HIGHWAY FACILITIES IN THE REGION BY ARTERIAL FACILITY TYPE BY COUNTY: 1972 AND 1985 STAGE OF THE FINAL RECOMMENDED TRANSPORTATION PLAN

County	Miles of Arterial Facilities		
	1972	Stage Increment	1985
Kenosha			
Freeway	12.1	--	12.1
Standard Arterial	267.8	68.9	336.7
Subtotal	279.9	68.9	348.8
Milwaukee			
Freeway	63.8	9.2	73.0
Standard Arterial	670.4	17.6	688.0
Subtotal	734.2	26.8	761.0
Ozaukee			
Freeway	10.8	16.8	27.6
Standard Arterial	239.5	36.2	275.7
Subtotal	250.3	53.0	303.3
Racine			
Freeway	12.0	--	12.0
Standard Arterial	337.4	70.5	407.9
Subtotal	349.4	70.5	419.9
Walworth			
Freeway	19.1	31.1	50.2
Standard Arterial	389.1	6.3	395.4
Subtotal	408.2	37.4	445.6
Washington			
Freeway	6.8	14.6	21.4
Standard Arterial	332.4	63.8	396.2
Subtotal	339.2	78.4	417.6
Waukesha			
Freeway	37.8	21.4	59.2
Standard Arterial	610.7	29.3	640.0
Subtotal	648.5	50.7	699.2
Southeastern Wisconsin Region			
Freeway	162.4	93.1	255.5
Standard Arterial	2,847.2	292.6	3,139.8
Total	3,009.6	385.7	3,395.3

Source: SEWRPC.

increase in transit trips may be expected. Automobile driver trips may be expected to decrease by more than 7 percent due to shifts to carpooling and mass transit use. The shift to transit may be expected to exceed the shift to carpooling. Consequently, automobile passenger trips may be expected to decline by about 1.6 percent.

The analyses further indicate that travel could be expected to be reduced from about 30.1 million vehicle miles on an average weekday to about 27.6 million, a reduction of more than 8 percent. The analyses indicate, however, that the facility improvements proposed under the recommended new regional transportation system plan would still be warranted. As indicated in Table 377, the reductions in average weekday traffic volumes on the proposed freeway facilities included in the new plan could be expected to range from no reduction at all in the case of such facilities as USH 12 Freeway and the USH 41 Freeway to about 14 percent reduction in the case of the North-South (IH 43) Freeway. Table 378 provides a comparison of anticipated design-year traffic volumes on selected standard surface arterials under the alternative motor fuel availability assumptions. The table indicates that the recommended improvements would be warranted even if motor fuel availability was constrained.

While the decrease in travel demand which could be expected to result from restricted motor fuel availability would probably not eliminate the necessity of making the improvements proposed under the recommended new transportation system plan, the level of congestion that could be expected on the plan system would be reduced. Table 379 provides a comparison of the number of miles of facility that could be anticipated to operate under, at, or over design capacity under the alternative fuel availability conditions. The table indicates that the total miles of facilities operating at or over capacity in the plan design year could be expected to be reduced from 383 miles, or 11 percent of the total arterial street and highway system, under the original assumptions, to 201 miles, or 6 percent of the total system, under the assumption of restricted motor fuel availability.

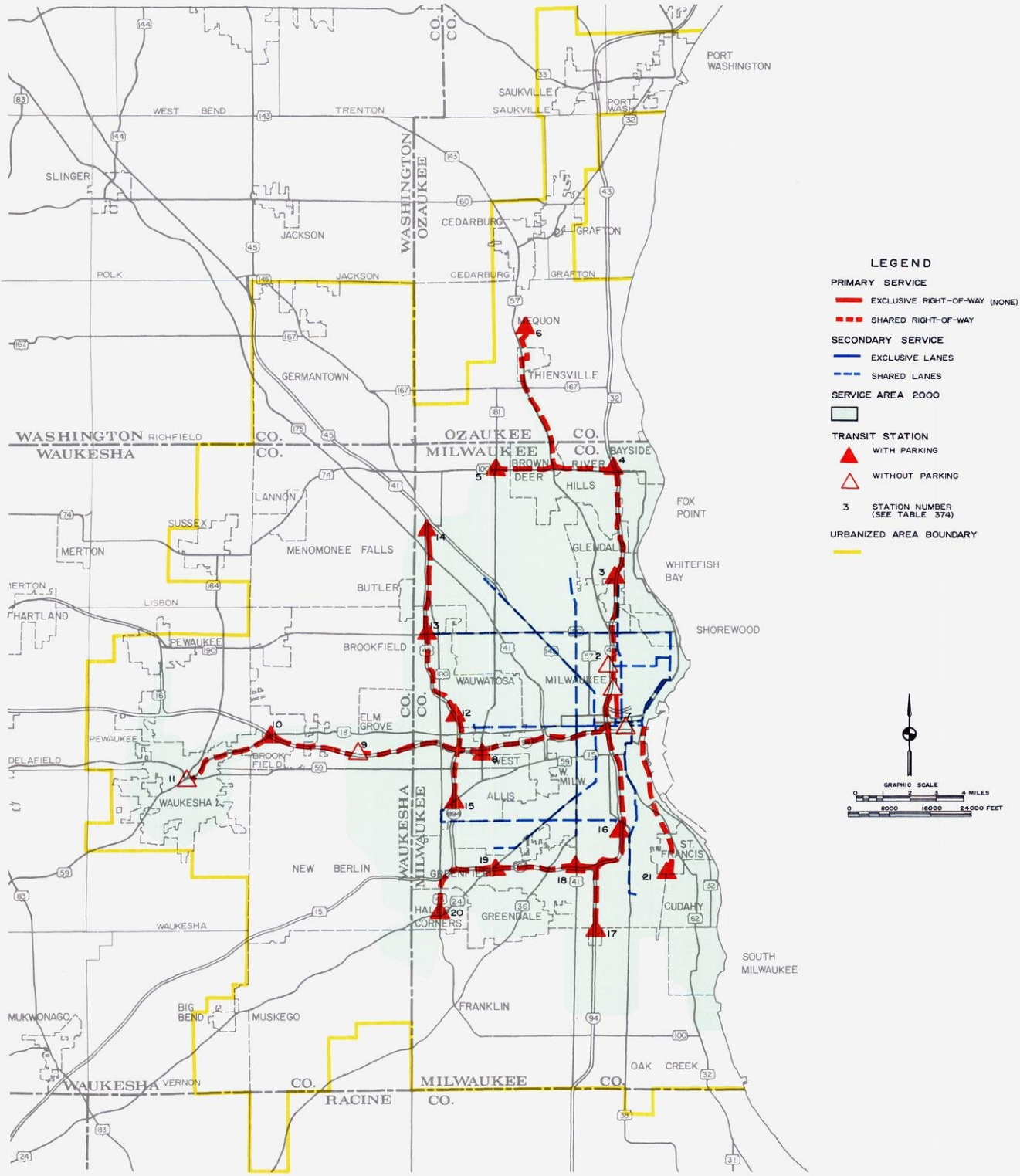
Motor Fuel Supply and Demand

The motor fuel sensitivity analysis of the recommended plan was also intended to determine whether a supply of motor fuel adequate to sustain the anticipated travel demand could be expected to be available. This required an assessment of both the supply and the demand for motor fuel. A comparison of the annual motor fuel consumption under both the recommended new transportation system plan assuming an unrestricted supply of motor fuel and such consumption assuming a restricted supply is provided in Table 380. The demand for motor fuel could be expected to approximate 526 million gallons per year under the unrestricted assumption and 490 million gallons per year under the restricted assumption. These estimates of consumption are based on the automobile fuel efficiencies mandated by the U. S. Congress; namely, a fleet average of 27.5 miles per gallon by 1985. The likelihood of attaining the increased fuel efficiencies is further supported by the household responses to the survey, which indicated that as motor fuel prices rise and in the event of motor fuel availability restrictions, households would, as a first option, purchase more energy-efficient vehicles.

Two alternative estimates of motor fuel supply were prepared. The first estimate was based on an assumption that gasoline would be rationed to provide a maximum of 10 gallons of motor fuel per registered vehicle per week. Under this assumption, an estimated 579 million gallons of fuel would be available for use within the Region in the design year, an amount sufficient to satisfy the

Map 128

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 1985 STAGE OF THE FINAL RECOMMENDED TRANSPORTATION PLAN



Under the 1985 stage of the final recommended transportation plan, transit service would be provided over 2,055 round-trip route miles of transit line in the Milwaukee urbanized area. Of this total, 433 route miles would provide primary service, 154 route miles secondary service, and 1,468 route miles tertiary service. The system would require the operation of about 705 buses during peak ridership periods. This would represent an increase of 994 round-trip route miles and 263 buses over 1972. The plan also recommends the provision of 21 public transit stations, an increase of 17 over 1972.

Source: SEWRPC.

Table 374

SELECTED CHARACTERISTICS PRIMARY TRANSIT STATIONS IN THE MILWAUKEE URBANIZED AREA
1985 STAGE OF THE FINAL RECOMMENDED TRANSPORTATION PLAN

Transit Station Identification					Type of Service			Passenger Facilities		
Primary Service Corridor	Number[a]	Name	Civil Division	Status	Primary	Secondary	Tertiary	Shelter	Number of Parking Spaces	Buses per Peak Hour in Peak Direction
East Side	1	W. North Avenue	City of Milwaukee	Proposed	X		X	X	--	10
	2	W. Locust Street	City of Milwaukee	Proposed	X	X	X	X	--	9
	3	North Shore	City of Glendale	Existing	X	X	X	X	200	7
	4	W. Brown Deer Road	Village of River Hills	Existing	X		X	X	225	5
	5	Northridge	City of Milwaukee	Proposed	X		X	X	180	3
	6	MATC-Mequon	City of Mequon	Existing	X			X	100	2
East-West	7	Downtown Milwaukee	City of Milwaukee	Proposed	X	X	X	X	--	67
	8	State Fair Park	City of Milwaukee	Proposed	X		X	X	200	3
	9	Brookfield Square	City of Brookfield	Proposed	X		X	X	--	2
	10	Goerke's Corners	Town of Brookfield	Existing	X			X	200	5
	11	Waukesha	City of Waukesha	Proposed	X		X	X	--	5
Zoo Freeway-North	12	Watertown Plank Road	City of Wauwatosa	Existing	X		X	X	200	5
	13	W. Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	200	5
	14	W. Good Hope Road	City of Milwaukee	Proposed	X		X	X	200	4
Zoo Freeway-South	15	W. National Avenue	City of West Allis	Proposed	X	X	X	X	300	8
IH 94 South	16	W. Morgan Avenue	City of Milwaukee	Proposed	X	X	X	X	200	5
	17	W. College Avenue	City of Milwaukee	Existing	X		X	X	300	6
Airport Freeway	18	S. 27th Street	City of Milwaukee	Proposed	X		X	X	250	6
	19	S. 76th Street	City of Greenfield	Proposed	X		X	X	200	6
	20	Hales Corners	Village of Hales Corners	Proposed	X		X	X	200	3
Lake Freeway	21	E. Layton Avenue	City of Cudahy	Proposed	X		X	X	150	4

[a] *See Map 128.*

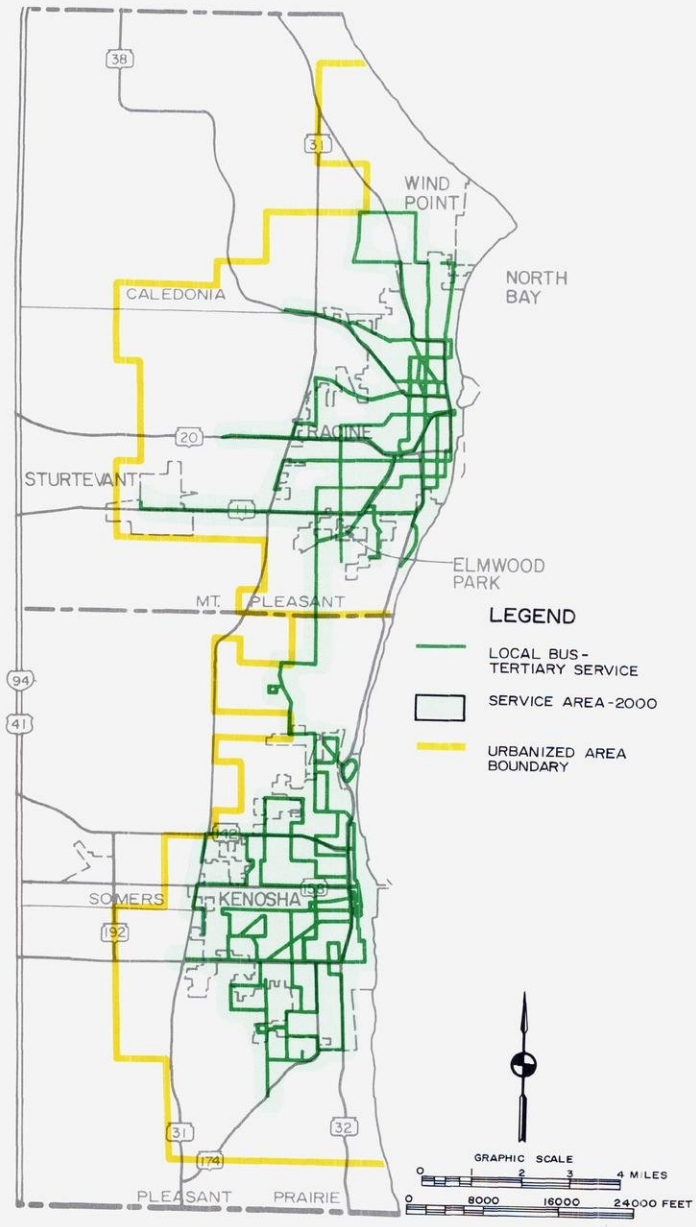
Source: SEWRPC.

anticipated travel demand under both the unrestricted and the restricted motor fuel availability assumptions. The second estimate of motor fuel availability was based on an assumption that gasoline would be rationed to provide a maximum of eight gallons per licensed driver per week. Under this assumption, it is estimated that about 523 million gallons of gasoline would be available per year within the Region in the design year. This amount would fall slightly short of meeting the travel demand under conditions of unrestricted motor fuel availability, the shortfall approximating three million gallons per year, or about 0.6 percent. The supply would, however, be adequate to meet the travel demand generated under the restricted fuel availability assumption, with a surplus of 33 million gallons per year, or about 6.7 percent.

It may be concluded from the foregoing analyses that the proposed improvements recommended in the new regional transportation system plan would be warranted even in the event of motor fuel shortages of the magnitude indicated above. It should be noted that the provision of an adequate mass transit system would become even more important under conditions of restricted motor fuel availability in order to adequately serve the increase in mass transit utilization that could be expected.

Map 129

TRANSIT SYSTEM IN THE KENOSHA AND RACINE URBANIZED AREAS: 1985 STAGE OF THE FINAL RECOMMENDED TRANSPORTATION PLAN



Under the 1985 stage of the final recommended transportation system plan, the transit systems for the Kenosha and Racine urbanized areas would consist of approximately 139 round-trip route miles of transit line in the Kenosha urbanized area and 142 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 32 buses in the Kenosha urbanized area and 24 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 80 round-trip route miles and 20 buses in the Kenosha area and 61 round-trip route miles and 14 buses in the Racine area over 1972.

Source: SEWRPC.

SUMMARY

This chapter has described the recommended year 2000 regional transportation system plan and summarized the process by which this plan was prepared by the Commission, including extensive review of alternative plans by the Commission Technical and Citizens Advisory Committees, and the presentation of a recommended plan and of alternatives thereto at a series of public informational meetings and public hearings held in 1976 and 1977. The process included a test and evaluation of four alternative regional transportation system plans consisting of various combinations of freeways, surface arterials, transit facilities—including exclusive transitways—and transit fare structures. The test and evaluation, which included the measurement of each plan against agreed-upon transportation system development objectives and supporting standards, a rank-based expected value evaluation, and a cost-revenue evaluation of each plan, are described in this chapter.

Consideration of the results of the full test and evaluation of the four alternative regional transportation system plans (see Appendix L for detailed summary tables) did not result in a consensus within, or between, the Technical and Citizens Advisory Committees. On a vote of seven ayes and six nays, with three abstentions, the Technical Advisory Committee recommended to the Commission Plan A'(50), a system plan containing all of a series of controversial freeway facilities, no transitways, and a basic $0.50 transit fare. On a vote of 12 ayes and six nayes, the Citizens Advisory Committee recommended to the Commission Plan A'(25), a system plan also containing all of a series of controversial freeway facilities, no transitways and a basic $0.25 transit fare. Both plans, however, sought to substitute certain freeway management measures for the transitways. Subsequent to the completion of the Advisory Committees' considerations of the alternative plan test and evaluation results, the Commission received a set of recommendations from an ad hoc task force established by a group of Milwaukee-area state legislators which urged the Commission to recognize that the unfinished portions of the Milwaukee County freeway system would not, because of legislative and fiscal constraints, be built in the foreseeable future. The task force suggested that steps be taken to deal with the traffic congestion problems existing at the "stub ends" of currently completed freeway segments, and that measures be instituted which would suppress travel demand and discourage automobile use.

Preliminary Recommended Transportation System Plan

Upon weighing the Technical and Citizens Advisory Committee recommendations and the suggestions made by the legislative ad hoc task force, and in view of the sharp division of public opinion concerning completion of the Milwaukee County freeway system and the impasse in transportation system development that has been created by that division of opinion, the Commission determined that a preliminary recommended regional

Table 375

COMPARISON OF HOME-BASED SHOPPING TRIP PRODUCTION RATES IN THE REGION 2000 UNRESTRICTED AND RESTRICTED MOTOR FUEL AVAILABILITY CONDITIONS

Trip Production Category		Average Weekday Trip Production Rate (Trips per Household)								Difference (Percent)			
		Unrestricted Motor Fuel Availability Conditions				Restricted Motor Fuel Availability Conditions							
Auto Availability (Autos per Household)	Family Size (Persons per Household)	Urbanizing Areas			Rural Areas	Urbanizing Areas			Rural Areas	Urbanizing Areas			Rural Areas
		Kenosha	Milwaukee	Racine		Kenosha	Milwaukee	Racine		Kenosha	Milwaukee	Racine	
0	1	0.19	0.27	0.17	0.05	0.18	0.25	0.16	0.04	- 6	- 6	- 6	- 20
	2	0.38	0.45	0.34	0.33	0.36	0.42	0.32	0.29	- 6	- 6	- 6	- 12
	3 or 4	0.76	0.52	0.69	0.67	0.67	0.46	0.61	0.51	- 12	- 12	- 12	- 24
	5 or more	0.90	0.57	0.85	0.95	0.85	0.54	0.80	0.84	- 6	- 5	- 6	- 12
1	1	0.88	0.46	0.80	0.33	0.77	0.40	0.70	0.25	- 12	- 12	- 12	- 24
	2	1.27	1.04	1.14	0.63	1.12	0.92	1.00	0.48	- 12	- 12	- 12	- 24
	3 or 4	1.82	1.31	1.63	1.00	1.38	1.00	1.24	0.52	- 24	- 24	- 24	- 48
	5 or more	2.15	1.77	1.93	1.48	1.89	1.56	1.70	1.12	- 12	- 12	- 12	- 24
2 or more	1	1.62	0.47	1.46	0.61	1.33	0.40	1.20	0.39	- 18	- 15	- 18	- 36
	2	2.15	1.07	1.93	0.95	1.76	0.92	1.58	0.61	- 18	- 14	- 18	- 36
	3 or 4	2.84	1.56	2.56	1.32	1.82	1.00	1.64	0.63	- 36	- 36	- 36	- 52
	5 or more	3.23	2.17	2.90	1.90	2.65	1.78	2.38	1.22	- 18	- 18	- 18	- 36

Source: SEWRPC.

Table 376

COMPARISON OF ANTICIPATED DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL 2000 UNRESTRICTED AND RESTRICTED MOTOR FUEL AVAILABILITY CONDITIONS

Estimated Year 2000 Trips Generated on the Average Weekday						
Mode of Travel	Unrestricted Motor Fuel Availability Conditions (Recommended Plan)		Restricted Motor Fuel Availability Conditions		Difference	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number	Percent
Automobile Driver.	3,764,100	65.5	3,493,000	62.9	- 271,100	- 7.2
Automobile Passenger . .	1,363,200	23.7	1,341,000	24.1	- 22,200	- 1.6
Transit Passenger.	335,000	5.8	432,600	7.8	97,600	29.1
School Bus Passenger . . .	288,600	5.0	288,600	5.2	0	0.0
Total	5,750,900	100.0	5,555,300	100.0	- 195,600	3.4

Source: SEWRPC.

Table 377

COMPARISON OF ANTICIPATED AVERAGE WEEKDAY TRAFFIC VOLUMES ON PROPOSED FREEWAYS IN THE REGION 2000 UNRESTRICTED AND RESTRICTED MOTOR FUEL AVAILABILITY CONDITIONS

Proposed Freeway	Range of Average Weekday Travel Volume (vehicles)	
	Unrestricted Motor Fuel Availability Conditions (Recommended Plan)	Restricted Motor Fuel Availability Conditions
Airport Spur	13,000 - 14,000	12,000 - 14,000
Stadium-South	48,000 - 68,000	43,000 - 60,000
Park-East and Lake-North[a]	18,000 - 23,000	15,000 - 23,000
Lake-South—Milwaukee County	54,000 - 68,000	50,000 - 60,000
Lake South—Kenosha and Racine Counties	27,000 - 55,000	27,000 - 50,000
USH 12	21,000 - 30,000	21,000 - 30,000
USH 45	10,000 - 19,000	10,000 - 17,000
USH 41	15,000 - 22,000	15,000 - 22,000
USH 16	8,000 - 26,000	7,000 - 24,000
IH 43	47,000 - 69,000	40,000 - 60,000

[a] *It should be noted that the anticipated average weekday volumes for the entire Park Freeway-East and Lake Freeway-North range from 18,000 to 34,000 vehicles per day.*

Source: SEWRPC.

Table 378

COMPARISON OF ANTICIPATED AVERAGE WEEKDAY TRAFFIC VOLUMES ON SELECTED STANDARD ARTERIAL STREETS AND HIGHWAYS IN THE REGION: 2000 UNRESTRICTED AND RESTRICTED MOTOR FUEL AVAILABILITY CONDITIONS

Facility		Unrestricted Motor Fuel Availability Conditions (Recommended Plan)		Restricted Motor Fuel Availability Conditions	
Name	Existing Number of Lanes	Range of Average Weekday Travel Volume (vehicles)	Planned Number of Lanes	Range of Average Weekday Travel Volume (vehicles)	Warranted Number of Lanes
USH 45 (Washington County)	2	8,000 - 10,000	4	8,000 - 9,000	4
STH 36 (Racine County)	2	13,000 - 18,000	4	13,000 - 17,000	4
STH 50 (Kenosha County)	2	14,000 - 16,000	4	13,000 - 16,000	4
STH 60 (Washington County)	2	11,000 - 14,000	4	10,000 - 13,000	4
STH 59 (Waukesha County)	2	15,000 - 16,000	4	13,000 - 14,000	4
STH 164 (Waukesha County)	2	15,000 - 23,000	4	15,000 - 22,000	4
STH 167 (Ozaukee County)	2	13,000 - 16,000	4	13,000 - 16,000	4
CTH A (Waukesha County)	2	19,000 - 30,000	4	18,000 - 27,000	4
CTH F (Waukesha County)	2	11,000 - 14,000	4	11,000 - 13,000	4
Pilgrim Road (Waukesha County)	2	17,000 - 23,000	4	16,000 - 20,000	4

Source: SEWRPC.

Table 379

COMPARISON OF THE MILES OF ARTERIAL STREETS AND HIGHWAY FACILITIES OPERATING AT VARIOUS SERVICE LEVELS IN THE REGION BY COUNTY: 2000 UNRESTRICTED AND RESTRICTED MOTOR FUEL AVAILABILITY CONDITIONS

County and Service Level	Miles of Arterial Facility			
	Unrestricted Motor Fuel Availability Conditions (Recommended Plan)	Restricted Motor Fuel Availability Conditions	Difference	
			Number	Percent
Kenosha County				
Under Design Capacity . . .	307.9	326.0	18.1	5.9
At Design Capacity.	48.5	30.4	- 18.1	- 37.3
Over Design Capacity	3.2	3.2	0.0	0.0
Subtotal	359.6	359.6	--	--
Milwaukee County				
Under Design Capacity . . .	617.8	699.8	82.0	13.3
At Design Capacity.	130.8	62.7	- 68.1	- 52.1
Over Design Capacity	26.5	12.6	- 13.9	- 52.5
Subtotal	775.1	775.1	--	--
Ozaukee County				
Under Design Capacity . . .	298.9	309.6	10.7	3.6
At Design Capacity.	12.0	1.3	- 10.7	- 89.2
Over Design Capacity	0.0	0.0	0.0	0.0
Subtotal	310.9	310.9	--	--
Racine County				
Under Design Capacity . . .	419.5	428.5	9.0	2.1
At Design Capacity.	22.8	13.8	- 9.0	- 39.5
Over Design Capacity	0.0	0.0	0.0	0.0
Subtotal	442.3	442.3	--	--
Walworth County				
Under Design Capacity . . .	472.8	473.3	0.5	0.1
At Design Capacity.	10.4	9.9	- 0.5	- 4.8
Over Design Capacity	0.0	0.0	0.0	0.0
Subtotal	483.2	483.2	--	--
Washington County				
Under Design Capacity . . .	419.2	431.6	12.4	3.0
At Design Capacity.	18.4	6.0	- 12.4	- 67.4
Over Design Capacity	0.0	0.0	0.0	0.0
Subtotal	437.6	437.6	--	--
Waukesha County				
Under Design Capacity . . .	606.8	656.0	49.2	8.1
At Design Capacity.	101.4	56.7	- 44.7	- 44.1
Over Design Capacity	9.2	4.7	- 4.5	- 48.9
Subtotal	717.4	717.4	--	--
Southeastern Wisconsin Region				
Under Design Capacity . . .	3,142.9	3,324.8	181.9	5.8
At Design Capacity.	344.3	180.8	- 163.8	- 47.5
Over Design Capacity	38.9	20.5	- 18.4	- 47.3
Total	3,526.1	3,526.1	--	--

Source: SEWRPC.

Table 380

COMPARISON OF MOTOR FUEL CONSUMPTION BY VEHICLES TRAVELING IN THE REGION BY FUEL TYPE
2000 UNRESTRICTED AND RESTRICTED MOTOR FUEL AVAILABILITY CONDITIONS

Vehicle Type Assuming 1985 Vehicle Efficiency Standards (27 mpg)	Annual Motor Fuel Consumption (million gallons)			
	Unrestricted Motor Fuel Availability Conditions (Recommended Plan)	Restricted Motor Fuel Availability Conditions	Difference in Consumption	
			Gallons	Percent
Gasoline	480	443	- 37	- 7.7
Diesel	35	35	0	0
Subtotal	515	478	- 37	- 7.2
Transit	11	12	1	9.1
Total	526	490	- 36	- 6.8

Source: SEWRPC.

transportation system plan be taken to public hearing that would be based on Plan A'(50) and that would further consist of two tiers with respect to the freeway system in Milwaukee County. Under the two-tier concept, the Commission proposed that all of the remaining uncompleted freeway segments in Milwaukee County be included in the recommended plan, but that these segments be divided into two groups. The first group, constituting the lower tier, would consist of those freeway segments which, in the Commission's judgment, were currently needed and therefore should be constructed as soon as possible. The second group, constituting the upper tier, would consist of those freeway segments which the analyses indicated would probably be needed in the future but which because of uncertainties concerning population growth and distribution, economic development, motor fuel availability, and public and legislative support should, in the Commission's judgment, be deferred for at least a decade while attempts are made both to better manage the existing transportation system to attain full use of its capacity through low-capital investment measures, and to reduce peak-hour travel demand through the institution of automobile use disincentives and transit and other high-occupancy vehicle use incentives. The major system management proposals included an extensive freeway control system effected through areawide ramp metering; increased promotion of carpooling and vanpooling; and significantly improved mass transit service. The proposed automobile use disincentives included parking supply restrictions, parking rate restrictions, and a parking surcharge, all to be carried out in the Milwaukee central business district.

The preliminary recommended transportation plan was taken to four well-attended public hearings held throughout the Region by the Commission. The public hearing held for Milwaukee and Waukesha Counties indicated both widespread support for and widespread opposition to completion of the Milwaukee County freeway system, providing further evidence of the very significant and very deep division of public opinion within those counties as to the desirability of completing the freeway system as originally planned. The most significant opposition to freeway construction was directed against the combination Park Freeway-West and Stadium Freeway-North "gap closure" project, although this project had a significant amount of support as well. With the exception of the Milwaukee County Expressway and Transportation Commission, there was little support by either freeway supporters or opponents for the preliminary Commission recommendation to place the Park Freeway-West and Stadium Freeway-North "gap closure" in the upper tier of the plan, thus reserving the cleared right-of-way for the Park Freeway-West in open space uses for at least a decade. Comments were also made at the hearing concerning the transportation system management proposals advanced in the preliminary plan. In general, there was reserved support for the freeway operational control system. The proposal to establish an all-day parking surcharge in downtown Milwaukee generated considerable opposition, as did the proposal to restrict the supply of all-day parking in the downtown Milwaukee area.

The Commission met on December 19, 1977, to deliberate on the public reaction to the preliminary recommended regional transportation plan. After considerable discussion and debate focusing primarily on the question of whether or not to continue to plan for the completion of the Milwaukee County freeway system, the Commission directed the staff to prepare a final recommended plan that would include all the uncompleted Milwaukee County freeways. The Commission further directed that a study be made of the impacts on the regional freeway and surface arterial system if the Stadium Freeway-North "gap closure" were ultimately to be removed from the plan. On December 28, 1977, the Commission met and received a communication from the Secretary of the Wisconsin Department of Transportation that state and federal funds for the study called for by the Commission on December 19, 1977, would likely not be available. After receiving this information and after further debate and discussion, the Commission directed that the Park Freeway-West and the Stadium Freeway-North "gap closure" be removed entirely from the new long-range plan. The Commission further directed that a study be presented on the best way to meet the transportation needs of the northwest quadrant of the Milwaukee urbanized area in the absence of these two freeways, and directed that the staff review the proposed plan with each of the seven County Juris-

dictional Highway Planning Advisory Committees to attempt to achieve a consensus on not only the details of the new functional plan but also on necessary adjustments in the seven adopted jurisdictional plans.

Recommended Regional Transportation System Plan

The recommended year 2000 regional transportation system plan consists of four major elements: a freeways element, a standard surface arterial streets and highways elements, a mass transit facilities and services element, and a system management element.

The recommended regional freeway system for the year 2000 includes the nearly 228 miles of freeways in the Region open to traffic as of January 1, 1977; 11 miles of freeways committed for construction; an additional 60 miles of proposed new freeways in the lower tier of the plan; an additional 12 miles of existing freeways recommended for significant improvement in the lower tier of the plan; and a total of 37 miles of proposed freeways in the upper tier of the plan. In addition, it is recommended that a series of special studies be conducted to deal with traffic problems at the four existing and two proposed freeway "stub ends" in Milwaukee, and that a special study be conducted of the transportation needs of northwestern Milwaukee County and southwestern Ozaukee County which would have been served by the previously planned Park Freeway-West and Stadium Freeway-North.

Under the recommended transportation system plan, the standard arterial street and highway system would be increased from the 2,850 miles existing in 1972 to about 3,190 miles in the year 2000. The additional mileage reflects primarily the addition of existing nonarterial facilities to the arterial system. The construction of new standard arterial facilities would total only about 150 miles under the recommended plan. Under the recommended plan about 2,621 miles of the total arterial street system, or about 74 percent, would be classified in the system preservation category; that is, improvements required to maintain structural adequacy and serviceability without increasing capacity of the arterial system. This includes 196 miles on which no work would be required; 1,545 miles on which only resurfacing would be required; and 880 miles on which reconstruction to the same capacity would be required. About 720 miles, or 20 percent, would be classified in the system improvement category, including 676 miles that would be reconstructed for additional capacity and 44 miles that would involve new construction of a replacement facility. The remaining 184 miles, or 5 percent, fall into the system expansion category where construction of new facilities would be required.

The recommended transportation system plan includes transit system development proposals for the three urbanized areas of the Region—Milwaukee, Kenosha, and Racine. The base transit fare is recommended to remain at the relative level of $0.50 in the Milwaukee urbanized area and at the relative level of $0.25 in the Kenosha and Racine urbanized areas, these fares being expressed in 1975 dollars.

In the Milwaukee urbanized area, the plan envisions the provision of three levels of transit service: primary, secondary, and tertiary. Primary service in the plan would be of the modified rapid transit type, provided by the operation of motor buses in mixed traffic over 80 miles of freeways and over 27 miles of surface arterial streets on extensions of the freeway routes. It is envisioned that the vehicles used for the primary service would provide for the collection and distribution of passengers at the end of each route. The primary transit service would be supported by the recommended implementation of a comprehensive freeway operational control system.

The secondary level of transit service envisioned in the plan would provide express bus service over arterial streets, with stops generally located only at intersecting bus routes. Under the recommended plan, secondary service would be provided over 14 individual transit routes with exclusive transit lanes—that is, traffic lanes where only buses would be allowed during specified hours of the day—on six arterial streets. The exclusive transit lanes would total nearly 10 miles. Shared secondary transit service would be provided over a total of about 146 miles of arterial facilities.

The tertiary level of mass transit service envisioned in the plan consists of local transit service provided primarily over arterial and collector streets, with frequent stops for passenger boarding and alighting. Under the preliminary recommended plan, extensive additions to the tertiary or local transit service routes would be provided. The plan envisions the ultimate extension of tertiary transit service to all of the Milwaukee urbanized area, including the newer urban residential areas in southern Ozaukee and Washington Counties and eastern Waukesha County.

In the Kenosha and Racine urbanized areas, only the tertiary or local level of mass transit service is envisioned in the plan. Because significant improvements in mass transit service in those two urbanized areas have taken place in recent years, the recommended regional transportation system plan for 2000 envisions only relatively minor route extensions and changes to reflect the anticipated expansion of these urbanized areas.

In addition to the arterial street and highway and transit facility and service recommendations described above, the final recommended regional transportation system plan for 2000 includes three major transportation system management recommendations. These management recommendations consist of the expansion of a freeway operational control system in the Milwaukee area, the expansion of curb parking restrictions on major surface arterials during peak hour travel periods, and the development of a continuing carpooling promotional program. The management recommendations are designed to accomplish several objectives, including ensuring that maximum use is made of existing transportation facilities before commitments are made to new capital investment; encouraging the use of high-occupancy vehicles, including buses, vans, and carpools; effecting motor fuel savings; and reducing vehicle miles of travel in congested areas.

Recommended Plan Performance and Costs

If the recommended new regional transportation system plan for the year 2000 is implemented, automobile availability may be expected to increase from about 704,600 in 1972 to about 1,002,500 in the design year of the plan, an increase of about 42 percent. The number of internal person trips generated within the Region on an average weekday may be expected to increase from 4.5 million in 1972 to about 5.7 million in the year 2000, a 26 percent increase. The number of mass transit trips made within the Region on an average weekday may be expected to increase from about 184,000 in 1972, or about 4 percent of the total person trips generated within the Region on an average weekday, to about 335,000 in the design year, or about 6 percent of the total person trips generated, an almost 82 percent increase in transit travel and a reversal of long-standing historic trends within the Region. Vehicle miles of travel on an average weekday within the Region may be expected to increase from about 20.1 million in 1972 to about 30.1 million in the design year, a 50 percent increase. Vehicle miles of travel on freeway facilities may be expected to increase from 31 percent of the total in 1972, to 42 percent of the total in the design year, assuming that all of the freeways in the upper tier of the plan are constructed. Arterial street and highway congestion, represented by the number of miles of facilities operating over capacity, may be expected to decrease from about 166 miles, or about 6 percent of the system in 1972, to about 39 miles, or 1 percent of the system in the design year. The number of miles of facilities operating at design capacity, however, may be expected to increase from about 152 miles, or about 5 percent of the total system in 1972, to about 344 miles, or about 10 percent of the total system in the design year.

The total costs of fully implementing the highway portion of the recommended new regional transportation system plan would approximate $136.1 million annually over the approximately 25-year plan implementation period, of which $92.7 million would be required for construction and $43.4 million for operation and maintenance. The total cost of fully implementing the transit portion of the recommended new regional transportation system plan is estimated at $50.9 million, of which $7 million would be required for capital costs and $43.9 million for operating costs.

Total annual costs for the complete implementation of all elements of the proposed new plan would thus total approximately $187 million. Public financial studies conducted by the Commission indicate that approximately $185 million, including transit fare bus revenues estimated to average $14 million per year, should become available annually for highway and transit purposes over the planning period, indicating the plan to be within the financial reach of the Region provided that transportation receipts increase at the historic rates evidenced from 1960 to 1972. An alternative revenue forecast that assumes that the transit fares and tax per gallon on gasoline will not keep pace with inflation and that takes into account the proposed increases in fuel efficiencies for automobiles indicates that there would be an annual revenue shortfall of $2 million.

Staging of the Recommended Transportation System Plan

This chapter has also identified a staging of the recommended regional transportation system plan to the year 1985. Staging recommendations were provided for all four elements of the recommended transportation plan: freeways, standard arterials, mass transit, and system management recommendations. Completion of the construction of the freeway facilities in the 1985 stage would result in a total 1985 freeway system of about 256 miles, an increase of 28 miles over the 1972 system.

The proposed 1985 standard arterial street and highway system in the Region would comprise 3,140 miles, an increase of 293 miles from the 1972 standard arterial system in the Region. This additional mileage reflects the addition of 252 miles of existing nonarterial facilities to the arterial system and the construction of 41 miles of new surface arterial streets and highways. Under the 1985 stage, about 3,231 miles, or 95 percent of the total arterial street and highway system, fall into the system preservation category; 105 miles, or 3 percent, fall into the system improvement category; and the remaining 59 miles, or 2 percent, fall into the system expansion category.

The 1985 stage of the recommended transportation plan in the Milwaukee urbanized area envisions that primary transit service would be provided over a total of 53 miles of freeway facility, with 17 miles of connecting surface arterials and a total of 21 public transit stations. In the Kenosha and Racine urbanized areas, some modifications to the existing tertiary level of transit service would be provided by 1985.

Importantly, the 1985 stage of the plan recommends the institution of the freeway operational control system described earlier, should preliminary engineering studies indicate the feasibility of the system. The 1985 stage of the plan also recommends that local communities continue to monitor traffic flow during peak hours of travel in order to determine where additional curb parking prohibitions should be instituted by 1985. Finally, the 1985 stage of the plan also recommends that carpool promotional activities and remote carpool parking lot facilities be undertaken on a continuation basis as required.

Plan Sensitivity to Motor Fuel Availability

The probable effects of restricted motor fuel availability and increased prices on major facility improvements proposed under the recommended regional transportation system plan were also evaluated in this chapter. The analysis considered potential changes in travel behavior by residents of the Region under such conditions based on the result of a special attitudinal and behavioral survey conducted within the Region to assess the probable nature and magnitude of such changes. Although the analysis indicated a potential 4 percent decrease in trip-making, an 8 percent decrease in vehicle miles of travel, and a 29 percent increase in transit ridership, major freeway and standard arterial facility improvements proposed under the recommended new regional transportation system plan would remain warranted

Chapter IX

PLAN IMPLEMENTATION

INTRODUCTION

The recommended regional land use and transportation plans described in the preceding chapters of this report provide a design for the attainment of the specific regional land use and transportation system development objectives formulated with the consent, and on the advice, of the local, state, and federal units and agencies of government concerned under the regional land use-transportation study. These recommended plans comprise two of the key elements of a comprehensive plan for the physical development of the Region: a land use plan and a transportation plan. The land use plan provides recommendations with respect to the amount, spatial distribution, and general arrangements of the various land uses required to serve the needs of anticipated future population and economic activity levels within the Region, while protecting the underlying and sustaining natural resource base. The transportation plan provides recommendations as to how the land use plan can best be served by highway and transit facilities.[1] In a practical sense, these plan elements are not complete until the steps required to implement the plans that is, to convert the plans into action policies and programs, are specified.

This chapter is, therefore, presented as a guide for use in the implementation of the recommended land use and transportation plans, which are two of the most important components of a comprehensive plan for the physical development of the Region. Basically, it outlines the actions which must be taken by the various levels and agencies of government concerned if the recommended land use and transportation plans are to be fully carried out. Those units and agencies of government which have plan adoption and plan implementation powers applicable to the recommended regional land use and transportation plans are identified; necessary formal plan adoption actions are specified; and specific implementation actions are recommended with respect to the land use, highway, and transit plan elements for each of the units and agencies of government concerned. In addition, financial and technical assistance programs available to such units and agencies of government in implementation of the regional plan components are discussed.

The plan implementation recommendations are, to the maximum extent possible, based upon, and related to, existing governmental programs and are predicated upon existing enabling legislation. Because of the ever-present possibility of unforeseen changes in economic conditions, state and federal legislation, case law decisions, governmental organization, and fiscal policies, it is not possible to declare once and for all time exactly how a process as complex as regional plan implementation should be administered and financed. In the continuing planning process, it will, therefore, be necessary to update periodically not only the land use and transportation plan elements themselves and the data and forecasts on which these plans are based, but also the recommendations for implementation.

It is important to note that the regional land use and transportation plans for the year 2000 represent extensions and refinements of the previously adopted year 1990 regional land use and transportation plans. Much has been accomplished since 1966 with respect to implementation of the initial regional land use and transportation plans in terms of the creation of local planning and plan implementation agencies, the application of public land use regulatory devices, and the investment of capital in public utilities and transportation facilities. The plan implementation recommendations set forth herein are very similar to those of the previous plan and have been modified only as necessary to reflect changes in state and federal law and governmental organization as well as to reflect revisions embodied in the year 2000 regional land use and transportation plan recommendations.

It should also be noted that since the adoption of the initial 1990 regional land use and transportation plans, the Commission has carried out a number of planning programs which have refined and detailed the concepts embodied in those plans for subareas of the Region. Examples of such plan refinements include the comprehensive plans for the Root, Fox, Milwaukee, and Menomonee River watersheds, the jurisdictional highway system plans for each of the seven counties in the Region, and the transit system development plans for the Kenosha, Racine, and Waukesha areas. Moreover, the Commission has also completed and adopted a variety of plans which extend and refine the overall regional plan within certain other functional areas. In this regard,

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[1] *It is important to note that the transportation plan, as prepared under the regional land use-transportation study, consists of two major subelements: a highway plan and a transit plan. Other subelements may include such transportation facilities as airports, seaports, and railways and rail terminals within the Region. An airport system plan was prepared and adopted by the Commission in 1975. A special transportation plan for the elderly and handicapped was prepared and adopted by the Commission in 1978. Other transportation facilities may be considered and plans prepared under future Commission work programs. In this regional transportation planning effort, the air, sea, and rail transportation systems were considered only to the extent that the terminal facilities of those systems comprise major traffic generators for the highway and transit systems.*

the Commission has completed a regional park and open space plan, a regional housing plan, a regional sanitary sewerage system plan, a regional airport system plan, and a regional library system plan. Each of these regional plan elements include specific recommendations concerning the manner in which it may be implemented, and these plan implementation recommendations complement and supplement the plan implementation measures set forth in this chapter.

BASIC PRINCIPLES AND CONCEPTS

It is important to recognize that plan implementation measures must grow out of adopted plans. Thus, action policies and programs must not only be preceded by plan adoption, but also must emphasize the most important and essential elements of the plan and those areas of action which will have the greatest impact on guiding and shaping development in accordance with the recommended plan. This is particularly important in planning for the orderly and economic development of a large urban region. The task is so highly complex that care must be taken not to become lost in plan implementation detail, the effects of which may be meaningless at the regional scale. Two major criteria should be used to determine which plan elements are truly regional in character or influence and are, therefore, essential to the attainment of regional development objectives: 1) the importance of the plan elements to the wise and judicious use of the underlying and sustaining natural resource base; and 2) the importance of plan elements to the functional relationships existing between land use and the demand for major utility, recreation, and transportation facilities. Plan elements identified on the basis of these two criteria should become the primary focus for regional plan implementation activities.

Thus, with respect to land use, regional plan implementation should focus on those aspects of land development and redevelopment which, either through their individual or aggregate effects, are regional in scope and not only interact strongly with the need for major utility, recreation, and transportation facilities, but also exert a heavy demand upon the limited natural resource base. These include large land-consuming uses, such as agriculture; regional park and related open space reservation; and, because of the demand which they exert upon public works facilities, residential uses and major commercial and industrial centers. The location and intensity of residential development within the Region must be carefully related to logical sanitary sewerage facility service areas and to soil capabilities if the intensification of existing and the creation of new environmental problems is to be avoided. Local commercial and service uses, local institutional and governmental uses, and local park and recreation areas need not receive explicit attention in regional land use plan implementation. These uses are implicitly provided for in the regional plans as integral components of residential neighborhoods and urban communities, the planning and development of which are primarily of local concern and properly subject to local planning and control.

Thus, with respect to land use, the regional plan will be largely achieved if the primary environmental corridors and prime agricultural lands of the Region are protected from incompatible urban development, if the major regional park and recreation areas are acquired for public use, and if future residential development within the Region approximates the density and spatial distribution patterns recommended by the regional plan. In addition, future major shopping and industrial centers should approximate the general spatial location pattern recommended by the regional land use plan.

With respect to transportation, regional plan implementation should focus on those facilities having areawide significance, such as the major freeway facilities, the interconnected major surface arterials, and the modified rapid transit facilities which combine high-speed service with high passenger-carrying ability. Thus, with respect to transportation, the regional plan will be largely achieved if the major freeway and interconnected surface arterials and the modified rapid transit networks are developed in accordance with the plan.

The foregoing would indicate that the regional development objectives and plans can be substantially met if the Commission and its constituent local units of government and affected state and federal agencies can significantly influence the spatial location and size of only four aspects of regional development: 1) the major transportation routes; 2) the major park and open space reservations, including the major drainageways; 3) the public sanitary sewerage facility service areas; and 4) the public water supply facility service areas. This is not to be interpreted as meaning that areawide planning should not concern itself with other aspects of regional development, such as solid waste disposal facilities and air and water pollution abatement measures, but only that primary emphasis and high priority in the regional land use and transportation plan implementation efforts should be given to the four aspects noted.

There are three main areas through which regional plan implementation may be achieved, and these parallel the three functions of the Regional Planning Commission: areawide research or inventory, preparation of a framework of long-range plans for the physical development of the Region, and provision of a center for the coordination of planning and plan implementation activities. All require a receptive attitude and preferably active planning and plan implementation programs at the local, county, and state levels of government.

A great deal can be achieved with respect to guiding areawide development along better lines if all concerned units and agencies of government, along with the Regional Planning Commission, perform the simple task of collecting, analyzing, and disseminating basic planning and engineering data on a continuing, uniform, areawide basis. Experience within the Region to date has already shown that if this important inventory function is properly carried out, the resulting information will be used and acted upon by both local and state agencies of

government and by private investors. If these same data were used as a primary input into the regional plan preparation, their utilization in arriving at public and private development decisions on a day-to-day basis would tend to contribute toward implementation of the regional plans.

With respect to plan preparation, it is essential that the regional plans, although confined to those functional elements having areawide significance, be prepared in sufficient depth and detail to provide a sound basis for plan implementation. This means that for necessary public works facilities, such as freeways and major drainageways, the plans must be carried to a stage wherein the location and alignment has been determined with sufficient accuracy and precision to provide an adequate basis for right-of-way reservation. Given such detailed plans, implementation will further require the development of very close working relationships between the Commission; the seven County Boards; the local units of government; such special purpose agencies as the Milwaukee County Park, Expressway and Transportation, and Metropolitan Sewerage Commissions; and certan state agencies, particularly the Wisconsin Departments of Transportation and Natural Resources.

Finally, it will be highly desirable, although not essential, to achieve an even finer degree of plan implementation than would be attainable through concern with the major plan elements alone through the Commission function of serving as a center for the coordination of local, areawide, state, and federal planning and plan implementation activities within the Region. The Commission's community assistance program, which actively assists the local municipalities in the preparation of plans and plan implementation devices, is an important factor in this respect, and will make possible the close integration of regional and local plans, adjusting the details of the latter to the broad framework of the former.

Planning Districts

The Commission's regional planning program provides for the establishment of planning districts within the Region for the purpose of carrying the regional planning programs into the greater depth and detail necessary for sound plan preparation and implementation. These districts are of two basic types. The boundaries of the first type are delineated on a basis of topography or topographically related development problems. Examples of such districts include the Root, Fox, Milwaukee, and Menomonee River watersheds for which detailed watershed planning programs have been completed by the Commission, and the Kinnickinnic River watershed, for which a detailed watershed planning program is nearing completion. The boundaries of the second type of planning district are delineated on the basis of particularly intensive urban development, such districts have certain common development problems. Examples of such districts are the Kenosha Planning District and the Racine Urban Planning District,[2] for which detailed comprehensive plans based on the 1990 regional land use and transportation plans have been completed and formally adopted by the Commission.

The planning districts are intended to comprise rational planning units within the Region; that is, they are intended not only to provide the basis for the preparation of certain elements of the areawide development plan in greater depth and detail, but also to provide an important basis for the implementation of the overall regional development plans. This latter function is important since the Regional Planning Commission is an entirely advisory body; and it is, therefore, only through cooperative interagency action that the regional plans will be implemented. The establishment of planning programs for such subareas of the Region as the Kenosha and Racine Planning Districts or a watershed affords an excellent opportunity to coordinate overall regional planning programs with more detailed planning programs for such areas of the Region, and thereby provides for full integration of local and regional development objectives and plans and for the implementation of regional as well as local plans through cooperative action.

PLAN IMPLEMENTATION ORGANIZATIONS

Because of the completely advisory role of the Commission, implementation of the recommended plans will be entirely dependent upon action by certain local, areawide, state, and federal agencies of government. Examination of the various agencies that are available to implement the recommended plan under existing enabling legislation reveals an array of departments, commissions, councils, boards, districts, and authorities at all levels of government. These agencies range from general-purpose local units of government such as common councils and village boards, through special-purpose areawide districts such as metropolitan sewerage commissions and state agencies that construct and operate facilities, such as the Department of Transportation, to federal administrative bodies that provide financial and technical assistance and direction, such as the U. S. Environmental Protection Agency.

Because of the many agencies in existence, it becomes exceedingly important to identify those agencies having legal powers and financial means to most effectively implement the recommended plans. Accordingly, the agencies whose actions will have significant effect, either directly or indirectly, upon the successful implementation of the recommended regional plans and whose full cooperation in plan implementation will be essential are listed and discussed below. The agencies are, for convenience, discussed by level of government; however, the interdependence between the various levels—as well as between the agencies—of government and the need for close intergovernmental cooperation cannot be overemphasized. A more detailed discussion of the duties

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[2] *The Kenosha Planning District consists of the City of Kenosha and the Towns of Pleasant Prairie and Somers. The Racine Urban Planning District consists of the City of Racine, the Villages of Elmwood Park, North Bay, Wind Point, and Sturtevant, and the Towns of Caledonia and Mt. Pleasant.*

and functions of these state and local agencies as they relate to the regional plan implementation may be found in SEWRPC Technical Report No. 6 (Second Edition), Planning Law in Southeastern Wisconsin, 1977, and in SEWRPC Planning Guide No. 4, Organization of Planning Agencies, 1964.

Local-Level Agencies

Statutory provisions exist for the creation at the county and municipal level of the following agencies that have certain planning and plan implementation powers important to regional plan adoption and implementation, including police, acquisition, condemnation, and construction powers.

County Park and Planning Agencies: County units of government have considerable flexibility available to establish agencies to perform the park and outdoor recreation and zoning and planning functions within the county. Counties may create park commissions or park and planning commissions pursuant to section 27.02 of the Wisconsin Statutes. In addition, counties also may elect to utilize committees of the county board to perform the park and outdoor recreation and zoning and planning functions. No matter which organizational structure is chosen, the basic plan implementation powers available are essentially the same. If, however, a county elects to establish a county park or county park and planning commission, these commissions have the obligation to prepare a county park system plan and a county street and highway system plan. There is no similar mandate when a county elects to handle these functions through committees of the county board.

Three counties in the Region—Walworth, Washington, and Waukesha Counties—have chosen to combine the park and outdoor recreation function and the planning and zoning function within a county park and planning commission having full zoning, subdivision plat review, and park planning and development functions. In Milwaukee County, there is a County Park Commission with full authority and responsibility for park and parkway acquisition, development, operation, and maintenance. Because Milwaukee County contains no unincorporated area, there is no county zoning authority. The Milwaukee County Park Commission, however, does perform a limited subdivision review function for subdivision plats lying in or adjacent to, proposed park and parkway development. Milwaukee County also has established a County Planning Commission to perform, essentially, a capital budgeting and programming function. This planning commission reviews all requests for capital improvements by Milwaukee County agencies, including those of the Park Commission.

In Racine County, the zoning and subdivision plat review functions are assigned to the County Land Use, Agricultural, Environmental and Extension Education Committee, which retains a professional staff. Responsibility for park and parkway acquisition and development is assigned to the Racine County Highway and Parks Committee, which also has a separate staff with sole responsibility for park and parkway acquisition, development, operation, and maintenance. Close cooperation between the Parks Department and the Planning and Zoning Department, it should be noted, have resulted in the effective coordination of the park and outdoor recreation and planning and zoning functions within Racine County.

In Kenosha County, responsibility for park and parkway acquisition, development, operation, and maintenance rests with the County Park Commission. The zoning and plat review functions in Kenosha County are assigned to the zoning administrator under the supervision of the County Zoning Committee.

Ozaukee County has established a County Park Commission with responsibility for park acquisition, development, operation, and maintenance. Ozaukee County has generally elected to leave the planning and zoning functions at the municipal level of government. The County has, however, enacted a shoreland and floodland zoning ordinance which is administered by the zoning administrator under the County Zoning Committee.

Implementation of the regional land use plan is best accomplished through a coordinated program of public land use regulation and public land acquisition and development activities. At the county level such coordination may best be achieved by combining the responsibilities for land use regulation and park functions within a single park and planning commission. In addition to having the obligation to prepare a county park system plan and a county street and highway system plan, county park and planning commissions may prepare and administer county shoreland, floodland, and comprehensive zoning ordinances and administer county land subdivision review functions. Such commissions are empowered to acquire, develop, maintain, and operate county parks and other open space land. The existence of a county park and planning commission in each county in the Region is, therefore, highly desirable for effective implementation of the recommended land use plan.

Accordingly, it is recommended that in Kenosha, Ozaukee, and Racine Counties, the county board of supervisors consider the re-creation and reconstitution of existing park and planning agencies, assigning to the reconstituted agencies all of the duties and functions relating to planning, zoning, subdivision plat review, and modified official mapping and to county park acquisition and development. A model ordinance for creating a county park and planning commission may be found in Appendix E of SEWRPC Planning Guide No. 4, Organization of Planning Agencies, 1964. Sections 27.03(2), 27.06, and 59.97 of the Wisconsin Statutes provide for the staffing and financing of such commissions. It should be noted that the recommendations for these three counties to reconstitute the park and planning functions within one department are flexible, allowing each county to decide upon the best organizational structure for implementing its park and land use development objectives.

Soil and Water Conservation Districts: These districts have the authority to develop comprehensive plans for the conservation of soil and water resources, prevention of soil erosion, and prevention of floods. Moreover, these districts have the authority to request that their county board of supervisors adopt special land use regulations that would provide for implementation of such plans in unincorporated areas. These districts have the power to acquire through eminent domain any property or rights therein for watershed protection; soil and water conservation; flood prevention works; and fish and wildlife conservation and recreational works, all of which may be construed under federal Public Law 83-566, as amended, as part of a watershed plan implementation program. The importance of proper soil and water conservation and management practices in successful attainment of the regional developmental objectives cannot be overemphasized. Lack of such practices may have a critical adverse effect upon the agricultural and environmental corridor land use plan elements. All seven counties within the Southeastern Wisconsin Region have created soil and water conservation districts under Section 92.05 of the Wisconsin Statutes, and have executed a basic and supplemental memorandum of understanding with the U. S. Department of Agriculture, Soil Conservation Service, for technical assistance.

Municipal Planning Agencies: These agencies include city, village, and town park boards and plan commissions created pursuant to Sections 27.08, 27.13, 62.23(1), 61.35, and 60.18(12) of the Wisconsin Statutes. These agencies may supplement the actions of the county park and planning commission in implementation of the various elements of the recommended plan. A discussion of the extent and limitations of the power of these various agencies may be found in SEWRPC Planning Guide No. 4, Organization of Planning Agencies, 1964.

It is recommended that those cities, villages, or towns without plan commissions created in accordance with Section 62.23 of the Wisconsin Statutes create such commissions. A model ordinance and resolution creating such commissions and giving towns power to create such commissions is provided in Appendices D and F of the above-cited planning guide.

It is also suggested that cities and villages whose corporate limits abut unincorporated areas consider the creation of joint extraterritorial zoning committees in cooperation with the adjacent towns, pursuant to Section 62.23(7a) of the Wisconsin Statutes, for the purpose of joint land use planning and zoning in areas of mutual interest.

Municipal Water and Sanitary Districts: These districts may be created by towns, villages, and cities pursuant to Sections 60.072, 60.30, 61.36, 62.18, and 198.22 of the Wisconsin Statutes and are authorized to plan, design, construct, operate, and maintain various public sanitary sewer and water supply systems.

County Highway and Transportation Committees: These committees are responsible for the administration and expenditure of all county funds for highway construction and maintenance and are empowered to establish and change the county trunk highway system, subject to the approval of the Wisconsin Department of Transportation; to cooperate with that Department in the selection of a system of federal aid secondary roads; and to acquire land for county highway purposes by purchase or condemnation. All seven counties within the Southeastern Wisconsin Region have established highway or highway and transportation committees in accordance with Section 83.015 of the Wisconsin Statutes. Milwaukee County's committee is also responsible for administering county expenditures for airports and other public works. In addition, Milwaukee County has established a County Expressway and Transportation Commission pursuant to Section 59.965(2) of the Wisconsin Statutes which is empowered to plan a county expressway (freeway) and mass transit system, to coordinate all freeway and mass transit planning and construction within the County, to acquire land for and construct such an expressway and mass transit system, and to cooperate with public and private agencies in mass transit and expressway applications.

Areawide Agencies

Statutory provisions exist for the creation of the following multicounty or metropolitan agencies having both general and specific planning and plan implementation powers important to implementation of the regional plan. Of the several areawide agencies discussed below, only statutory provisions for metropolitan transit authorities have not been utilized in the Region to date.

Metropolitan Sewerage Commissions: These commissions are empowered to plan sanitary sewer and stormwater drainage systems and to construct such systems over large areas which include many units of government. The Metropolitan Sewerage Commission of the County of Milwaukee, created pursuant to Section 59.96 of the Wisconsin Statutes, has jurisdiction over all of Milwaukee County except the City of South Milwaukee, including areas outside the County but in the same gravity drainage area as Milwaukee County. Other metropolitan sewerage commissions may be created pursuant to Section 66.22 of the Wisconsin Statutes and may include contiguous municipalities. The Metropolitan Sewerage Commission of the County of Milwaukee is extremely important to regional plan implementation, particularly to the pollution abatement and flood control activities and to the provision of the sanitary sewerage services to a large area of the Region.

Cooperative Contract Commissions: Section 66.30 of the Wisconsin Statutes provides that municipalities[3] may contract with each other to provide jointly any services or exercise jointly any powers that such municipalities may be authorized to provide or exercise separately.

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[3] *The term municipality under this section of the Statutes is defined to include the state and any agency thereof, cities, villages, towns, counties, school districts, and regional planning commissions.*

Such commissions have been given bonding powers for the purposes of acquiring, developing, and equipping land, buildings, and facilities for areawide projects. Significant economics can often be effected through providing governmental services and facilities on a cooperative, areawide basis. Moreover, the nature of certain developmental and environmental problems often requires that solutions be approached on an areawide basis. Such an approach may be sufficiently and economically provided through the use of a cooperative contract commission.

Good examples of the use of a cooperative contract commission are the Underwood Sewer Commission, cooperatively established by contract between the City of Brookfield and the Village of Elm Grove for the purpose of providing for the construction, operation, and maintenance of a sanitary interceptor sewer along Underwood Creek, and the Menomonee South Sewerage Commission, established cooperatively between the City of Brookfield and the Village of Menomonee Falls for the purpose of providing for the construction, operation, and maintenance of a sanitary intercepting sewer along Butler Ditch. Another example of a cooperative contract commission is the North Shore Water Commission, created to plan, design, construct, and operate a water supply system for the City of Glendale and the Villages of Fox Point and Whitefish Bay in Milwaukee County.

The intergovernmental cooperation under such cooperative contract commissions may range from the sharing of expensive public works equipment to the construction, operation, and maintenance of major public works facilities on an areawide basis. Such cooperative contract commissions may be delegated to specific areawide plan implementation powers by the local units of government and, as such, could become important agencies for implementing certain functional elements of the comprehensive plan for the physical development of the Region. A model agreement creating a cooperative contract commission is provided in Appendix A of SEWRPC Technical Report No. 6 (First Edition), Planning Law in Southeastern Wisconsin, 1966.

Transit Commissions and Boards: Transit commissions can be established by cities and are empowered to establish, maintain, and operate a public transportation system, the major portions of which are within the city. Within the Region, the City of Kenosha has created a transit commission pursuant to Section 66.943 of the Wisconsin Statutes. The City of Racine created a Transit-Parking Commission under Section 66.06 which is similar to a transit commission with the addition of parking responsibilities. The existence of the Geneva Lake Area Joint Commission is presently authorized under Section 66.30 of the Wisconsin Statutes, and provides transit service within Walworth County and northern Illinois. Transit boards may be established by counties and are empowered to establish, maintain, and operate a public transportation system within that county and any contiguous or cornering counties. Milwaukee County has established a transit board pursuant to Section 59.968 of the Wisconsin Statutes.

Metropolitan Transit Authority: Such an authority, if created pursuant to Section 66.94 of the Wisconsin Statutes, would have the power to acquire, construct, and operate a public transportation system, and would have the power of eminent domain within a district which would include all of Milwaukee County and those units of government located in adjacent counties through and into which the transportation system would extend. Such an authority does not have any powers of taxation. It can, however, issue revenue bonds. No such authority presently has been activated within the Region. The creation of such an authority is recommended only if experience indicates that the modified rapid transit elements of the recommended regional transportation plan cannot be fully implemented by the Milwaukee County Expressway and Transportation Commission in cooperation with existing entities. Due to the limited powers of such authorities, specifically revenue generation through taxation, the Milwaukee County Board established a Transit Board as previously noted to provide for the acquisition and operation of the privately owned and operated transit system. The timeliness of the acquisition precluded the necessary revision to Section 66.94 which was determined necessary to provide the required funding authority.

Regional Planning Commission: Although not a plan implementation agency, one other areawide agency warrants discussion herein: the Regional Planning Commission itself. This Commission, created by the Governor in cooperation with the seven constituent county boards under Section 66.945 of the Wisconsin Statutes, is empowered to prepare and adopt a master plan for the physical development of the Region. It has no statutory plan implementation powers. Its powers are limited to publicizing plans; issuing reports; providing community planning assistance; contracting with the local units of government to do planning; acting for a state agency or local unit of government, with approval of that agency or unit, in reviewing and approving subdivision plats and administration of shoreland zoning ordinances; and reviewing the location of or acquisition of land for any of the elements or facilities which are included in the adopted regional plan.

Although it has no statutory plan implementation powers, a regional planning commission may be able to assert indirect leverage for the implementation of its plans by being designated a reviewing agency for applications for federal or state grants-in-aid. Examples of such indirect plan implementation are the review of federal grant applications under the U. S. Office of Management and Budget Circular A-95 and the review of applications for state Outdoor Resources Action Plan (ORAP) funds.

State-Level Agencies

There exist at the state level the following agencies that have either general or specific planning authority and certain plan implementation powers important to adoption and implementation of the recommended regional plans.

Wisconsin Department of Administration: The Wisconsin Department of Administration was established to coordinate management services and assist the other agencies of state government. The Department of Administration, Office of State Planning and Energy, in particular, has an important role in coordinating state government activities relating to land use. Among the responsibilities associated with this role are the evaluation of land use regulatory programs to prevent unnecessary review procedures, the review of state policies on extension of public services to ascertain their effect on promoting sound patterns of land use, and the development of a land use information system that will satisfy the needs of state agencies and local governments. Another major coordinating effort by the Office of State Planning and Energy involves administration within Wisconsin of the federally sponsored Coastal Zone Management Act of 1972.[4] The initiation of this program is part of an overriding concern for the misuse of Wisconsin's coastline bordering on the Great Lakes which stems in large part from the lack of appropriate alternatives that an effective planning process could supply. In an effort to combat this situation, the Office of State Planning and Energy has been designated as the lead agency to assist state, regional, and local levels of government in developing guidelines for balancing appropriate uses of the coastal zone. Finally, the Office of State Planning and Energy serves as the state clearinghouse for the review of federal grants and the coordination of federally supported programs, under the authority of the U. S. Office of Management and Budget Circular A-95.

Wisconsin Department of Natural Resources: This Department has broad authority and responsibility in the areas of park development, natural resource protection, water quality control, and water regulations. The department has the obligation to prepare a comprehensive statewide plan for outdoor recreation and to develop long-range, statewide conservation and water resource plans; the authority to designate such sites, as necessary, to protect, develop, and regulate the uses of state parks, forests, fish, game, lakes, streams, certain plant life, and other outdoor resources; the authority to acquire conservation and scenic easements; and the authority to administer the federal grant program known as the Land and Water Conservation Fund (LAWCON) within the State, as well as the park and open space grant funds available under the state Outdoor Resources Action Plan (ORAP) Program. The Secretary of the Department has, pursuant to federal planning guidelines, the responsibility of certification of river basin, regional, and metropolitan plans for water quality management prior to submission to the U. S. Environmental Protection Agency (EPA). Without such certification and subsequent acceptance by the EPA, local units of government within the Region would lose their eligibility for federal grants-in-aid for the construction of sewerage facilities.

The Department also has the obligation to establish standards for floodplain and shoreland zoning and the authority to adopt, in the absence of satisfactory local action, shoreland and floodplain zoning ordinances as well as the authority to prohibit the installation or use of onsite soil absorption sewage disposal systems and to approve the regulation of such systems as promulgated by the Wisconsin Department of Health and Social Services.

The Department, in accordance with the provisions of the federal Clean Air Act, must adopt and enforce ambient air quality standards for particulate matter, sulfur oxides, carbon monoxide, nitrogen dioxide, hydrocarbons, and photochemical oxidants at a level at least as stringent as the established National Ambient Air Quality Standards. For that purpose, the Department is charged with the preparation of a State Implementation Plan to Achieve Air Quality Standards which is to contain measures for the attainment of the standards in as timely a manner as possible, and for the maintenance of the standards for at least 10 years. The Regional Planning Commission continues to actively support the Department's air quality program through the development of a regional air quality maintenance plan for southeastern Wisconsin which is intended to provide the basis for the State Implementation Plan to Achieve Air Quality Standards.

In addition, the Department has the authority to regulate water diversions, shoreland grading, dredging, encroachments, and deposits in navigable waters; authority to regulate construction of neighboring ponds, lagoons, waterways, stream improvements, and pierhead and bulkhead lines; authority to regulate the construction, maintenance, and abandonment of dams; authority to regulate water levels of navigable lakes and streams and lake and stream improvements, including the removal of certain lake bed materials; and authority to require abatement of water pollution, to administer state financial aid programs for water resource protection, to assign priority for federal aid applications for sewage treatment plants, to review and approve water supply and sewerage systems, and to license well drillers and issue permits for high-capacity wells. With such broad authority for the protection of natural resources of the State and the Region, this Department will be extremely important to the implementation of many of the major elements of the comprehensive regional land use plan.

The Department of Local Affairs and Development: A major objective of this Department is to promote comprehensive planning programs by local and regional entities which would initiate development projects and encourage solutions to areawide problems. In accordance with this objective, the Department conducts an extensive program of technical assistance to local units of government in planning and planning-related matters. Other responsibilities of the Department include the administration of state platting regulations under Chapter 236 of the Wisconsin Statutes; review of county plans for solid waste management; and review of petitions for incorporation and consolidations of villages and cities.

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[4] *Statute 86, Public Law 92-583 (1972).*

This Department has also been empowered to consult with the Wisconsin Department of Industry, Labor and Human Relations in the formulation of standards for decent, safe, and sanitary dwelling accommodations which could have a significant impact on planning for residential development throughout the State.

Wisconsin Department of Health and Social Services: This Department has the authority to review subdivision plats not served by public sanitary sewerage systems and to regulate private onsite soil absorption sewage disposal systems.

Wisconsin Board of Soil and Water Conservation Districts: This board, on behalf of the State, coordinates and assists the programs of the county soil and water conservation districts concerned with the proper development, use, and protection of soil, water, and related natural resources: apportions among the districts any funds allotted from state or federal sources; approves district sponsorship of federally assisted watershed projects authorized under Public Law 566; and approves the participation of drainage boards in federally assisted water management projects.

Wisconsin Department of Transportation: The Wisconsin Department of Transportation is authorized to preserve and improve mass transit systems within the State and to provide the State with an integrated highway transportation system. The Department is charged with responsibility for administering all state and federal aids for highway improvements; for the planning, design, construction, and maintenance of all state trunk highways; and for planning, laying out, revising, constructing, reconstructing, and maintaining the national system of interstate and defense highways, the federal aid primary system, the federal aid secondary system, and the federal aid urban system, the latter four functions all being subject to federal review and regulation. The Department is also responsible for reviewing county trunk highway routes in order to assure that these routes form an integrated system of county trunk highways between adjoining counties. The Department is authorized to enter into cooperative agreements with the governing bodies of any county, city, village, or town, or with the federal government, respecting the financing, planning, establishment, improvement, maintenance, use, regulation, or vacation of highways within their respective jurisdiction.

Specifically, three sections of the Wisconsin Statutes, when considered together, provide the basis for what might be considered a master plan for the state trunk highway system. One of these sections directs the preparation of county maps showing the official layout of the state trunk highway system. The second permits marked and traveled locations to differ from the official locations and thereby allows the official layout maps to function in some instances as plans. Indeed, it appears that these official layout maps were originally regarded as master plans for the state trunk highway system. Special legislative committees, whose function was to periodically study and revise the entire state trunk highway system, apparently functioned in 1917, 1919, 1923, and for the last time in 1934, and their work is reflected on the official layout maps. Since 1934, all consideration of changes in the system has been on a piecemeal, ad hoc basis by the State Highway Commission, the predecessor agency to the Department of Transportation, acting pursuant to the provisions of Chapter 84 of the Wisconsin Statutes, or by action of the State Legislature itself, as provided by Chapter 518, Laws of 1947; Chapter 475, Laws of 1949; Chapter 75, Laws of 1953; Chapters 369 and 371, Laws of 1955; Chapters 596, 597, and 598, Laws of 1961; and Chapter 348, Laws of 1971. The third permits the Department to establish locations and right-of-way widths for future freeways or expressways and to protect the rights-of-way for these facilities from development. It is also apparent that the various federal aid systems in and of themselves constitute long-range plans insofar as they tend to coordinate the expenditure of federal highway aid monies.

The planning and programming procedure developed by the Department within this legislative framework determines when and where the various improvement projects will be accomplished on the existing state trunk highway system and establishes standards for such determination. The procedure provides an orderly and effective device whereby the many complex and highly interrelated tasks involved in the final accomplishment of modern highway improvement projects—tasks such as route location, including necessary mapping and preliminary engineering; implementation of legal changes in the state trunk highway routes, including necessary public hearings, detailed design and final engineering, acquisition of right-of-way, preparation of construction plans, specifications, and cost estimates, and letting of contracts; and actual construction, including layout, inspection, and final surveys—can be carried out, and as such, the procedure constitutes an effective current planning program.

The Department is also empowered to review and regulate subdivision plats along state trunk highways outside the corporate limits of the City of Milwaukee and, as previously noted, is empowered to prepare official maps of future freeway and expressway routes. The Department, through its administration of federal and state highway aids to local units of government and through its highway design and engineering functions, exerts a powerful influence on street and highway system planning and development within Wisconsin and is probably the single most important agency to highway system plan implementation.

Wisconsin Department of Agriculture: Among the many responsibilities of the Wisconsin Department of Agriculture, most important to the implementation of the regional land use plan is the administration of the state Farmland Preservation Program through which farmers may be eligible for income tax credits to offset excessive property tax on farmland which they want to maintain in agricultural use. This program was enacted in the Farmland Preservation Act, Wisconsin Statutes Chapter 91 (1977). This program could contribute signifi-

cantly to the attainment of the agricultural land preservation objectives of the regional land use plan by reducing the burden to farmers of high property tax assessments which might otherwise force them to give up their lands to urban development.

Wisconsin Department of Business Development: The Wisconsin Department of Business Development coordinates, assists, and promotes the economic development of the state. The Department provides assistance to commercial, industrial, and recreational developers and to small and minority business enterprises.

Federal-Level Agencies

There exists at the federal level the following agencies which administer federal aid programs that will have important effects upon the implementation of the recommended regional plan because of the potential impact on the financing of both actual land acquisition and the construction of specific facilities.

U. S. Department of Housing and Urban Development: This agency administers the federal comprehensive planning assistance program, the federal Flood Insurance Program, various federal housing assistance programs, the federal Community Development Block Grant Program, and the federal Urban Development Action Grant Program. The Community Development Block Grant Program—under which grants are available to local units of government for a broad range of activities including the provision of public utilities and facilities, economic development activities, and housing and neighborhood rehabilitation—can be important to implementation of the regional land use plan both in fully developed and developing communities.

U. S. Department of the Interior, Heritage Conservation and Recreation Service: This agency administers park and open space acquisition and development grants through the federal Land and Water Conservation Fund Program. The program is administered in Wisconsin through the Wisconsin Department of Natural Resources. Grants under this program can be particularly important to implementation of the outdoor recreation and open space preservation elements of the regional land use plan.

U. S. Department of Agriculture, Soil Conservation Service: This agency administers resource conservation and development projects and watershed projects under federal Public Law 566 and provides technical and financial assistance through county soil and water conservation districts to landowners in the planning and construction of measures for land treatment, agricultural water management, and flood prevention and for public fish, wildlife, and recreational development. This agency also conducts detailed soil surveys and provides interpretations as a guide to utilizing soil survey data in local planning and development.

U. S. Department of Agriculture, Agricultural Stabilization and Conservation Service: This agency administers the federal Agricultural Conservation Program (ACP) which provides grants to rural landowners in partial support of carrying out approved soil, water, woodland, wildlife, and other conservation practices. These grants are awarded under yearly and long-term assistance programs, providing guaranteed funds for carrying out approved conservation work plans.

U. S. Environmental Protection Agency: This agency administers water quality management planning grants and grants for sanitary sewage treatment plant and related pollution control facilities. In addition, this agency is responsible for the ultimate enforcement of water quality standards of interstate waters, should the states not adequately enforce such standards. Under guidelines promulgated by this agency, river basin, regional, and metropolitan water quality management plans are required as a condition of the approval and award of federal grants-in-aid for the construction of sewerage facilities.

The U. S. Environmental Protection Agency is also charged with administering Section 208 of the 1972 Federal Water Pollution Control Act. As a designated agency under that program, the Regional Planning Commission is involved in the water quality planning and management program for southeastern Wisconsin which intended to update, extend, and refine the previous studies and plans completed by the Commission and in so doing, fully meet the requirements of Section 208 of the Federal Water Pollution Act.

Further, the U. S. Environmental Protection Agency has the responsibility to enforce the provisions of the Clean Air Act of 1963 and its subsequent amendments of 1965, 1970, and 1977. Pursuant to this federal legislation, the Regional Planning Commission, together with the Wisconsin Department of Natural Resources, is preparing a regional air quality maintenance plan for southeastern Wisconsin which will provide for the timely attainment and long-term maintenance of the established state and federal ambient air quality standards within the Region.

U. S. Department of Agriculture, Farmers Home Administration: This agency administers water and wastewater disposal facility construction grants and loans for rural areas and rural housing loans and grants.

U. S. Department of Transportation, Federal Highway Administration: The U. S. Department of Transportation, Federal Highway Administration, administers all federal highway aid programs, working through the Wisconsin Department of Transportation, Division of Highways. The Federal Highway Administration must approve all changes in the federal aid systems and will, in this respect, have an important role in implementation of the highway element of the recommended transportation system plan for the Region.

U. S. Department of Transportation, Urban Mass Transportation Administration: The U. S. Department of Transportation, Urban Mass Transportation Administration, provides financial aid to urban mass transit systems through a comprehensive matching grant program. The two major categories of financial assistance through

matching grants are transit system capital expenditures and transit system operating assistance. Matching grants are also available for urban mass transit demonstration projects and associated technical studies.

PLAN ADOPTION AND INTEGRATION

Upon adoption of the new regional land use and transportation plans by formal resolution of the Southeastern Wisconsin Regional Planning Commission, in accordance with Section 66.945(10) of the Wisconsin Statutes, the Commission will transmit a certified copy of the resolution and adopted plan to all local legislative bodies within the Region and to all of the aforesaid existing state, local, areawide, and federal agencies.

Endorsement, adoption, or formal acknowledgment and integration of these plans by the local legislative bodies and the existing local-, areawide-, state-, and federal-level agencies involved is highly desirable and in some cases necessary to assure a common understanding between the several government levels and to enable their staffs to program the necessary implementation work. In some cases, formal adoption is required by the Wisconsin Statutes before certain public plan implementation actions can proceed, as in the case of city, village, and town plan commissions created pursuant to Section 62.23 of the Wisconsin Statutes. Adoption of the new regional land use and transportation by units and agencies of government that have adopted the initial year 1990 regional land use and transportation plans will serve to substitute the new plans for the old.

It is extremely important to understand that adoption of the recommended regional plans by any unit or agency of government pertains only to the statutory duties and functions of the adopting agency, and such adoption does not and cannot in any way preempt action by another unit or agency of government within its jurisdiction. Thus, adoption of the regional plan by a county would make the plan applicable as a guide, for example, to county highway and park system development but not to municipal street and park development. To make the plan applicable as a guide to municipal street and park development would require its adoption by the municipality concerned.

Local-Level Agencies

1. It is recommended that the seven county boards formally adopt the recommended regional land use plan as it affects each county, as authorized by Section 66.945(12) of the Wisconsin Statutes, after recommendation by the respective county park and planning agencies as a guide to future land use development within the county. The plans should be adopted as county development plans pursuant to Section 59.97(3)(d) of the Wisconsin Statutes.

2. It is recommended that the seven county soil and water conservation districts adopt the recommended regional land use plan, particularly the agricultural and environmental corridor land use elements, so as to lay a broad, well-defined basis for the development of comprehensive conservation plans under Section 92.08(4) of the Wisconsin Statutes and to assure eligibility for tax relief and technical and financial assistance. It is further recommended that all seven districts adopt a policy requesting those state and federal agencies assisting the districts to provide only such soil and water conservation planning and management assistance as would serve to implement the recommended regional land use plan, particularly attainment of compatible land uses in areas designated on the plan as agricultural and environmental corridors, and for urban expansion.

3. To supplement the afore-recommended county actions, it is suggested that the planning commissions of cities, villages, and towns in the Region adopt the recommended regional plan as authorized by Section 66.945(12) of the Wisconsin Statutes as a guide to physical development in their area of jurisdiction. The plans should be adopted by the local planning commissions as local master plans pursuant to Section 62.23(3)(b) of the Wisconsin Statutes. While Wisconsin Statutes do not require adoption of local master plans by the local governing body, the Regional Planning Commission recommends that city councils, village boards, and town boards adopt such local master plans as a matter of endorsing the local planning commission action.

4. It is desirable that the governing bodies of all municipal water and sanitary districts and utilities formally acknowledge the recommended regional land use plan, particularly the residential land use elements, and determine their utility service areas in accordance with such plan.

5. It is recommended that the seven County Highway or Highway and Transportation Committees refine, adopt, and integrate the recommended regional transportation plan—as a functional plan—into the county highway system where applicable as a guide to future highway and transit facility development within the county. It is further recommended that, upon approval of the regional transportation plan by the Milwaukee County Board, the Milwaukee County Expressway and Transportation Commission adopt and integrate the recommended freeway and modified rapid transit elements of the regional transportation plan—as these affect Milwaukee County—into the county expressway plan as authorized by Section 59.965(5) of the Wisconsin Statutes.

Areawide Agencies

1. It is recommended that the Milwaukee Sewerage Commission of the County of Milwaukee, the Western Racine-Metropolitan Sewerage Com-

mission, the Walworth County Metropolitan Sewerage Commission, and any other metropolitan sewerage commissions created subsequent to the publication of this report formally acknowledge the recommended regional land use plan, particularly the residential land use element, in the determination of their service areas. It is further recommended that the Metropolitan Sewerage Commission of the County of Milwaukee formally indicate those areas outside the district limits that the Commission would be willing to provide with sewerage service pursuant to the recommended plan under contracts authorized by Section 59.96(9)(c) of the Wisconsin Statutes.

2. It is recommended that existing cooperative contract commissions and any cooperative contract agencies subsequently created formally acknowledge the recommended regional plans in regard to the exercise of their specific powers and duties.

3. It is recommended that the City of Racine and City of Kenosha Transit-Parking Commissions, and the Milwaukee County Transit board, adopt and integrate the recommended regional transportation plan as a guide to mass transit facility and services development within their jurisdiction.

4. It is recommended that, if a Metropolitan Transit Authority is activated, this Authority, as one of its early actions, adopt, refine, and integrate the recommended regional transportation plan, particularly the recommendations for mass transit facility development and service.

State-Level Agencies

1. It is recommended that the Wisconsin Natural Resources Board endorse the regional land use plan and direct its staff in the Wisconsin Department of Natural Resources to integrate the recommended land use plan elements into its broad range of agency responsibilities, as well as to assist in coordinating plan implementation activities during the plan design period. In particular, it is recommended that the Natural Resources Board endorse the recommended outdoor recreation and open space subelements and direct its staff to integrate these plan elements into the long-range conservation and comprehensive outdoor recreation plans authorized by Section 23.09(7) of the Wisconsin Statutes and required by the Federal Land and Water Conservation Act. It is further recommended that the Board, through its staff, coordinate the recommended regional land use plan with its activities relating to floodland and shoreland zoning. It is also recommended that the Board and its staff consider and give due weight to the recommended land use plan in the exercise of their various water regulatory powers; in the exercise of their air quality planning and regulatory functions; and in the review of sanitary sewerage system improvements including the construction or expansion of sewage treatment plants and the extension of sewer service areas. It is further recommended that the Board adopt the detailed soils data and analysis prepared by the U. S. Department of Agriculture, Soil Conservation Service, as a guide in regulating soil absorption sewage disposal systems.

2. It is recommended that the Wisconsin Department of Local Affairs and Development endorse the recommended regional land use plan and integrate the plan into its activities with respect to the provision of technical assistance to local units of government and with respect to reviewing subdivision plats.

3. It is recommended that the Wisconsin Board of Health and Social Services endorse the land use plan—in particular, the residential land use element—and direct its staff to follow the plan recommendations in the exercise of its subdivision plat review and approval powers created by Section 36.13(2)(m) of the Wisconsin Statutes. It is further recommended that the Board direct its staff to utilize the detailed soil survey prepared by the U. S. Department of Agriculture, Soil Conservation Service, as a guide in reviewing and objecting to subdivision plats, in accordance with Section 236.12 of the Wisconsin Statutes.

4. It is recommended that the Wisconsin Board of Soil and Water Conservation Districts endorse the recommended regional land use plan, particularly the agricultural land use and environmental corridor elements, and use the plan in its efforts to coordinate the county soil and water conservation district program and projects, as required in Section 92.04(4)(c) of the Wisconsin Statutes.

5. It is recommended that the Wisconsin Department of Transportation endorse the recommended regional transportation plan. It is further recommended that the Department integrate the recommended regional transportation plan, including the recommendations for the staged construction and jurisdictional responsibilities thereof, into the state long-range highway system plans as authorized by Sections 84.01, 84.02, and 84.025 of the Wisconsin Statutes, as a functional guide to highway system development within the Region.

6. It is recommended that the Wisconsin Department of Agriculture acknowledge the regional land use plan, particularly the agricultural land element, and utilize it in the administration of the state Farmland Preservation Program.

7. It is recommended that the Wisconsin Department of Business Development endorse the recommended regional land use and transportation plans, and support implementation of the plans in its economic development activities.

Federal-Level Agencies

Under the provisions of federal legislation enacted in the late 1960's,[5] applications by local units of government for federal grants in partial support of the planning of, acquisition of land for, and the construction of such public facilities as highways and other transportation facilities, sewerage and water supply systems, parks, airports, waste treatment works, schools, libraries, water development, land conservation projects, and hospitals must be submitted to an areawide planning agency for review, comment, and recommendations before consideration by the federal administering agency. The comments and recommendations of the areawide planning agency shall include information concerning the extent to which the proposed project is consistent with the comprehensive planning program for the Region and the extent to which such project contributes to the fulfillment of the planning program. The review, comments, and recommendations by the areawide planning agency are entirely advisory to both the local and federal agencies of government concerned and are intended to provide a basis for achieving the necessary coordination of public development programs in urbanizing regions. If used properly, such review can be of material assistance in achieving implementation of the recommended regional land use and transportation plans.

1. It is recommended that the U. S. Department of Housing and Urban Development endorse the regional land use plan and utilize the plan in the administration and granting of federal aid for community development and in the administration of its comprehensive planning assistance and flood insurance programs.

2. It is recommended that the U. S. Department of the Interior, Heritage Conservation and Recreation Service, formally acknowledge the regional plans, especially the environmental corridors and the regional recreational sites in the administration and granting of federal aids under the Land and Water Conservation Fund Act.

3. It is recommended that the U. S. Department of Agriculture, Soil Conservation Service, formally acknowledge the regional plans and utilize the plan recommendations in its administration and granting of federal aids for resource conservation and development and multiple-purpose watershed projects and in its provision of technical assistance to landowners and operators for land and water conservation practices.

4. It is recommended that the U. S. Department of Agriculture, Agricultural Stabilization and Conservation Service, formally acknowledge the regional plans and utilize the plans, recommendations in the administration of its Agricultural Conservation Program, with particular respect to the various agricultural land management measures and practices.

5. It is recommended that the U. S. Environmental Protection Agency formally acknowledge the regional land use plan; utilize the plan recommendations in the administration and granting of federal aid for sewage treatment plants and related facilities; and consider and give due weight to the recommended plan in the exercise of its air quality regulatory functions and in the administration of its air quality programs.

6. It is recommended that the U. S. Department of Agriculture, Farmers Home Administration, formally acknowledge the recommended regional plans, particularly the agricultural and residential land use elements and their related population forecasts, in the administration and granting of loans and grants-in-aid for rural water and waste disposal facilities and for housing.

7. It is recommended that the U. S. Department of Transportation, Federal Highway Administration, through the Wisconsin Department of Transportation formally acknowledge the recommended regional plans, particularly the highway transportation elements, in the administration and granting of federal aids for highway and highway-related construction within the Region.

8. It is recommended that the U. S. Department of Transportation, Urban Mass Transportation Administration, formally acknowledge the recommended regional plans, particularly the urban mass transit facility and service elements, in the administration and granting of federal aids for transit development and operations within the Region.

Subsequent Adjustment of the Plan

No plan can be permanent in all of its aspects or precise in all of its elements. The very definition and characteristics of "regional planning" suggest that a regional plan, to be viable and of use to local, state, and federal units and agencies of government, be continually adjusted through formal amendments, extensions, additions, and refinements to reflect changing conditions. The Wisconsin Legislature clearly foresaw this when it gave to regional planning commissions the power to "amend, extend, or add to the master plan or carry any part or subject matter into greater detail" under Section 66.945(9) of the Wisconsin Statutes.

Amendments, extensions, and additions to the regional plan will be forthcoming, not only from the work of the Commission under the continuing regional land use-transportation study but also from statewide plans and from federal agencies as national policies are established or modified, new programs created or existing programs expanded or curtailed, or even as nationwide general land use or transportation plan elements are prepared and adopted. This regional planning effort itself represents an amendment to the initial regional land use and transportation plans completed in 1966. Adjustments may come from subregional district and local planning programs

[5] *Intergovernmental Cooperation Act of 1968.*

which, of necessity, must be prepared in greater detail and result in greater refinement of the regional plans. Areawide adjustments may come from regional or state planning programs, which may include additional comprehensive or special-purpose planning efforts, such as the preparation of areawide sanitary sewer service area plans, regional water supply plans, or county park and highway plans. It should be noted that one specific recommendation of the new regional transportation plan involves a transportation study of the northwest travel corridor of the Milwaukee urbanized area—a study necessitated by the removal of the Park Freeway-West and Stadium Freeway-North "gap closure" from the staff-recommended new regional transportation plan. This study is expected to result in a formal amendment to the new regional transportation plan.

All of these adjustments and refinements will require the utmost cooperation between local, areawide, state, and federal agencies, as well as coordination by the Southeastern Wisconsin Regional Planning Commission, which has been empowered under Section 66.945(8) of the Wisconsin Statutes to act as a coordinating agency for programs and activities of the local units of government.

To most effectively and efficiently achieve this coordination between local, areawide, state, and federal programs and, therefore, assure the timely adjustment of the regional plans, it is recommended that all the aforesaid local, areawide, and state agencies having various plan and plan implementation powers transmit all subsequent planning studies, plan proposals and amendments, and plan implementation devices to the Southeastern Wisconsin Regional Planning Commission for consideration as to integration into, and adjustment to, the regional plans.

LAND USE PLAN IMPLEMENTATION

The implementation of the recommended regional land use plan is perhaps the singularly most important step toward the ultimate realization of the regional development objectives. It requires the most intricate implementation devices and the utmost in cooperation among the local units of government and the areawide, state, and federal agencies involved. It also requires careful detailing and refinement by the Regional Planning Commission and the local units of government working in close cooperation so as to insure the proper integration of the regional and local plans and the proper adjustment of the local plan implementation devices to the plans. For example, floodway and floodplain areas lying within the recommended environmental corridors should be determined, precisely delineated, and accurately mapped through careful engineering studies carried out as part of a comprehensive watershed planning program.[6] County park and open space needs and plan proposals to meet these needs should be determined.[7] Residential areas should be precisely planned and the supporting land uses, such as local parks, schools, and shopping areas implicitly contained within the residential land uses, should be explicitly identified and plan proposals to meet these needs prepared.

The most important land use plan implementation measures are summarized in this section. For convenience in presentation and use, this section has been divided into the following major subject areas: zoning ordinances, special land use regulations, open space acquisition, public development policies, and state and federal aid programs.

Zoning Ordinances

Of all the land use implementation devices presently available, perhaps the most important and most versatile is the application of local police power to control land use development through the adoption of appropriate zoning ordinances, including zoning district regulations and zoning district delineations. Zoning ordinances are most effectively utilized when prepared within the context of a local master plan, and preparation of land use plans by city, village, town, and county planning agencies should precede creation or amendment of zoning ordinances. Such local master plans should be formulated within the framework provided by the regional plans. At the county level, such a plan should place particular emphasis on refinement and detailing of the agricultural lands and primary environmental corridor lands recommended under the regional land use plan. At the local level, such a plan should delineate neighborhoods and special planning districts, such as community-level industrial and commercial centers.

City, village, town, and county zoning ordinances, including zoning district regulations and zoning district maps, should then be adopted or amended to implement the local land use plan. The zoning ordinances or amendments to existing zoning ordinances described in the following recommendations should be adopted by the appropriate local units of government within the Region so as to provide a clear indication of the intent to implement the recommended regional land use plan at the local level of government.

1. It is recommended that the county zoning agencies within the Region which have county zoning ordinances in effect formulate and recommend to their respective county boards amendments to the zoning ordinances in accordance with Section 59.97 of the Wisconsin Statutes, as necessary. These new zoning measures would serve to provide district regulations, including exclusive use districts similar to those provided in the

[6] *Such floodway and floodplain delineation and mapping has been completed for portions of the Root, Fox, Milwaukee, and Menomonee River watersheds and is underway for the Kinnickinnic River watershed under Commission watershed planning programs.*

[7] *Such county and local park and open space plans should be conducted within the context of the regional park and open space plan adopted by the Commission in 1977.*

SEWRPC Model Zoning Ordinance,[8] together with changes to zoning district maps, to reflect the recommended regional land uses.[9]

2. It is then recommended that these county boards adopt the pertinent amendments and changes, in accordance with Section 59.97(3) of the Wisconsin Statutes, and that the boards of all towns which have filed approval of the county zoning ordinances file certified resolutions approving such amendments and changes.

3. It is recommended that towns lying in counties which subsequently adopt a zoning ordinance similar to the SEWRPC model zoning ordinance approve such county zoning ordinance and file a certified copy of such approval in accordance with Section 59.97 of the Wisconsin Statutes.

4. It is further recommended that the plan commissions of all cities, villages, and towns which have not filed approval of the county zoning ordinance formulate and recommend to their respective governing bodies, as appropriate, new zoning ordinances or amendments to existing zoning ordinances in accordance with Sections 60.74 or 62.23(7) of the Wisconsin Statutes, as necessary. These new measures would serve to provide district regulations, including exclusive use districts similar to those provided in the SEWRPC Model Zoning Ordinance,[10] together with new zoning district maps or changes to existing zoning district maps, to reflect the recommended regional land uses.

5. It is then recommended that the respective municipal governing bodies adopt such ordinances or amendments thereto, including such district maps or changes thereto, pursuant to Sections 60.74 or 62.23(7) of the Wisconsin Statutes. The zoning of lands in certain unincorporated areas may be supplemented by the exercise of the extraterritorial zoning power of the cities and villages jointly with the towns, pursuant to Section 62.23(7)(a) of the Wisconsin Statutes.

The task of delineating zoning district boundaries to reflect the regional plan recommendations is as difficult as it is important. Proper delineation of the boundaries of the recommended regional land uses will require a careful study and thorough understanding of not only the local community plan recommendations of the local zoning agencies, but also the regional plan recommendations and their relationships to the local community. In this process, recommended environmental corridors must be delineated and broken down in appropriate districts, and recommended agricultural use areas must be delineated. Moreover, the delineation of the zoning districts to reflect immediately the recommended regional land use plan may result initially in overzoning which may, in turn, result in mixed and uneconomical future land use patterns. Therefore, the use of holding zones, such as exclusive agricultural districts or large estate-type residential districts, may be necessary so as to regulate community growth in both time and space in an orderly and economical manner. The following recommendations are made to all zoning agencies within the Region to assist them in the task of zoning ordinance preparation, including zoning district delineation.

Urban Residential Areas: Not all of the areas shown on the recommended regional land use plan as devoted to urban residential use (see the land use map in the pocket attached to the back cover of this volume) should initially be placed in residential use districts.[11] Only existing and platted, but not yet fully developed residential areas, as well as those areas that have immediate residential development potential and can be economically served by municipal utilities and facilities, such as sanitary sewer, public water supply, and schools, should be placed in exclusive residential districts and related to the development densities indicated on the recommended regional land use plan. The balance of the residential land use elements should be placed in a holding district, such as agricultural district zone. The use of these holding districts is discussed in SEWRPC Planning Guide No. 3, Zoning Guide, 1964. Such holding districts should be rezoned into the appropriate residential district or supporting land use districts, such as neighborhood business or park districts, only when the community can economically and efficiently accommodate the proposed development.

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[8] *See SEWRPC Planning Guide No. 3, Zoning Guide, April 1964. It is recognized that some progress has been made in carrying out this recommendation, particularly in Walworth County.*

[9] *Because all of Milwaukee County is contained within incorporated cities and villages, county zoning is no longer, under existing statutes, an effective device for achieving areawide land use regulations in this county. Ozaukee County has elected not to enact a comprehensive county zoning ordinance, leaving all zoning responsibilities, except shoreland and floodland zoning mandated by State Legislators, to the cities, villages, and towns within the county.*

[10] *Ibid., footnote 8.*

[11] *Suggested district regulations are specified in Appendix A of SEWRPC Planning Guide No. 3, Zoning Guide, April 1964. It should be noted that the recommended residential development densities shown on the regional land use plan can be achieved within each planned development unit by various combinations of lot sizes per dwelling unit and various housing structure types. Moreover, each residential development density specified on the plan encompasses a density range and, therefore, provides for considerable flexibility in the selection of local residential land use regulations while permitting attainment of the regional development objectives.*

It is important to recognize that residential zoning restrictions may have a significant influence on housing costs, and, therefore, on the locational choice of housing for moderate- and lower-income persons. To maximize locational choice, all urban communities, especially "developing" communities, should incorporate provisions for a full range of residential structure types—single-family, two-family, and multifamily—as well as a reasonable range of housing sizes within their zoning ordinances. Moreover, urban communities should incorporate provisions for a full range of residential lot sizes and include one or more residential districts specifying minimum lot sizes of no more than 7,200 square feet for single-family detached housing units and 8,000 square feet for two-family structures.

Rural Residential Areas: The plan recognizes that there will continue to be some demand for rural, or "country" living by nonfarm people. To a large extent, in past years this demand has been met through the development of subdivisions served by septic tanks and private wells with lot sizes ranging from one to three acres. The recommended regional land use plan seeks to discourage this kind of development since it represents neither rural nor urban development. Rather, the plan recommends that this portion of the housing market be satisfied through very low-density country estate-type development. Rural residential zoning districts accommodating such development should specify lot sizes of at least five acres per dwelling unit, and zoning districts should be delineated with proper attention to soil and other natural resource base limitations. Properly situated with respect to the natural resource base, such large lot rural residential development can be sustained without public sanitary sewer and water supply, and woodland and wetland areas can be preserved and wildlife habitat can continue to sustain itself in the area. Such large lot development can be accommodated without significant alteration of the natural drainage system. Also, this type of development permits the replacement of a malfunctioning septic system in a different portion of the lot.

Agricultural Areas: Areas which have been designated as prime agricultural lands and agricultural areas surrounding major scientific, educational, and recreation sites should be placed in exclusive agricultural use districts which essentially permit only agricultural uses. In such areas, dwellings should be permitted only as accessory to the basic agricultural uses. Commercial forests, prime wildlife habitat areas, wetlands, and floodways and floodplains within the agricultural areas should be placed in conservancy districts. Aesthetic forests, existing park sites, potential park sites, and other sites having high aesthetic or recreational value may be placed in park districts which would permit both public and private recreational facilities. Existing mineral extraction operations and those areas which have immediate extractive potential may be placed in quarrying districts which are carefully regulated as to operation and restoration.

In addition to the preservation of prime agricultural lands, the preservation of other general agricultural lands in the Region is also important to the economic well being, natural beauty, and the quality of life within southeastern Wisconsin. While such general agricultural lands may serve as a land reserve for urban expansion necessitated by growth in the regional population, these general agricultural lands should also be preserved insofar as possible, and the extent of conversion of general agricultural land to urban land use should be confined to that proposed under the adopted regional land use plan. The preservation of general agricultural lands should be accomplished through the use of agricultural and very low-density residential zoning districts which are designed to reflect community needs, the pattern of land ownership, and the suitability of land for farming.

Primary Environmental Corridors: The primary environmental corridors shown on the regional land use plan are generalized in nature and should be refined and detailed through county and local planning to identify more precisely the areas which ought to be preserved. Once refined in this manner, the regional primary environmental corridors should be placed immediately in one of several zoning districts, as dictated by consideration of existing development; the character of specific resource values to be protected within the corridor; and the attainment of the open space preservation and resource conservation objectives of the corridor. Prime wildlife habitat areas, wetlands, woodlands, and undeveloped floodlands lying in the corridor should be placed in conservancy and floodland protection districts. Existing and potential park sites lying in the corridor should be placed in park districts which permit the development of appropriate private and public recreational facilities. The remaining area lying in the corridors may then be placed in exclusive agricultural use districts or in large estate-type residential use districts, depending upon the limitation of the soils for utilization of onsite sewage disposal systems.

Major Retail and Service Centers: The regional land use plan recommends the development of two entirely new major retail and service centers in the Region by the year 2000, one site to be located in the City of Oak Creek and the other site to be located in the western portion of the City of Racine. The proposed Oak Creek center, the general site location of which is shown on the regional land use plan, should be more precisely located and delineated at the local level and then placed in an appropriate commercial district so as to ensure preservation of a suitable site and to give the community adequate control over future development. The Racine west site has already been appropriately zoned for future commercial development, as have the other 14 existing developed or partially developed centers.

Major Industrial Centers: The regional land use plan recommends that five major industrial centers be developed in the Region by the year 2000. These centers would be located in the Cities of Kenosha, Milwaukee, Oak Creek, Burlington, and Waukesha. All five sites were already under some stage of development by 1970. The cities involved should review their local zoning ordinances to determine what adjustments, if any, are needed to ensure the continued development of

these sites in conformance with the regional land use plan recommendations.

Public Airports: A major element of the comprehensive plan for the development of the Region—the regional airport system plan—was adopted by the Commission in 1975. The recommended plan includes 14 public use airports, 12 of which would function as general purpose airports, including one scheduled air transport airport, five basic transport airports, four general utility airports, and two basic utility airports. The remaining two would function primarily to serve special aviation needs associated with recreational development in Walworth County. The regional airport plan recommends that master plans be prepared for the areas surrounding each general purpose airport as an important step toward preventing incompatible land use development within the airport environs and minimizing nuisances and safety hazards involving aircraft operations and neighboring land uses. It is further recommended that those cities, villages, and towns involved subsequently review their local zoning ordinances to determine what adjustments, if any, are needed to ensure that the land use development allowed by the zoning ordinances is fully compatible with the land use development objectives expressed in the airport area master plan.

Major Recreation Sites: The regional land use plan recommends the acquisition and development of two entirely new major parks in the Region by the year 2000: the Sugar Creek site in the Town of Lafayette, Walworth County, and the Paradise Valley site in the Town of West Bend, Washington County. These sites should be placed in park districts so as to insure their preservation and availability for eventual public acquisition. Recommended boundaries for these sites are available on large-scale maps on file in the Commission offices.

Zoning and Property Tax Policies: One of the criticisms often leveled against the use of zoning powers for open space preservation purposes is that, in an urbanizing area, the assessed valuation of the restrictively zoned land may be so high as to reasonably preclude maintenance of the land in predominantly rural uses. In addition, the mill rate applied to the assessed valuation is often rising rapidly in developing communities due to increased demands for urban services, in particular for school services. This is particularly true where communities have allowed substantially unregulated land development to occur, resulting in extensive urban sprawl.

Section 70.32 of the Wisconsin Statutes directs local assessors to assess real estate at the full market value which could ordinarily be attained at a private sale. Where such open lands are adjacent to or within a rapidly urbanizing area, and particularly where poor land use regulations have permitted highly dispersed urban development, property tax assessments may reflect the public's sometimes exaggerated estimate of the development potential. Even if the land is zoned for exclusive agricultural or conservancy use, the local assessor is allowed to consider the market value of real property based on the reasonable probability of rezoning to permit more intensive use. Some lands zoned for agricultural or conservancy use realistically have no potential for more intensive development, so the market value and the assessed value both should reflect that fact. Under present Wisconsin constitutional and statutory law, the most satisfactory way to relieve the owner of lands zoned for exclusive agricultural or conservancy use or for floodland use from the possibility of unrealistically high property assessment and resultant taxation where it exists is to remove the development potential. This may be accomplished in one of four ways:

1. The property owner may voluntarily grant to a governmental unit an essement for value that would prohibit development for a period of at least 20 years.

2. The property owner may voluntarily place restrictive covenants which would prohibit development and would be enforceable by a governmental unit in perpetuity or for some substantial time.

3. A governmental unit may purchase the development rights.

4. The owner of agricultural or open space land may be granted an income tax deduction.[12]

All of these private or governmental actions will affect the valuation of individual land ownerships. Under approaches number 1 and 2, the local assessor would assess lands at their fair market value for agricultural, conservancy, and floodland uses rather than for potential urban uses, and the landowner would realize value through a reduced assessment of his property. Under approach 3, each individual landowner would realize additional value through the sale of development rights. Finally, under approach number 4, each individual landowner would realize value through a reduction in his income tax.

It is recognized that all four above methods of compensating the landowners for preserving open space lands represent techniques largely untried in the Southeastern Wisconsin Region. At the present time, however, they represent the only satisfactory ways in which the inconsistencies between the Wisconsin taxation, land development, and open space reservation policies can at least partially be overcome.

Special Land Use Regulations

In addition to the general zoning regulations previously discussed and recommended, there are several special land use regulations available to local units of government and to certain state agencies. These can contribute in varying degrees toward the implementation of the recommended regional land use plan.

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[12] *Enabling legislation for this method is contained in the recently adopted Farmland Preservation Act, Wisconsin Statutes Chapter 91 (1977).*

Soil and Water Conservation Regulations: Counties may supplement the exclusive agricultural and conservancy zoning district regulations of the comprehensive county zoning ordinances with special land use regulations adopted for the purpose of conserving soil and water resources, controlling erosion, reducing stream pollution, and promoting good soil and water conservation practices. Such land use regulations may prescribe the construction of upland water control structures, such as terraces, terrace outlets, grassed waterways, erosion control dams, dikes, ponds, and diversion channels as well as the application of good land management practices, such as contour strip cropping and the seeding and planting of lands to special plants, trees, and grasses.

1. It is recommended that all county soil and water conservation districts, except the Milwaukee County District, formulate proposed soil and water conservation regulations pursuant to Section 92.09(1) of the Wisconsin Statutes; hold the necessary public hearings and a referendum; and, if a simple majority of the land occupiers affected approve such regulations, recommend adoption to the respective county boards.

2. It is then recommended that all county boards, except the Milwaukee County Board, adopt such proposed regulations pursuant to Section 92.09 of the Wisconsin Statutes; enforce such regulations; and, if necessary, have the work performed by the district supervisors pursuant to Sections 92.10 and 92.11 of the Wisconsin Statutes.

3. It is further recommended that the Wisconsin Board of Soil and Water Conservation Districts apportion appropriate state and federal funds to the county soil and water conservation districts within the Region to enable implementation of the necessary conservation programs.

Soil Restrictions: The regional soil survey and analysis completed by the U. S. Department of Agriculture, Soil Conservation Service, in cooperation with the Commission under the initial regional land use-transportation study, delineates and classifies those soils which have severe and very severe limitations for urban development utilizing onsite soil absorption sewage disposal systems. The soil survey provides a sound basis for county sanitary codes and state regulatory procedures governing the installation and use of septic tanks.

1. It is recommended that all counties, except Milwaukee County, pursuant to Section 59.07(51) of the Wisconsin Statutes, adopt sanitary ordinances regulating private water and sewage disposal systems that are related to the regional soil survey. Such ordinances should prohibit the installation of septic tank sewage disposal systems on soils that have "very severe limitations" for such systems as established in the regional soils survey, and should prohibit septic tank sewage disposal systems on soils that have "severe limitations" for such systems unless such limitations are overcome at the time of development.

2. It is further recommended that all counties, except Milwaukee County, and all cities, villages, and towns within the Region, pursuant to Section 236.45 of the Wisconsin Statutes, amend existing or adopt new subdivision regulations similar to the SEWRPC Model Land Division Ordinance,[13] including the recommended soil restriction clause.

3. It is recommended that the Wisconsin Department of Natural Resources, pursuant to Section 144.025(2)(q) of the Wisconsin Statutes, similarly regulate the provision of septic tank sewage disposal systems, prohibiting such systems on soils having "very severe limitations" and soils having "severe limitations" unless the limitations are overcome.

4. It is recommended that the Wisconsin Department of Health and Social Services fully utilize the regional soil survey and interpretive analysis and prohibit, pursuant to Chapters H62 and H65 of the Wisconsin Administrative Code, the subdivision of land for urban development where such development will result in health problems created by the inability of the soils to absorb the sewage effluent.

Floodland Regulations: It is recommended that all cities, villages, and counties within the Region amend, as appropriate, their zoning ordinances to include special floodland regulations similar to those set forth in Appendix I of SEWRPC Planning Guide No. 5, Floodland and Shoreland Development Guide, as amended and improved through applications and practice throughout the Southeastern Wisconsin Region. Such regulations, if properly adopted and endorsed, will ensure the substantial maintenance and open use of all undeveloped floodlands in the Region. It should also be noted that such floodland regulations are required in addition to any basic zoning district regulations, such as agricultural districts, estate-type residential districts, park districts, and conservancy districts. Each county, city, and village in the Region must, pursuant to Section 87.30 of the Wisconsin Statutes, formulate and adopt an effective and reasonable floodland zoning ordinance as soon as the necessary flood hazard data become available. Failure to do so may result in the Wisconsin Department of Natural Resources acting to exercise state floodplain zoning powers, pursuant to Section 87.30 of the Wisconsin Statutes.

Shoreland Regulations: It is recommended that Kenosha, Ozaukee, Racine, Walworth, Washington, and Waukesha Counties carefully review their respective shoreland zoning regulations adopted pursuant to Section 59.971 of the Wisconsin Statutes. These regulations apply in unincorporated areas to all land lying within 1,000 feet of a lake, pond, or flowage and 300 feet from the bank of a river or stream or the landward side of the flood-

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[13] *See Appendix A of SEWRPC Planning Guide No. 1, Land Development Guide, November 1963.*

plain, whichever is greater. The recommended county reviews would seek to determine if changes are necessary to meet the land use development objectives contained in the regional land use plan. It is also recommended that those municipalities with lakes, ponds, or flowages review their respective shoreland zoning regulations. A model of such special shoreland regulations has been set forth in Appendix I of SEWRPC Planning Guide No. 5, as amended and improved through application and practice throughout the Southeastern Wisconsin Region.

Other Means for Open Space Preservation: Attainment of the open space preservation objectives of the regional land use plan will require the public acquisition of substantial tracts of land within the Region's primary environmental corridors. Since it is not economically feasible to acquire all of these lands immediately, certain police powers that are available to local units of government must be utilized to insure their preservation until such time as they may be acquired. In addition to the use of various zoning districts to achieve such preservation, other police powers, including official mapping powers and subdivision control powers, may be utilized.

Official mapping powers, as well as the required base maps and survey control system, are described in SEWRPC Planning Guide No. 2, Official Mapping Guide, February 1964. The single most important prerequisite of such official mapping is the availability of accurate base maps at an adequate scale, based upon a control survey system that properly relates the U. S. Public Land Survey system to the State Plane Coordinate system. These maps have now been prepared for areas encompassing a total of 853 square miles, or 32 percent of the total area of the Region.

1. It is recommended that all cities, villages, and towns within the Region prepare and adopt official maps pursuant to Section 62.23(6) of the Wisconsin Statutes, showing thereon as proposed parks and parkways those primary environmental corridor lands proposed for public acquisition and other lands proposed to be publicly acquired and developed as large parks under the regional park and open space plan. Such official maps should be prepared both for the area encompassed within the corporate limits of the municipalities and the area within the extraterritorial subdivision plat approval jurisdictional area and should be adopted by an ordinance similar to that set forth in Appendix A of SEWRPC Planning Guide No. 2.

2. In addition to such official mapping, it is recommended that all local units of government in the Region amend the existing or adopt new land subdivision regulations, similar to the SEWRPC Model Land Division Ordinance,[14] which would prohibit subdividing for any purpose all primary environmental corridor lands which are recommended for public acquisition and all open space areas which are recommended for development as large parks under the regional park and open space plan.

3. It is further recommended that the Wisconsin Department of Natural Resources and the State Department of Health and Social Services supplement such local action by objecting to, or denying approval of, any subdivision plat lying within the recommended environmental corridors that lies on marsh, swamp, peat, or other organic soils; is subject to flooding or has a high water table; or does not provide adequate sewage and waste disposal systems in accordance with Section 236.13(2m) of the Wisconsin Statutes.

4. It is also recommended that the Wisconsin Department of Natural Resources, in the exercise of its water diversion, encroachment, deposit, alteration, and development regulatory powers, either prohibit or stringently regulate those uses and structures in the corridors so as to ensure that they will be compatible with the purpose of providing open space, preserving wildlife habitat, enhancing the park and recreation value, protecting the ground and surface waters, and otherwise retaining the corridor lands and waters in a natural condition.

Open Space Acquisition

Acquisition of open space lands for recreation and open space preservation purposes may be accomplished in various ways, ranging from actual gifts by owners, through dedication by land developers at the time of platting, to outright purchase of the entire fee or of lesser interest by the state or by local units of government. There is justification for requiring land developers to dedicate reasonable portions of those sites or parklands lying within their subdivision or to pay a fee in lieu of dedication toward the purchase of neighboring park land. This justification is based upon the concept that the local governing body, by permitting such developer to create building sites or dwelling units, places a demand upon the entire community which is thereafter responsible for the services that must be provided to such development and its residents, including parklands, and that the owner or developer or future resident should, in justice, bear all or a portion of such costs directly attributed to his land.

1. It is recommended that the planning agencies of all the seven counties and the plan commissions of all cities, villages, and towns within the Region recommend to their respective governing body, in accordance with Section 236.45(4) of the Wisconsin Statutes, the amendment of existing land subdivision ordinances or the adoption of new land subdivision ordinances that are similar to the SEWRPC Model Land Division Ordinance,[15]

[14] *Ibid., footnote 13.*

[15] *See Appendix A of SEWRPC Planning Guide No. 1, Land Development Guide, November 1963.*

so as to assure the dedication of appropriate recreational sites and corridor parklands or payment of fees in lieu of such dedication.

2. It is recommended that the respective governing bodies adopt such recommended land division ordinances or amendments thereto pursuant to Section 236.45 of the Wisconsin Statutes.

If open space lands cannot reasonably be acquired by gift or dedication, public purchase of the entire fee interest or the purchase of less than fee interest may be required for plan implementation.

1. It is recommended that the constituent county boards, by resolution, formally request the Wisconsin Department of Natural Resources to acquire those segments of the primary environmental corridor lying within their county which are shown on the regional park and open space plan[16] as recommended for state acquisition. In addition, it is recommended that the Washington County Board, by resolution, formally request the State Department of Natural Resources to acquire and develop the Paradise Valley site in the Town of West Bend, Washington County, as a state park, should that site become available.

2. It is then recommended that the Wisconsin Department of Natural Resources acquire the lands recommended for state ownership under the regional park and open space plan pursuant to Section 27.01 of the Wisconsin Statutes.

Such state action may be supplemented by appropriations and expenditures for park and open space purposes by local units of government in the Region, particularly at the county level.

1. It is recommended that all seven counties within the Region continue or commence active park acquisition and development programs, pursuant to Section 27.065 of the Wisconsin Statutes, so as to provide an integrated system of regional parks and recreation areas and a permanent preservation of the primary environmental corridors.

2. It is also recommended that all cities, villages, and towns supplement such county action whenever possible through the local acquisition of primary environmental corridor lands. Several communities have initiated corridor acquisition programs and already own segments of the primary environmental corridor. Those communities may wish to continue their acquisition program separately or with financial assistance from their respective counties, or they may desire to donate their holdings to the county as was done in Milwaukee County in 1937.

[16] *See SEWRPC Planning Report No. 27, A Regional Park and Open Space Plan for Southeastern Wisconsin—2000, November 1977.*

It should be noted that purchase by the local units of government of less than the fee interest of the environmental corridors may be considerably cheaper than acquisition of the entire interest, and may result in more rapid preservation, acquisition, and use of these lands. Such acquisition of less than fee interests may be in the form of scenic easements for vista protection, conveyances of development rights to assure continuance of private parks or open spaces, and grants of various public access and development rights for construction and use of park facilities. These devices should be used when acquisition of the entire fee interest is too costly or otherwise not practical.

Public Development Policies

Also important to implementation of the recommended regional land use plan is the adoption and adherence to certain public development policies concerning annexation, incorporation, consolidation, and the extension of municipal utilities, such as water supply and sanitary sewer systems. Proper consideration of the regional land use plan in deliberations concerning municipal annexations, consolidations, and incorporations will assist in achieving more economical urban service areas, since the urban land use delineations on the recommended regional plan were based upon historic growth trends, rational utility service areas, drainage patterns, and soil capabilities. The following recommendations concern the more important public policies that will have a significant effect upon the implementation of the regional land use plan.

1. It is recommended that all cities and villages within the Region carefully consider the urban land use pattern indicated on the recommended regional land use plan when reviewing proposed annexations. To the maximum extent possible, only such lands are shown on the recommended plan as urban and such other contiguous lands which may be necessary to meet local open space, utility, and community facility needs should be annexed.

2. It is also recommended that all cities, villages, and towns within the Region carefully consider the urban land use pattern indicated on the recommended land use plan when reviewing consolidations and incorporations and give due weight to the urban service area implications of any consolidations or incorporations as these might affect the regional land use pattern.

3. It is further recommended that the State Department of Local Affairs and Development, in reviewing any proposed annexations, consolidations, or incorporations, give due weight to the urban land use pattern shown on the recommended land use plan and the implications which this pattern may have for the establishment of rational urban service areas, recognizing that annexations, incorporations, or consolidations which do not properly recognize the recommended land use plan may not be in the public

interest and may substantially hinder the solution of governmental problems affecting the regional community.

4. It is recommended that all metropolitan and municipal utilities and the Wisconsin Department of Natural Resources adopt and adhere to utility extension policies that would result in only those areas shown as urban on the recommended regional land use plan being serviced by public water supply and sanitary sewer systems.

5. It is further recommended that all metropolitan and municipal utilities design and install public water supply and sanitary sewer systems so as to preclude the provision of such services to urban development proposed to be located in the floodplains or on lands shown on the regional land use plan as agricultural or environmental corridors or on those soils designated in the regional soil survey as having "severe limitations" and "very severe limitations" for such urban development.

State and Federal Aid Programs

The following recommendations concern those state and federal agencies which administer grants and aids toward the acquisition and development of lands and the construction of specific municipal facilities that will have a direct effect upon the implementation of the recommended regional land use plan.

1. It is recommended that the Wisconsin Department of Natural Resources administer the federal Land and Water Conservation Fund (LAWCON) Program and the state Outdoor Resources Action Plan (ORAP) Program in accordance with the recommended regional land use plan as refined by the regional park and open space plan and, in particular, assign the highest appropriate priority to grant requests for the acquisition of environmental corridor lands in the most highly urbanized areas of the Region.

2. It is recommended that the Wisconsin Department of Natural Resources approve only such grant applications for municipal pollution prevention and abatement facilities under the state's financial assistance program in accordance with Section 144.21(5) of the Wisconsin Statutes that are located and designed in accordance with the recommended regional land use plan and population forecasts.

3. It is recommended that the U. S. Department of Housing and Urban Development approve only those applications for community development block grants and urban development action grants that are properly related to the recommended regional land use plan and, where public facilities and utilities are involved in such grants, approve only those requests that are located and designed generally in accordance with the recommended urban service areas and population forecasts.

4. It is recommended that the Wisconsin Department of Natural Resources and the U. S. Environmental Protection Agency approve only those grant applications for sewage treatment plants and related facilities that are located and designed in accordance with the recommended regional land use plans and population forecasts.

5. It is recommended that the U. S. Department of Agriculture, Farmers Home Administration, approve only those grant applications for rural water and waste disposal facilities which would provide service to the existing development or are located and designed in accordance with the recommended regional land use plan and population forecasts. It is further recommended that this agency approve only those loan applications for rural housing which are consistent with the recommended regional land use plan.

TRANSPORTATION SYSTEM PLAN IMPLEMENTATION

For plan implementation purposes, the recommended regional transportation plan may be subdivided into two major elements, one dealing with highway and the other with transit facilities. Each of these two major plan elements may be further subdivided into two functional facility type groups, based upon the primary character of service to be rendered by the facilities included in each group. For highway facilities, these two functional groups are: 1) freeways and expressways, and 2) standard arterial streets and highways (see Table 381 and Figure 42). For transit facilities these two functional groups are: 1) modified rapid transit facilities, and 2) ordinary mass transit facilities.[17]

At the regional level, principal emphasis must be focused initially on implementation of those transportation facility improvement recommendations which, because of the high capacity and high level of service provided, form the basic framework for the entire regional transportation system. The recommended transportation plan, therefore, contains firm recommendations for the general location and capacity of all of the facilities in the first functional group under each major plan element; that is, for all freeway and expressway, and modified rapid transit facilities required to serve the recommended regional land use plan. In addition, the plan contains preliminary recommendations for standard arterial street and highway facilities and for ordinanry mass transit facility service areas. However, because of the multiple-purpose functions of some of these facilities, the many alternatives available, the relationship to local development and redevelopment, and the jurisdictional problems involved, these recommendations will require refinement under the continuing regional transportation planning effort. Such refinement must be carried out cooperatively

[17] *See pages 261 to 263 and pages 284 to 287 of Volume 1 of this report for a more complete discussion of functional classification.*

Table 381

FUNCTIONAL HIGHWAY CLASSIFICATION SYSTEMS—CORRIDOR AND FACILITY TYPES

The functional grouping used in this report relates to the supply of transportation system capacity; that is, to the character and level of service provided by highway facilities of different types. It is also possible to functionally classify transportation corridors on the basis of the character and level of transportation service required or demanded within the corridors. The latter type of classification considers the type and size of areas connected by the corridors, as well as the type and volume of traffic within the corridors. Criteria based on this method of classification has been used by the Wisconsin Department of Transportation in the development of its statewide highway system plan, the realignment of the various Federal Aid Highway Systems, and the distribution of state aids.

The Wisconsin Department of Transportation has classified traffic corridors into three major functional types: arterials, collectors, and locals. The arterials consist of those corridors which must provide for the rapid movement of concentrated volumes of traffic over relatively long distances and which provide the more direct and unrestricted routes between large centers of land use activity, providing for traffic movement between, rather than within, these areas. The arterials have been further subclassified into two categories on the basis of the size of the area served or intensity of activity within the area served, and each of these subclassifications have further been divided into rural and urban categories as follows:

Principal Arterials

Rural: serve corridor movements having trip length and travel density characteristics of an interstate or interregional nature. These routes generally serve all urban areas greater than 5,000 population.

Urban: serve the major economic activity centers of the urban areas having the highest traffic volume corridors, and regional and intraurban trip length desires.

Minor Arterials

Rural: in conjunction with principal arterials, serve cities, large communities, and other traffic generators providing intraregional and interarea traffic movements.

Urban: serve economic activity centers important within the urban area having moderate traffic volumes, and serve intercommunity trip length desires. Minor arterials interconnect and augment the principal arterial system.

Collectors

The collectors consist of those corridors which provide for moderately rapid movement of traffic between activity areas and serve to collect and distribute traffic between arterials and local roads and to provide land access. Each collector group is further subclassified into rural and urban routes. Rural collectors have been further subclassified into two groups: Major Collectors, which perform a semiarterial function, and Minor Collectors, which perform a more strictly collection and distribution function. Urban collectors perform strictly a collection and distribution function.

Rural: Major collectors provide service to moderate-sized communities and other intraarea traffic generators, and link those generators to nearby larger population centers or higher function routes. Minor collectors provide service to all remaining smaller communities and link the locally important traffic generators with their rural hinterland, and are spaced consistent with population density so as to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road.

Urban: Collectors provide direct access to residential neighborhoods and commercial industrial areas, and serve moderate to low traffic volumes and interneighborhood trip desires. As the name implies, these routes collect and distribute traffic between locals and arterials. The local routes provide access to land use activities, and no functional distinction between rural and urban is used.

Local Streets

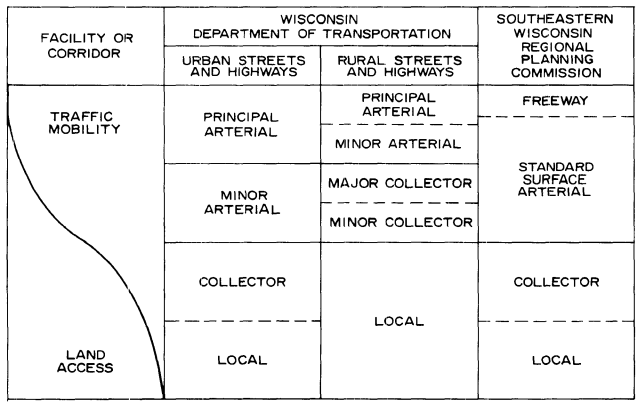
Rural: provide access to adjacent land and provide for travel over relatively short distances on an intertownship or intratownship basis. All roads not classified as arterials or collectors are local function roads.

Urban: serve the predominant function of direct access to adjacent land uses. They serve the ends of most trips within the urban area. All streets not classified as arterials or collectors are locals.

Source: SEWRPC.

Figure 42

RELATIONSHIP OF FUNCTIONAL HIGHWAY CLASSIFICATION SYSTEMS– CORRIDOR AND FACILITY TYPES



Source: SEWRPC.

by the state, county, and local units of government concerned. An initial step toward this refinement was provided in the regional transportation plan by converting the functional regional highway plan to a jurisdictional plan. This chapter contains specific plan implementation recommendations primarily for the freeway and expressway and modified rapid transit plan elements.

Adoption and Implementation Recommendations

The recommended regional transportation plan includes recommendations for the ultimate construction of approximately 71 miles of new freeway, and for the expansion of the capacity of an additional 26 miles of freeway. The plan also calls for the ultimate construction of 106 miles of new standard arterials, and for the expansion of the capacity of an additional 683 miles of standard arterials. In addition, the recommended plan includes recommendations for the provision of 107 miles of modified rapid transit lines.

It is important to transportation plan implementation that the transportation implementing agencies adopt and integrate the recommended regional transportation plan as a functional guide to transportation system development within the Region. As a consequence, the following plan adoption and implementation recommendations are made:

U. S. Department of Transportation, Federal Highway Administration: It is recommended that the U. S. Department of Transportation, Federal Highway Administration:

1. Adopt the recommended regional transportation plan and utilize the plan as a guide in the administration and granting of federal aids for highway system development within the Region.

U. S. Department of Transportation, Urban Mass Transportation Administration: It is recommended that the U. S. Department of Transportation, Urban Mass Transportation Administration:

1. Adopt the recommended regional transportation plan and utilize the plan as a functional guide in the administration and granting of federal aids for transit system development within the Region.

Wisconsin Department of Transportation: It is recommended that the Wisconsin Department of Transportation:

1. Adopt and integrate the recommended regional transportation plan into the state long-range transportation system plan as a functional guide to transportation system development within the Region.

2. In cooperation with the Wisconsin Department of Local Affairs and Development, undertake a review of the current relocation laws, practices, and procedures to determine if such laws, practices, and procedures adequately compensate homeowners for repairs and renovations undertaken prior to public acquisition; if it would be in the public interest to provide for a cash payment to dislocatees for "pain and suffering" incurred as a result of the public taking of land; and if it can be made more attractive to homeowners to physically relocate their homes when public taking of land is necessary.

Racine and Kenosha Transit-Parking Commissions and Milwaukee County Transit Board: It is recommended that the Racine and Kenosha Transit-Parking Commissions and the Milwaukee County Transit Board:

1. Adopt the recommended regional transportation plan as this plan affects their respective transit service areas.

County Boards of Supervisors: It is recommended that the county boards of the seven constituent counties comprising the Region upon the recommendation of the county highway and transportation committees:

1. Adopt, refine, and integrate the recommended regional transportation plan into their respective county highway systems.

Common Councils, Village Boards, and Town Boards: It is recommended that upon referral to, and recommendation of, the local plan commissions, each common council, village board, and town board within the Region:

1. Adopt the recommended regional transportation plan as a guide to the transportation system development of the community as the regional transportation plan affects the community.

Jurisdictional Responsibility

As already noted, the highway element of the recommended functional transportation system plan has been converted to a jurisdictional highway system plan. The jurisdictional plan identifies the governmental level and agency that should have the responsibility for acquiring, constructing, and maintaining each of the recommended freeway and surface arterial facilities. The recommended jurisdictional classification for each link in the total arterial system is indicated by color code on the plan map in the pocket attached to the back cover of this report. The conversion of the transportation plan to a jurisdictional plan was accomplished by amending the seven jurisdictional highway plans prepared for, and adopted by, each county within the Region. The amendment process considered both the original jurisdictional responsibility recommendations made for each county and the changes made in the plan reevaluation process to the original year 1990 regional transportation system plan as the basis for the county jurisdictional highway system plans. Arterial street facility additions, deletions, and modifications, and attendant changes in the character of service provided were all considered by each county's original jurisdictional highway committee, and were utilized as necessary to revise the original jurisdictional county highway plans.

Federal Aid Realignment

To establish an integrated highway network, and to assure effective expenditure of federal monies on such a network, it will be necessary to continue the adjustment of the federal aid highway systems—begun upon completion of the initial jurisdictional highway system plans—to the new recommended jurisdictional highway plan. Such a realignment was initially proposed as a part of the initial regional transportation plan recommendations through the jurisdictional highway planning process. The federal aid highway system currently consists of three elements: a primary system, including interstate highway routes, to be designated by each state through its state highway department in accordance with comprehensive, areawide, transportation plans; a secondary system consisting of rural "major collector" routes designated by the state highway department and concerned local officials; and an urban system consisting of urban arterials designated by local officials with concurrence of the state highway department and in accordance with comprehensive, areawide transportation plans. The urban system can be established in any urban area of over 5,000 population. The federal share of the cost of improvements on these various highway systems is 90 percent for interstate routes and 70 percent for all other routes.

With certain limited exceptions,[18] no federal monies may be expended for either engineering or construction on any facilities not on one of the federal aid systems. Consequently, the actual location and extent of these systems have extremely important implications for the highway planning and plan implementation process. Based upon the new jurisdictional plan for the Region, the following plan adoption and implementation recommendations are made:

U. S. Department of Transportation, Federal Highway Administration: It is recommended that the U. S. Department of Transportation, Federal Highway Administration:

1. Adopt the recommended jurisdictional highway system plan for the Region and utilize the plan as a guide in the review of requests for realignment of the various federal aid systems and in the administration and granting of federal aids for highway improvement within the Region.

2. Cooperate in, and approve the adjustment of, the federal aid systems to the recommended jurisdictional highway system plan.

Wisconsin Department of Transportation: It is recommended that the Wisconsin Department of Transportation:

1. Adopt and integrate the recommended jurisdictional highway system plan into the state long-range highway system plan.

2. Seek, in cooperation with the Region's seven county boards and appropriate local officials, realignment of the state trunk, county trunk, local trunk, and federal aid systems to the recommended jurisdictional highway system plan.

3. Assume full operational and maintenance responsibilities for all state trunk highways within the Region.

4. Assume responsibilities for the implementation of carpool parking lot facilities as recommended in the regional transportation plan.

County Boards of Supervisors: It is recommended that the county boards of the seven constituent counties comprising the Region upon recommendation of their county highway committees:

1. Adopt the recommended jurisdictional highway system plan as a guide to future highway facility development within the county.

2. Seek, in cooperation with the Wisconsin Department of Transportation, realignment of the state trunk, county trunk, local trunk, and federal aid systems to the recommended jurisdictional highway system plan.

3. Assume full operational and maintenance responsibilities for all county trunk highways within their respective counties.

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[18] *The exceptions include "off system" construction and deconstruction projects and "off system" safety improvement projects.*

Common Councils, Village Boards, and Town Boards:

1. It is suggested that, to supplement recommended federal, state, regional, and county plan adoption actions, the 28 city common councils, 54 village boards, and 65 town boards within the Region act to adopt the recommended jurisdictional highway system plan as a guide to highway system development within their areas of jurisdiction. It is further suggested that the respective local planning agencies adopt and integrate the recommended jurisdictional highway system plan into the local master plans and to certify such adoption to their local governing body.

2. It is recommended that the 28 city common councils, 54 village boards, and 65 town boards within the Region act to approve within their respective counties a County Official Map prepared in conformance with the recommended jurisdictional highway system plan, and establish local official maps that include the proposed local trunk highway facilities.

3. It is recommended that the 28 city common councils, 54 village boards, and 65 town boards within the Region adopt, pursuant to the recommendation of their local planning agencies, subdivision control ordinances and zoning regulations necessary to assure the integrity of the recommended jurisdictional highway system plan.

Freeway Implementation Recommendations

Further implementation recommendations for major highway facilities can be divided into the following subareas: corridor refinement, right-of-way reservation, right-of-way acquisition, facility construction, and capacity protection. Corridor refinement requires the preparation of precise and definitive plans by the state, county, or local units of government having jurisdictional responsibility, working in close cooperation with the other agencies and local units that have related transportation responsibilities. Such plans must ultimately set forth proposals as to the precise centerline location and ultimate right-of-way width required for each facility, for frontage road treatment and alterations in related existing facilities, for types of access control, and for the types and locations of grade separations and interchanges.

After the detailed mapping of the rights-of-way and other lands required to accommodate the recommended freeway facilities have been completed, the necessary land can be reserved from development by means of official mapping, building setback line ordinances, land division ordinances, and private deed restrictions. Such prior reservation of right-of-way serves as an expression of governmental intent to acquire land for highway purposes far in advance of actual facility construction, and thereby not only achieves great economies in ultimate right-of-way acquisition, but also permits land adjacent to the required right-of-way to be privately purchased and developed with full knowledge of the future highway development proposals. Such action serves to greatly reduce public misunderstanding of proposed highway system improvements and should thereby assist in both avoiding and overcoming opposition to the actual construction of the recommended facilities. Such prior reservation of right-of-way also serves to assure that the lands needed for future highways will be available at the price of unimproved land, thus resulting in great economies, and serves to avoid in the future the disruption, dislocation, discontent, and great expense involved in the acquisition and clearance of developed urban areas for street and highway purposes. The most effective and efficient means of prior reservation of right-of-way is the use of the official mapping powers granted by the State Legislature to the State Highway Commission, counties, cities, villages, and towns in Wisconsin.

The next step in plan implementation is right-of-way acquisition. The governmental powers available to acquire the rights-of-way and other lands required to develop the recommended transportation plan elements range from purchase through dedication and lease to eminent domain. The use of any one particular method to acquire the necessary rights-of-way is determined by available funds; state and local regulations; availability of leasable facilities; the attitude of donors, landowners, and land developers; and the lead time available to construct the necessary facility. Facility construction is the step in plan implementation which logically follows right-of-way acquisition.

The final step in plan implementation is capacity protection. Freeway and expressway facilities require large investments of public capital, not only for right-of-way acquisition and construction but also for the purchase of access rights from abutting property owners in order to protect these facilities from the encroachment of urban development and to control the location of access points. If this investment of public capital is to be protected and the design capacities and service levels of these high-type facilities preserved, state, county, and local units of government must act to protect the traffic capacity of these facilities through exercise of police power.

Further recommendations for the implementation of major highway facilities in the recommended transportation plan must be made with respect to the lower tier and upper tier of the plan. These recommendations for the implementation of the major highway facilities of the recommended transportation plan are limited, because nearly all additional 97 miles of freeways proposed for the Region have proceeded through corridor refinements and right-of-way reservation and acquisition.

Lower-Tier Plan Implementation Recommendations

Under the lower tier of the regional transportation plan, the following plan implementation recommendations are made:

Freeway Implementation:

1. It is recommended that the Wisconsin Department of Transportation conduct in close cooperation with local governments:

a. For USH 12 from STH 67 to the Walworth-Rock County Line, corridor refinement, right-of-way reservation and acquisition, facility construction as staged in the plan, and capacity protection.

b. For USH 41 from STH 145 to the Washington-Dodge County Line, facility construction as staged in the plan and capacity protection.

c. For the USH 16 bypass of the Village of Oconomowoc, right-of-way acquisition, facility construction as staged in the plan, and capacity protection.

d. For the West Bend Freeway from STH 145 to existing USH 45 north of the City of West Bend, facility construction as staged in the plan and capacity protection.

2. It is recommended that the Milwaukee County Expressway and Transportation Commission conduct:

a. For the Lake Freeway-South from its current terminus to Layton Avenue, facility construction as staged in the plan.

b. For the Stadium Freeway-South from its current terminus to Lincoln Avenue, facility construction as staged in the plan.

Special Studies

1. It is recommended that special freeway "stub end" studies be undertaken by the Wisconsin Department of Transportation, Milwaukee County, and affected municipalities for each of the following locations in Milwaukee County:

a. At the current terminus of the Park Freeway-East;

b. At the current northerly terminus of the Daniel Webster Hoan Memorial Bridge portion of the Lake Freeway, including specific consideration of how best to reconnect Lincoln Memorial Drive to the Mason Street-Prospect Avenue area, assuming that the extension of the Lake Freeway-North and the consequent completion of the downtown freeway loop as included in the upper tier of the plan may or may not be carried out;

c. At the proposed south end of the Lake Freeway-South near E. Layton Avenue. This "stub end" study would be conducted in conjunction with the final design of the proposed extension of the Lake Freeway-South to E. Layton Avenue. The terminus of the Lake Freeway-South at E. Layton Avenue should be coordinated with the lower-tier plan recommendation to construct a surface arterial highway on the Lake Freeway right-of-way south from E. Layton Avenue to the Illinois state line; and

d. At the proposed south end of the Stadium Freeway-South at W. Lincoln Avenue. This "stub end" study would be conducted in conjunction with the final design of the proposed extension of the Stadium Freeway-South to W. Lincoln Avenue.

2. It is recommended that a special study be undertaken of arterial street and highway and transit travel needs and facilities in the northwest travel corridor of Milwaukee County extending up into southern Ozaukee County. This study, to be conducted by SEWRPC with Milwaukee and Ozaukee Counties and affected municipalities, is needed to determine what transportation facility improvements, if any, should be included in the regional transportation plan to accommodate the travel demand that was to have been accommodated on the previously proposed Park Freeway-West and Stadium Freeway-North, the latter consisting not only of the "gap closure" of the Stadium Freeway-North but also of the previously proposed Stadium Freeway-North extension in the N. 76th Street travel corridor of Milwaukee and Ozaukee Counties. The lower tier of the plan recommends that this special northwest travel corridor study be undertaken immediately upon adoption of the new regional transportation plan.

   The Milwaukee northwest corridor study should have as a component special design studies with respect to two of the current freeway "stub ends." These two are the existing terminus of the Stadium Freeway-North near N. 47th Street and W. Lloyd Street and the currently uncompleted Hillside Interchange on IH 43.

3. It is recommended that transportation systems management actions proposed under the regional transportation plan and under the separate, but coordinated, transportation systems management planning program be pursued by the appropriate agencies. Actions proposed under the long-range plan include a freeway control system, curb parking restrictions, and carpool facilities and promotion.

4. It is recommended that SEWRPC, in cooperation with the Wisconsin Department of Transportation and the Region's counties and municipalities, conduct a study to classify the street and highway system of the Region with respect to the new Wisconsin Department of Transportation functional classification system. This study should include, if necessary, the revision of the recommended jurisdictional highway system plans for each county and recommendations for any realignment of federal highway aids.

Upper-Tier Plan Implementation Recommendations: The following plan implementation recommendations relate to the upper tier of the plan; that is, freeway facilities. They are to be pursued if at some future date—at least 10 years from 1978—it is the consensus that travel demand modification efforts have not worked well and that the freeway "stub end" and associated improvements do not adequately provide the needed transportation service within the Region.

1. It is recommended that the Wisconsin Department of Transportation, in close cooperation with local governments, conduct:

   a. For the Lake Freeway-South from E. Layton Avenue in Milwaukee County southerly through Racine and Kenosha Counties, facility construction and capacity protection.

2. It is recommended that the Milwaukee County Expressway and Transportation Commission conduct:

   a. For the Lake Freeway-North from its current terminus to the Park Freeway-East, right-of-way acquisition and facility construction.

   b. For the Park Freeway-East from its current terminus to the Lake Freeway-North and facility construction.

   c. For the Stadium Freeway-South from Lincoln Avenue to the Airport Freeway, right-of-way acquisition and facility construction.

Transit Implementation Recommendations

With regard to plan implementation recommendations for major transit facilities that is, modified rapid transit in the Milwaukee urbanized area, beyond plan adoption by appropriate agencies and units of government, it is recommended that the Milwaukee County Expressway and Transportation Commission, in cooperation with the Milwaukee County Transit Board, assume jurisdictional responsibility for the recommended modified rapid transit plan elements. If implementation of the modified rapid transit plan under these two agencies proves to be unattainable, then it is recommended that a metropolitan transit authority be created, pursuant to Section 66.94(9) of the Wisconsin Statutes, to assume jurisdictional responsibility for all elements of the recommended modified rapid transit plan. It should be noted that such a transit authority does not, under the present enabling legislation, possess any tax powers, and thus a review and revision of Section 66.94 of the Wisconsin Statutes would be required.

FINANCIAL AND TECHNICAL ASSISTANCE

Upon adoption of the various recommended regional land use and transportation plan elements, it is essential that the areawide governmental agencies concerned and the local units of government within the Region effectively utilize all sources of financial and technical assistance available for execution of the recommended elements. In addition to current revenue sources, such as property taxes, fees, fines, public utility earnings, state collected taxes, and state appropriations and aids for highways, education, and welfare available for plan implementation, the areawide agencies and local units of government can make use of other revenue sources, such as borrowing, special taxes and assessments, gifts, and certain state and federal aids and grants. Various types of technical assistance useful in plan implementation are also available from county, regional, state, and federal sources. The type of assistance available ranges from the detailed advice on land and water management practices provided by the U. S. Department of Agriculture, Soil Conservation Service, to the educational, advisory, and review services offered by the Regional Planning Commission's Community Assistance Division.

Because of the numerous financial and technical assistance programs available, it becomes necessary to herein identify and discuss those that may have a significant effect upon the direct implementation of the recommended regional land use and transportation plans; particularly those programs that relate to land acquisition and major facility construction. Programs that are applicable to only one unit of government or have only an indirect effect upon implementation of the regional plans, such as federal mortgage financing insurance, are not discussed herein.

Borrowing

Areawide agencies and local units of government are normally authorized to borrow so as to effectuate their powers and discharge their duties. Chapter 67 of the Wisconsin Statutes generally empowers counties, cities, villages, and towns to borrow money and to issue municipal obligations not to exceed 5 percent of the equalized assessed evaluation of the municipality's taxable property, with certain exceptions, including school bonds and revenue bonds. Those borrowing powers directly related to regional land use and transportation plan implementation include:

1. Counties may bond for the original construction and improvement of highways, not to exceed 1 percent of the equalized assessed value of the taxable property in the county; county park land acquisition and development; airport acquisition and development; and parking lot acquisition and development.

2. Cities and villages may borrow and issue bonds for construction of water supply and distribution systems, sanitary sewer systems, and sewage disposal plants, park land acquisition and development, street construction, expansion, and improvement; airport acquisition and development; parking lot acquisition and development; and industrial site acquisition and development.

3. Towns may issue bonds for river front, lakeshore, woodlot, and scenic and historic site acquisition; airport acquisition and development; and laying out, opening, widening, and improving streets.

In addition, certain special-purpose units of government may borrow money to finance capital improvements. Thus, Section 60.307 of the Wisconsin Statutes specifically authorizes town sanitary districts to borrow money and to issue bonds for the construction or extension of storm sewer, sanitary sewer, and water supply systems. Sections 66.25 and 59.96(7) of the Wisconsin Statutes authorize metropolitan sewerage districts to borrow money and to issue bonds for the construction of sanitary sewerage facilities. A metropolitan transit authority is specifically granted, by Section 66.94(15) of the Wisconsin Statutes, the continuing power to borrow money for the purpose of acquiring transit systems or parts thereof. In addition, the powers of cooperative contract commissions created under Section 66.30 of the Wisconsin Statutes include borrowing by the contracting bodies of such commissions for acquiring, constructing, and equipping areawide projects.

Temporary and Emergency Loans: Section 67.12 of the Wisconsin Statutes authorizes counties, cities, villages, and towns to obtain temporary and emergency loans by issuance of promissory notes or orders drawn on the municipality's treasurer. Advanced borrowing in anticipation of the payment of ordered or levied taxes, borrowing on tax sales certificates, and borrowing against its assets in a closed bank are also authorized. Section 67.125 of the Wisconsin Statutes further authorizes cities, villages, and towns to borrow in an amount not to exceed that portion of the uncollected, delinquent taxes which are to be returned to such municipalities.

Federal Loans: Federal advances and loan programs are available for public works planning and construction and for resource conservation. A brief description of those federal programs which may be of greatest significance to regional plan implementation follows:

1. Resource conservation and development loans are available to local units of government and soil and water conservation districts from the U. S. Department of Agriculture, Soil Conservation Service, for planning and carrying out a balanced program of resource conservation, development, and utilization.

2. Low-interest forestry loans are available to farmers and farm associations from the U. S. Department of Agriculture, Farmers Home Administration, for reforestation and the establishment of forestry practices and programs.

3. Rural water and sewer loans are available to rural units of government which are unable to obtain credit elsewhere at reasonable terms from the U. S. Department of Agriculture, Farmers Home Administration, for developing domestic water supply and waste collection and disposal systems.

Special Taxes and Assessments

Counties and cities have special assessment powers for park and parkway acquisition and improvements under Sections 27.065 and 27.10(4), respectively, of the Wisconsin Statutes. Counties are empowered under Section 27.06 of the Wisconsin Statutes to levy a mill tax to be collected into a separate fund and to be paid out only upon order of the county park commission for the purchase of land and other Commission expenses. Farm drainage boards, town sanitary districts, metropolitan sewerage districts, cities, and villages also have taxing and special assessment powers under Sections 88.06, 60.306, 66.25, 59.96(9), and 62.18(16) of the Wisconsin Statutes. Although soil and water conservation districts have no taxing, bonding, or assessment powers, such districts may recover the cost and expenses, with interest, of performing work or operations, as authorized by a court under Section 92.11 of the Wisconsin Statutes.

Gifts

Donations of lands, interests in lands, for monies from private individuals and corporations should not be overlooked as of possible assistance in regional plan implementation, particularly with respect to park acquisition and environmental corridor preservation. The potential contributions, both in leadership and funds from private groups, should not be underestimated. Such gifts either in lands, interests in lands, or monies may, moreover, be used toward the local contribution in obtaining various state and federal grants.

Planning Grants

Several federal planning grant programs are available for the financing of planning programs which can serve to assist in the necessary refinement and detailing of the regional plan at the local level and in this manner contribute substantially toward regional plan implementation.

Comprehensive Planning Assistance Program: Under this program administered by the U. S. Department of Housing and Urban Development (HUD), planning grants are available to the State, areawide planning agencies, and urban counties. Grants may cover up to two-thirds of the cost of preparing comprehensive plans including preparation of maps, planning inventories, plans, and implementation devices.

Area Development Assistance Planning Grants: Under this program administered by the U. S. Department of Agriculture, Farmers Home Administration, planning grants are available to local units of government, regional and local planning commissions, and state governments in support of the preparation of comprehensive plans for rural areas. Grants may cover up to 75 percent of the total cost of the planning grant.

Coastal Management Program Grants: Under this program, administered by the U. S. Department of Commerce, National Oceanic and Atmospheric Administration, grants are available to state and local units of government to assist in the management of the Great Lakes and coastal areas. Grants may cover up to 80 percent of the total cost of the management proposals.

Urban Development Grants

An important element of the regional land use plan is the conservation of stable existing urban areas and the revitalization of deteriorating areas. Federal urban development grant programs will continue to play an important role in the attainment of these objectives.

Community Development Block Grants Program: This program, authorized under Title I of the Housing and Community Development Act of 1974, Public Law 93.383, and administered by the U. S. Department of Housing and Urban Development, consolidates seven former community development-type categorical programs and provides grants to local units of government for a variety of purposes, including the construction or improvement of public utilities and facilities, economic development activities, and housing rehabilitation. These grants are available as entitlement grants to urban counties as well as to cities with populations in excess of 50,000, and are available as "small city grants" to communities of under 50,000 persons.

Urban Development Action Grants: Authorized by the housing and community development act of 1977 and administered by the U. S. Department of Housing and Urban Development, this program is intended to aid "distressed" cities and urban counties which require increased public assistance and private investment to alleviate physical and economic deterioration. To be eligible, cities and urban counties must meet certain HUD distress criteria relating to such factors as the age of the housing stock, income levels, population decline, unemployment, job decline, and poverty conditions. Eligible activities are those activities in support of commercial industrial, or residential project which are eligible under the community development block grant program as well as other activities which are clearly consistent with the objectives of revitalizing the local economic base or reclaiming neighborhoods having excessive housing abandonment or deterioration.

Park and Open Space Grants

State and federal park and open space aid programs provide local units of government with substantial financial assistance in the acquisition and development of park and open space lands. In general, the local units of government in the Region are eligible for these grants; however, the eligibility of individual projects is based upon a certain planning and other prerequisites and must be determined for each specific project. The following is a brief description of the two most important programs.

Outdoor Resource Action Plan (ORAP) Program: This program, administered by the Wisconsin Department of Natural Resources, provides grants to all local units of government in amounts up to 50 percent of the cost of acquiring and developing recreational lands and rights-in-land to be used for local park and open space systems.

Federal Land and Water Conservation Fund (LAWCON) Program: This program, administered by the U. S. Department of the Interior, Heritage Conservation and Recreation Service, through the Wisconsin Department of Natural Resources, provides grants to state and local units of government in amounts up to 50 percent of the cost of acquisition and improvement of outdoor recreation areas.

Water Supply and Sewerage System Grants

State and federal grant programs are available to local units of government for the financing of water systems, sewer facilities, storm water drainage systems, and sewage treatment facilities. A brief description of these programs follows.

State Water Pollution Prevention and Abatement Program: This program, administered by the Wisconsin Department of Natural Resources pursuant to the rules set forth in Chapter NR 125 of the Wisconsin Administrative Code, provides financial assistance to local units of government for the cost of approved pollution abatement and prevention projects. Eligible projects include waste treatment facilities; trunk, relief, and intercepting sewers; outfall sewers; certain sewage collection systems; and other appurtenances. For nonfederally aided projects, the state grant is 25 percent of the total cost. For projects receiving federal aid, the state grant offer may amount to 5 percent to provide combined state and federal assistance in the amount of 80 percent of the cost of the project, except that combined state and federal assistance may extend to 90 percent of the cost of that part of the project consistng of advanced tertiary sewage treatment components.

Federal Waste Treatment Works Construction Program: This program, administered by the U. S. Environmental Protection Agency, provides federal financial assistance in an amount of 75 percent of the total cost of approved projects. Projects must be found to be in conformance with an approved facility plan and areawide water quality management or Section 303 basin plan, as applicable.

Federal Farmers Home Administration Programs: A number of programs administered by the U. S. Department of Agriculture, Farmers Home Administration, provide grants toward the cost of developing domestic water supply and waste collection and disposal systems to rural units of government if they are unable to obtain credit at reasonable terms.

Soil and Water Conservation Grants

There are several programs available for conservation and protection of the agricultural lands and environmental corridors recommended to be preserved under the regional land use plan. These programs are briefly described below.

State Soil and Water Conservation Program: This program, administered by the Wisconsin Board of Soil and Water Conservation Districts, provides grants to the county soil and water conservation districts in amounts up to 50 percent toward the cost of approved soil and water conservation projects.

Federal Agricultural Conservation Program: This program, administered by the U. S. Department of Agriculture,

Agricultural Stabilization and Conservation Service, provides grants to farmers for carrying out approved soil, water, woodland, and wildlife conservation practices.

Federal Resource Conservation and Development Program: This program, administered by the U. S. Department of Agriculture, Soil Conservation Service, provides cost sharing up to 100 percent for flood control and sediment control works and up to 50 percent for construction of water conservation works, structural recreation works, and improved land use measures.

Federal Multiple-Purpose Watershed Program: This program, administered by the U. S. Department of Agriculture, Soil Conservation Service, through the State Soil Conservation Board, provides cost sharing up to 100 percent to qualified sponsors, such as soil and water conservation, flood control, drainage, or irrigation districts, for flood prevention works and up to 50 percent toward agricultural water management, public recreation, fish and wildlife development, acquisition of certain recreational land rights, and agricultural land planning and treatment.

Inland Lake Protection and Rehabilitation Grant Programs: State and federal grants are available to public inland lake protection and rehabilitation districts for water quality feasibility studies as well as for the implementation of inland lake protection and rehabilitation measures to control water pollution and improve water quality conditions. Such districts are eligible for 60 percent grant funding from the Wisconsin Department of Natural Resources or 50 percent from the U. S. Environmental Protection Agency, the federal funds being administered through the Wisconsin Department of Natural Resources.

State Water Quality Regulation Enforcement Program: This program, administered by the Wisconsin Department of Natural Resources, provides annual grants to counties in amounts up to $1,000 in partial support of the cost of administering and enforcing county water protection or shoreland use regulations.

Transportation Grants

Several federal and state grant programs are available to local units of government for the financing of the planning and construction of certain arterial streets and highways, and the development of urban mass transit systems. A brief description of these programs follows.

Federal Highway Aid Program: This program, administered by the U. S. Department of Transportation, Federal Highway Administration, provides financial assistance to the Wisconsin Department of Transportation, and through that Commission to local units of government. The funds provided under this program may be used for preliminary engineering, design, right-of-way acquisition, and construction for authorized projects on the federal aid interstate, primary, secondary, and urban highway systems; and for bridge replacement, off-system improvements, safety improvements, and roadway beautification. The federal assistance funds require state matching funds which range from 10 percent local match for interstate highway projects to 30 percent local match for urban or primary system projects. Federal aid urban highway funds can also be used for limited mass transit capital expenditures.

Federal Transit Aid Program: This program, administered by the U. S. Department of Transportation, Urban Mass Transportation Administration, provides financial assistance to urban mass transit systems. There are currently four major funding categories: capital expenditures, operating assistance, demonstration projects, and technical studies. Capital expenditure funds are approved by the Urban Mass Transportation Administration on a project-by-project basis and can provide up to 80 percent of the total project capital costs. Operating assistance funds are distributed on a formula basis directly to urbanized areas over 200,000 population and through the State for urbanized areas under 200,000 population. These funds may be used to defray up to 50 percent of transit operating costs, or up to 80 percent of transit capital improvement costs.

State Highway Aids: State highway aids are derived from the state motor vehicle fuel taxes, motor vehicle registration and driver licensing fees, and motor carrier fees, and are administered by the Wisconsin Department of Transportation. The aids comprise a segregated fund which can be used only for highway and highway-related construction, operation, and maintenance.

The total annual net motor vehicle revenues, a result of deducting the annual collection and enforcement expenses from the total annual gross motor vehicle revenues, are distributed by the Wisconsin Department of Transportation, in accordance with the provisions of Section 20.395 and Chapter 86 of the Wisconsin Statutes, as amended by the 1977 State Budget Act. It should be noted that this act effected a change in the method of distribution of state aids by introducing the functional classification of a facility in determining the level of aids to be provided.

State Transit Aids: State transit aids are available to urban mass transit systems to fund up to two-thirds of the nonfederal share of the transit system's operating deficit under Section 85.05 of the Wisconsin Statutes. In addition, the 1977 State Budget Act provides for two new sources of funds relating to elderly and handicapped transportation services. The first source, authorized under Section 85.08(5) of the Wisconsin Statutes, allocates funds annually to the respective counties on the basis of elderly and handicapped population residing therein. These funds may be used to provide or aid in the provision of transportation services to the elderly and handicapped. The second source, authorized under Section 85.08(6), is intended to supplement the federal capital grant programs and consists of one-time-only grants to provide for the purchase of vehicles. Transit planning and demonstration projects can be funded for up to 100 percent of total cost as approved by the Wisconsin Department of Transportation, authorized under Section 85.06 of the Wisconsin Statutes.

Technical Assistance

Certain federal, state, regional, and county agencies provide, upon request, various levels and types of technical assistance useful in regional plan implementation to local units of government. Limited guidance and assistance is usually provided without cost, or such assistance may be provided for a nominal fee. In some cases, the local unit of government may contract with the agency for more extensive technical assistance services. A summary of the various levels and types of assistance available by agency follows.

County Agencies: The county soil and water conservation districts are authorized to cooperate in furnishing technical assistance to landowners or occupiers and any public or private agency in preventing soil erosion and floodwater and sedimentation damage and in furthering water conservation and development.

Those counties with park or planning staffs provide certain technical services related to park design and general community planning and development problems to local units of government and private groups.

Areawide Agencies: The Southeastern Wisconsin Regional Planning Commission, through its Community Assistance Division, provides limited educational, advisory, and review services to the local units of government, including participation in educational programs, such as workshops; provision of speakers; sponsorship of regional planning conferences; publication of bimonthly newsletters; selection of staff and consultants; preparation of planning programs; special base and soil and mapping; preparation of suggested zoning, official mapping, and land division ordinances; information regarding federal and state aid programs; and the review of local planning programs, plan proposals, ordinances, and most state and federal grant applications. In addition, the Commission is empowered to contract with local units of government under Section 66.30 of the Wisconsin Statutes to make studies and offer advice on land use, transportation, community facilities, and other public improvements.

The Milwaukee-Metropolitan Sewerage District through the Sewerage Commission of the City of Milwaukee provides technical assistance to local units of government within the District and contract areas on stormwater drainage and sanitary sewer design, construction, and maintenance.

State Agencies: The University of Wisconsin Extension, through county agents and extension specialists, provides important educational and technical assistance to farmers and to local units of government in public affairs, soil and water conservation, and outdoor recreation. An example of such university assistance is the educational services on the use and adaptation of the detailed operational soil survey and interpretative analyses being provided under a "Memorandum of Understanding" between the University and the Commission. Since the work of the Commission is entirely advisory, the importance of organized educational efforts directed at achieving public understanding and acceptance of the regional plans cannot be overestimated. The University Extension can, in this respect, fulfill an indirect, yet most important, plan implementation function.

The Wisconsin Department of Natural Resources provides advice in water problems; fish management; and forest planting, protection, management, and harvesting, and provides financial assistance to counties to prepare outdoor recreation plans which would establish county eligibility under the federal Land and Water Conservation Fund Program.

The Wisconsin Department of Natural Resources also provides plan review services and supervision of the operation of public water supply and sewage treatment facilities, and is authorized to provide technical assistance to local units of government and private groups in their efforts to initiate or engage in specific types of development, such as parks, recreation, resource development, water supply, and sewage disposal. The department was recently authorized to extend assistance to local units of government for the purpose of securing uniformity of water resource protection regulations.

The State Board of Soil and Water Conservation Districts is authorized to provide assistance to landowners and the county soil and water conservation districts in carrying out soil and water conservation practices.

Federal Agencies: The U. S. Department of Agriculture, Soil Conservation Service, provides technical assistance to local units of government and soil and water conservation districts for resource conservation, development, and utilization programs. The Soil Conservation Service also provides technical assistance to local units of government in the adaptation of the detailed operational soil survey and interpretative analyses to urban planning and development problems under the previously cited "Memorandum of Understanding" with the Commission.

The U. S. Department of Agriculture, Farmers Home Administration, provides technical and management assistance to farmers and farm associations for forestry programs, soil improvement, fish production, and recreational enterprise.

The U. S. Department of the Interior, Heritage Conservation and Recreation Service, provides limited technical assistance and advice to local units of government and private interests in recreational resource planning and programming.

The U. S. Environmental Protection Agency provides technical assistance and advice on request at no cost to state and local units of government and private firms relative to water quality problems.

SUMMARY

This chapter has described the various means available and has recommended specific procedures for implementation of the recommended regional land use and transportation plans. The most important recommended

plan implementation actions are summarized in the following paragraphs by level of government, responsible agency or unit of government, and plan element.

Local Level

County Board of Supervisors (Land Use and Transportation Plans): It is recommended that each county board of the seven constituent counties comprising the Region upon the recommendation of the county planning agencies and county highway committees:

1. Adopt the recommended regional land use and transportation plans as these plans affect each respective county.

2. Create a county park and planning commission where this has not already been accomplished.[19]

3. Amend existing or adopt new county zoning ordinances so as to provide land use regulations similar to those contained in the SEWRPC Model Zoning Ordinance; adopt changes to the zoning district maps, as appropriate, to reflect the recommended regional land use plan;[20] and adopt soil and water conservation regulations.[21]

4. Adopt sanitary ordinances related to the regional soil survey and analysis so as to regulate the installation of private water and sewage disposal systems.

5. Amend existing or adopt new county subdivision control ordinances so as to provide regulations similar to those contained in the SEWRPC Model Land Division Ordinance.

6. Request by resolution the Wisconsin Department of Natural Resources to acquire those segments of the primary environmental corridor lying within the county which are shown on the regional park and open space plan as recommended for state acquisition, and continue or commence active county park and related open space acquisition and development programs so as to result in the provision of an integrated system of regional parks and recreation areas and the permanent preservation of the primary environmental corridors.

7. Integrate the environmental corridors shown on the recommended regional land use plan into the county park plan and adopt such a county park plan.

8. Adopt the recommended jurisdictional highway system plan as a guide to future highway facility development within the county.

9. Seek, in cooperation with the Wisconsin Department of Transportation, realignment of the state trunk, county trunk, local trunk, and federal aid systems to the recommended jurisdictional highway system plan.

10. Assume full operational and maintenance responsibilities for all county trunk highways within the county.

11. Prepare, in cooperation with the Wisconsin Department of Transportation, the Regional Planning Commission, and affected local units of government, a functional highway classification for the county and, if necessary, a revised jurisdictional highway plan for each respective county, and seek adjustment of the federal aid systems to the jurisdictional highway system plan.

County Soil and Water Conservation District (Land Use Plan): It is recommended that the seven soil and water conservation districts within the Region:

1. Adopt the recommended regional land use plan as it affects each respective district and request those state and federal agencies assisting such districts to provide only such assistance as would serve to implement the recommended regional land use plan.

2. Formulate soil and water conservation regulations necessary to assist in implementation of the recommended regional land use plan.

Common Councils, Village Boards, and Town Boards (Land Use and Transportation Plans): It is recommended that upon referral to, and recommendation of, the local plan commissions, each common council, village board, and town board within the Region:

1. Adopt the recommended regional plans as a guide to the physical development of the community as the regional plans affect the community.

2. Amend existing or adopt new local zoning ordinances so as to provide land use regulations similar to those contained in the SEWRPC Model Zoning Ordinance, and adopt changes to the zoning district maps, as appropriate, to reflect the recommended regional land use plan or file certified resolutions approving amendments and changes to the county zoning ordinances.

3. Acquire lands lying within the primary environmental corridors appropriate for development as community parks.

4. Consider and give due weight to the rational urban service areas designated by the recommended regional land use plans in all delibera-

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[19] *Walworth, Washington, and Waukesha Counties have created such commissions. Milwaukee County has a County Park Commission but has no need for a combined park and planning commission because there are no unincorporated areas remaining in the County.*

[20] *Not applicable in Milwaukee and Ozaukee Counties.*

[21] *Not applicable in Milwaukee County.*

tions concerning annexations, consolidations, and incorporations.

5. Adopt the recommended jurisdictional highway system plan as a guide to highway system development within the area of jurisdiction and integrate the recommended jurisdictional highway system plan into the local master plan.

6. Approve within the county a County Official Map prepared in conformance with the recommended jurisdictional highway system plan, and establish local official maps showning thereon the proposed local trunk highway facilities as well as primary environmental corridor and other open space lands to be publicly acquired and developed as parks and parkways.

7. Amend existing or adopt new subdivision control ordinances, providing regulations similar to those contained in the SEWRPC Model Land Division Ordinance, in order to facilitate local implementations of the regional land use plan and to assure the integrity of the recommended jurisdictional highway system plan.

Municipal Water and Sanitary Districts (Land Use Plan): It is recommended that all municipal water and sanitary districts within the Region:

1. Acknowledge the recommended regional land use plan, thereafter determine proposed utility service areas in accordance with the plan, and adopt and adhere to utility extensions and service policies that are consistent with the rational urban service areas designated by the plan.

2. Design and install public water supply and sanitary sewage systems so as to preclude service by such systems to proposed development located in floodplains, on soils having "very severe limitations" or "severe limitations" for urban development, or within the recommended regional environmental corridors and agricultural areas.

Milwaukee County Expressway and Transportation Commission (Transportation Plan): It is recommended that the Milwaukee County Expressway and Transportation Commission:

1. Recommend to the County Board of Supervisors that the proposed freeway and modified rapid transit facilities plan be approved and that the general plan of expressways be modified as required.

2. Upon approval of the modified plan by the County Board, assume implementation responsibilities for those freeway elements contained in the adopted general plan of expressways for Milwaukee County except for the North-South Freeway from Henry Clay north to the County line.

3. Assume implementation responsibilities for the fixed facility elements of the modified rapid transit plan.

Areawide Level

Metropolitan Sewerage Commissions (Land Use Plan): It is recommended that the Metropolitan Sewerage Commission of the County of Milwaukee, the Western Racine-Metropolitan Sewerage Commission, and the Walworth County Metropolitan Sewerage Commission:

1. Acknowledge the recommended regional land use plan, thereafter determine proposed sewer service areas in accordance with the plan, and adopt and adhere to utility extension and service policies that are consistent with the rational urban service areas applied by the plan.

Racine and Kenosha Transit Commissions and Milwaukee County Transit Board (Transportation Plan): It is recommended that the Racine and Kenosha Transit-Parking Commissions and the Milwaukee County Transit Board:

1. Adopt the recommended regional transportation plan as this plan affects their respective transit service areas.

State Level

Wisconsin Department of Natural Resources (Land Use Plan): It is recommended that the State Natural Resources Board and the Department of Natural Resources:

1. Endorse the regional land use plan and direct its integration into the various conservation, park, and outdoor recreation, environmental protection, and technical and financial assistance programs conducted by various divisions of the department.

2. Adopt the regional soil survey and analyses as a guide in regulating installation of soil absorption sewage disposal systems within the Region, prohibiting the installation of such systems on soils within the Region that have "very severe limitations" for such systems as determined by the detailed operational soil surveys.

3. Object to subdivision plats lying within certain areas of the recommended environmental corridors, including the delineated floodways and floodplains of all perennial streams and watercourses.

4. Assign the highest appropriate priorities to all federal Land and Water Conservation Fund (LAWCON) applications or state Outdoor Resources Action Plan (ORAP) local park aid applications for land located within the primary environmental corridors.

5. Approve only such applications for state and federal aids in partial support of the construction and improvement of municipal pollution

prevention and abatement facilities that are located and designed in general concurrence with the recommended urban service areas and population forecasts.

6. Endorse and integrate the environmental corridors shown on the recommended regional land use plan into the state long-range conservation and outdoor recreation plans and acquire those portions of the primary environmental corridors which are recommended for state acquisition under the regional park and open space plan.

7. Approve only those proposed sanitary sewer extensions found to be in accord with the development recommendations contained in the regional land use plan.

Wisconsin Department of Local Affairs and Development (Land Use and Transportation Plans): It is recommended that the Wisconsin Department of Local Affairs and Development:

1. Endorse the regional plans and direct their integration into the various functions of the department.

2. Give due weight to the recommended land use plan in reviewing proposed annexations, incorporations, and consolidations.

3. Promote implementation of the regional plans in its program providing technical assistance to local units of government.

4. Undertake, in cooperation with the Wisconsin Department of Transportation, a review of current relocation laws, practices, and procedures.

Wisconsin Department of Health and Social Services (Land Use Plan): It is recommended that the Wisconsin Board of Health and Social Services and the Department of Health and Social Services:

1. Endorse the recommended regional land use plan, with particular regard for the rational urban service areas applied by the plan in the exercise of its subdivision review and approval powers.

2. Adopt the regional soil survey and analyses as a guide in reviewing subdivision plats, and prohibit the subdivision of land covered by soils that have "very severe limitations" and "severe limitations" for residential development as determined by detailed operational soil surveys.

Wisconsin Board of Soil and Water Conservation Districts (Land Use Plan): It is recommended that the Wisconsin Board of Soil and Water Conservation Districts:

1. Endorse the recommended regional land use plan, particularly the agricultural land use and environmental corridor element, as a guide in the coordination of the county soil and water conservation district projects.

2. Apportion appropriate federal and state funds to county soil and water conservation districts to enable implementation of their conservation programs in accordance with the land use plan.

Wisconsin Department of Agriculture: It is recommended that the Wisconsin Department of Agriculture:

1. Acknowledge the regional land use plan, particularly the agricultural land element, and utilize it in the administration of the state Farmland Preservation Program.

Wisconsin Department of Business Development: It is recommended that the Wisconsin Department of Business Development:

1. Endorse the recommended regional land use and transportation plans, and support implementation of the plans in its economic development activities.

Wisconsin Department of Transportation (Transportation Plan): It is recommended that the Wisconsin Department of Transportation:

1. Adopt and integrate the recommended regional transportation plan into the state long-range highway and transportation system plan as a functional guide to transit and highway system development within the Region.

2. Adopt and integrate the recommended jurisdictional highway system plan into the state long-range highway system plan.

3. Seek, in cooperation with the county boards and appropriate local officials, realignment of the state trunk, county trunk, local trunk, and federal aid systems to the recommended jurisdictional highway system plan.

4. Assume full operational and maintenance responsibilities for all state trunk highways within the Region.

5. Under the lower tier of the plan, it is recommended that the Wisconsin Department of Transportation, in close cooperation with local governments undertake:

   a. For USH 12 from STH 67 to the Walworth-Rock County Line, corridor refinement, right-of-way reservation and acquisition, facility construction all as staged in the plan, and capacity protection.

   b. For USH 41 from STH 145 to the Washington-Dodge County Line, facility construction as staged in the plan and capacity protection.

c. For the USH 16 conversion and the Oconomowoc bypass, right-of-way acquisition, and facility construction, all as staged in the plan, and capacity protection.

d. For the West Bend Freeway from STH 145 to existing USH 45 north of the City of West Bend, facility construction as staged in the plan and capacity protection.

e. For the Lake Freeway-South from E. Layton Avenue in Milwaukee County southerly through Racine and Kenosha Counties to the Illinois state line, right-of-way acquisition.

f. For IH 43 from STH 167 in the City of Mequon to Henry Clay Street in the City of Glendale and for IH 94 from the Goerkes Corners Interchange with USH 18 to USH 16, the addition of facility capacity as staged in the plan.

6. Under the upper tier of the plan, it is recommended that the Wisconsin Department of Transportation, in close cooperation with local governments, for the Lake Freeway-South from E. Layton Avenue to the Milwaukee-Racine County Line, conduct under the upper tier of the plan facility construction and capacity protection.

7. Undertake, in cooperation with the Wisconsin Department of Local Affairs and Development, a review of current relocation lows, practices, and procedures.

8. Assume implementation responsibilities for the carpool parking lot facilities recommended in the regional transportation plan.

9. Conduct a review of Section 66.94 dealing with the creation of Metropolitan Transit Authorities and propose any amendments to this section of the Statutes to insure a proper legislative basis for the creation of such an authority in southeastern Wisconsin should such creation become necessary.

Federal Level

U. S. Department of Housing and Urban Development (Land Use and Transportation Plans): It is recommended that the U. S. Department of Housing and Urban Development:

1. Endorse the recommended regional land use and transportation plans and use these plans as a guide in the administration and granting of federal aids for community development.

U. S. Department of the Interior, Heritage Conservation and Recreation Service (Land Use Plan): It is recommended that the U. S. Department of the Interior, Heritage Conservation and Recreation Service:

1. Acknowledge the regional land use plan, especially the park and open space elements, and utilize the plan in its administration and granting of aids under the Land and Water Conservation Fund program.

U. S. Department of Agriculture, Soil Conservation Service (Land Use Plan): It is recommended that the U. S. Department of Agriculture, Soil Conservation Service:

1. Acknowledge the recommended regional land use plan and utilize the plan as a guide in the administration and granting of federal aids for resource conservation and development and for construction of multipurpose watershed projects within the Region and in the provision of technical assistance for land and water conservation.

U. S. Department of Agriculture, Agricultural Stabilization and Conservation Service (Land Use Plan): It is recommended that the U. S. Department of Agriculture, Agricultural Stabilization and Conservation Service:

1. Acknowledge the recommended regional land use plan and utilize the plan in the administration of its agricultural conservation program.

U. S. Environmental Protection Agency (Land Use Plan): It is recommended that the U. S. Environmental Protection Agency:

1. Acknowledge the regional land use plan and utilize the plan as a guide in the administration and granting of federal aids for the construction of sewage treatment plants and related facilities within the Region.

U. S. Department of Agriculture, Farmers Home Administration (Land Use Plan): It is recommended that the U. S. Department of Agriculture, Farmers Home Administration:

1. Acknowledge the recommended regional land use plan and utilize the plan in the administration of its rural water and waste disposal facility grants and rural housing loans.

U. S. Department of Transportation, Federal Highway Administration (Transportation Plan): It is recommended that the U. S. Department of Transportation, Federal Highway Administration:

1. Adopt the recommended regional transportation plan and utilize the plan as a guide in the administration and granting of federal aids for highways.

2. Adopt the recommended jurisdictional highway system plan for the Region and utilize the plan as a guide in the review of requests for realignment of the various federal aid systems and in the administration and granting of federal aids for highway improvement within the Region.

3. Cooperate in, and approve the adjustment of, the federal aid systems to the recommended jurisdictional highway system plan.

U. S. Department of Transportation, Urban Mass Transportation Administration (Transportation Plan): It is recommended that the U. S. Department of Transportation, Urban Mass Transportation Administration:

1. Adopt the recommended regional transportation plan and utilize the plan as a guide in the administration and granting of federal aids for transit system development within the Region.

General Considerations

Several particularly significant aspects of regional plan implementation previously discussed in this chapter warrant restatement here in summary form. First, it should be reiterated that the recommended regional land use and transportation plans, as presented in this report, are intended to comprise flexible guides to the sound physical development of the Region, and, as such, are advisory to the local, state, and federal units and agencies of government and to private developers as these public and private bodies consider land use and transportation facility development matters within the Region. The regional plans are not to be considered as an inflexible mold to which all future development within the Region must precisely conform. Rather, the regional plans are to be regarded as a point of departure against which land use and transportation system development proposals can be evaluated as they arise and, in the light of which, better development decisions can be made by all concerned. The regional plans are intended to be used as a framework around which both comprehensive community development plans and single-purpose facility system development plans are developed in a coordinated manner and, as such, are subject not only to continual reinterpretation but also to refinement and detailing.

Second, the adoption or endorsement of the recommended regional land use and transportation plans as guides to the sound development of the Region by the local units of government and by the various state and federal agencies concerned is highly desirable, and in some cases essential, in order to secure a common understanding of areawide development objectives and to permit the necessary plan implementation work to be cooperatively programmed and jointly executed.

Third, plan implementation action policies and programs must not only be preceeded by plan adoption or endorsement, but must also emphasize the most important and essential elements of the plan and those areas of action which will have the greatest impact on guiding and shaping development in accordance with the recommended plan. Two major criteria should be used to determine which plan elements are truly regional in character or influence and are, therefore, essential to the attainment of regional development objectives: 1) the importance of the plan elements to the wise and judicious use of the underlying and sustaining natural resource base; and 2) the importance of the plan elements to the functional relationships existing between land use and the demand for major utility, recreation, and transportation facilities. In light of these criteria, the regional development objectives and plans can be substantially met if the Commission and its constituent local units of government and affected state and federal agencies can significantly influence the spatial location and size of only four aspects of regional development: the major transportation routes, particularly the freeway and modified rapid transit facilities; the major park and open space reservations, including the major drainageways; the public sanitary sewerage facility service areas; and the public water supply facility service areas.

Fourth, the importance of close coordination and cooperation between the local units of government and between these units of government and the various state and federal agencies to plan implementation cannot be overemphasized. Responsibilities for achieving such coordination and cooperation on a voluntary basis within the traditional framework of government in Wisconsin have been assigned to the Commission by the State Legislature, and the Commission has begun to be utilized by both local municipalities and by certain state and federal agencies for the attainment of the necessary coordination and cooperation. Even more intensive utilization of the Commission as a center for the attainment of close coordination of the many planning and plan implementation activities which are carried on within the seven-county Region must be made in the future if the regional plans are to be implemented and a more efficient, economical, attractive, and healthful environment is to be achieved within the Region. Advisory review of the location and size of major public works facilities by the Commission is essential for the effective development of transportation, utility, and community facilities within the Region, which not only comprise efficient systems as such, but which properly serve and promote the desired regional land use pattern; for abatement of costly duplication of effort and unnecessary expenditure of public funds; and for the preservation and protection of the underlying and sustaining natural resource base. Such review by the Commission may be obtained by contract or by request, or may be required by state and federal legislation.

Fifth, implementation of the regional plans will not be brought about by massive action of some one unit or agency of government. Rather, implementation of the regional plans will be brought about through literally thousands of development decisions made on a day-to-day basis over a period of many years by many private investors and by many public administrators operating at the local, areawide, state, and federal levels of government. It is extremely important that the individuals, corporations, or agencies making these decisions be aware of and understand the development proposals set forth in the recommended regional land use and transportation plans so that these plans will receive proper consideration in development decisions.

Finally, regional plan implementation can be achieved only within the context of a continuing, comprehensive, areawide planning effort, through which the planning inventories and forecasts on which the regional plans are based are updated, monitored, and revised; the plans themselves are reappraised and, if necessary, revised to accommodate changing conditions; and through which the plans are interpreted on a day-to-day basis to local, state, and federal units and agencies of government and to private investors and developers as the need to make development decisions arises. In this respect, it should be stressed that planning does not and cannot concern itself with future decisions; that is, with "things that should be done in the future." Rather, it must be recognized that decisions exist only in the present and that planning is necessary just because decisions can only be made in the present, yet cannot be made for the present alone. The question therefore, that faces public officials, private investors, and interested citizen groups within the Region concerning implementation of the recommended regional land use and transportation plans is not what should be done tomorrow to bring about the plans but, rather, what must be done today in light of the plans to get ready for an uncertain tomorrow. In a highly complex and dynamic urbanizing region such as southeastern Wisconsin, one key decision or the lack of such a decision may commit the Region as a whole and its many constituent units and agencies of government to a given course of action, sometimes irrevocably. This is particularly true in the field of public works development, where a decision to build one important link in a system may commit the entire system for a generation or more to come.

Chapter X

SUMMARY AND CONCLUSIONS

INTRODUCTION

This volume is the second of two which together present the major findings and recommendations of the extensive reevaluation of the adopted year 1990 regional land use and transportation plans carried out by the Southeastern Wisconsin Regional Planning Commission from 1972 through 1978. The first volume, published in April 1975, sets forth the basic principles and concepts underlying the plan reevaluation, and presented in summary form the essential factual information pertinent to sound, long-range, areawide land use and transportation system planning in southeastern Wisconsin. More specifically, the first volume presents data on the demography, economy, and public financial resource base of the Region; the land use pattern; the natural resource and public utility base; the configuration, capacity, and use of the regional transportation system; the travel habits and patterns within the Region; and the status of community plans and land use control ordinances as of 1972. Importantly, that volume also presents data on the changes in these factors which occurred since the initial benchmark inventories conducted by the Commission in 1963. In addition, the first volume includes a summary description of the adopted design-year 1990 regional land use and transportation plans, together with a summary of the progress made toward implementation of those plans from their adoption in 1966 to the base year of the plan reevaluation, 1972.

This, the second volume, presents a set of revised regional land use and transportation system development objectives, principles, and standards as formulated under the plan reevaluation effort; presents new forecasts of economic activity, population levels, and of land use, transportation, and natural resource demands; and presents and evaluates alternative land use and transportation system plans designed to meet anticipated growth and change in the Region through the new design year 2000. Finally, this second volume presents the new regional land use and transportation plans selected from among the alternatives considered after public review and evaluation and recommended for adoption and implementation. This volume also includes an environmental assessment of the recommended plans, a proposed staging of land use and major transportation facility development, and specific recommendations for land use and transportation system plan implementation.

ANTICIPATED REGIONAL GROWTH AND CHANGE

Rapid change is one of the basic characteristics of the modern world. Urban growth, decay, and renewal are among the most important aspects of this change. An important step in the regional planning process is an attempt to forecast the probable nature and approximate magnitude of these changes, including changes in population size, density, composition, and spatial distribution; in employment levels; in personal income and public financial resources; in automobile and truck availability; in travel habits and patterns, including modes used; and in land use, including development densities. No one, of course, can "predict" the future, and all forecasts involve uncertainties. Nevertheless, forecasts are essential if a plan is to be prepared which can serve as a point of departure for sound decisionmaking with respect to regional development. Given the uncertainties underlying any forecasts, it must also be recognized that planning must be a continuous process involving the periodic reassessment of the forecasts and attendant revision of the plans.

The Commission views the continuing planning process as cyclical in nature, alternating between system, or areawide planning, and project, or local planning. Under this concept, transportation facilities development and management proposals are initially advanced at the areawide systems level of planning, and then implemented through local project planning. If for whatever reasons a particular facility construction or management proposal advanced at the areawide systems planning level cannot be implemented at the project level, that determination is taken into account in the next cycle of systems planning. The regional land use-transportation planning process for southeastern Wisconsin is, as reflected in this report, in its second cycle, the initial cycle having consisted of the systems level planning completed by the Commission in 1966, and the project level planning carried out by many implementing agencies in the approximate decade that has elapsed since that completion. The proposed new land use and transportation plans accordingly reflect the experience gained through both successes and failures in implementation at the local project level of the original areawide systems plans.

Population

The Commission and the Technical Coordinating and Advisory Committee on Regional Land Use-Transportation Planning (TCAC) reviewed 15 different population projections, each based upon differing sets of assumptions with respect to fertility and migration, before agreeing upon a probable range of future resident population levels in the Region and within that range on a forecast level. The probable future range of resident population was established at between 1.9 million and 2.4 million persons by the year 2000. A single forecast level of 2.2 million persons was selected to be used in the preparation of the new plans. This forecast population level is based on an assumed reduction in fertility rates to below replacement level by 1985, and then

a gradual increase to replacement level from 1985 to 2000; and on an assumed halt of regional outmigration by 1985, with no substantial net in- or out-migration occurring thereafter.

The forecast regional population for the year 2000 represents an increase of about 463,000 persons, or about 26 percent, over the enumerated 1970 population of 1,756,000 persons; and an increase of about 441,000, or 25 percent, over the estimated 1977 population of 1,778,000 persons. At the county level, the population forecasts indicate continued rapid population growth in Ozaukee, Washington, and Waukesha Counties, with slower rates of population growth in Kenosha, Racine, and Walworth Counties. Milwaukee County, currently experiencing a significant decline in population, would under the forecast be expected to continue to lose population until about 1980, when its population would stabilize. After 1985 the population of Milwaukee County would, under the forecast, begin to again increase.

Employment

Employment in the Region by the year 2000 is projected to range from 994,500 to 1,101,400 jobs. Within this range, a forecast regional employment level of 1,016,000 jobs was selected. This regional employment level would represent an increase of 274,400 jobs, or about 37 percent over the 1970 level of 741,600 jobs, and an increase of about 198,000 jobs, or 24 percent over the estimated 1977 employment level of 818,300 jobs. It is envisioned that the number of jobs will increase in all seven counties, with the largest increases occurring in Milwaukee and Waukesha Counties. Milwaukee County's proportion of total regional employment, however, would continue to decline, reflecting some continued decentralization of jobs in the Region.

Automobile Availability

The number of automobiles available in the Region is projected to increase to about 1,168,100 by the year 2000. This would represent an increase of about 463,500 automobiles, or 66 percent over the 1972 level of 704,600, and an increase of about 414,000 automobiles, or 55 percent over the estimated 1977 level of 754,300. The number of trucks is projected to increase to about 144,000 by the year 2000, an increase of 67,000, or 87 percent over the 1972 level; and an increase of 37,000, or 35 percent over the 1977 level of 107,000. This projection is based upon an assumption of a decreasing rate of growth in automobile availability and the existence of a saturation level of automobile ownership.

In preparing the new regional transportation plan, it was explicitly recognized that the number of automobiles that would be available in the Region by the year 2000 could be influenced by the type and extent of mass transit service provided in the Region. Accordingly, one of the products of the new transportation plan was an estimate of the number of automobiles that would be available if the recommended transportation plan, and especially the mass transit element, were to be fully implemented. The analyses indicated that the future automobile availability level in the year 2000 could be expected to reach about 1,002,500, or about 165,600 automobiles fewer than the projection noted above.

Land Use

Commission studies have documented the sharply declining population density of the developed urban areas of the Region since that density peaked in 1920 at an average level of about 11,300 persons per square mile. This density declined to about 8,500 persons per square mile in 1950, and to 4,800 persons per square mile in 1963. By 1970 urban land uses in the Region occupied a total of about 512 square miles, and the average population density of the area encompassed by these uses had declined to about 4,350 persons per square mile. If it is assumed that the trend in land use decentralization exhibited over the period 1963 to 1970 will continue to the year 2000, land devoted to urban use within the Region would increase to about 831 square miles, or by about 319 square miles, and the average population density of the area encompassed by such uses would decline further to about 2,300 persons per square mile. By contrast, the recommended regional land use plan described in this volume proposes that only about 113 square miles of land be converted from rural to urban use to accommodate growth and change in the Region through the year 2000, and that the decline in population density be arrested and the density held at a level of about 3,500 persons per square mile.

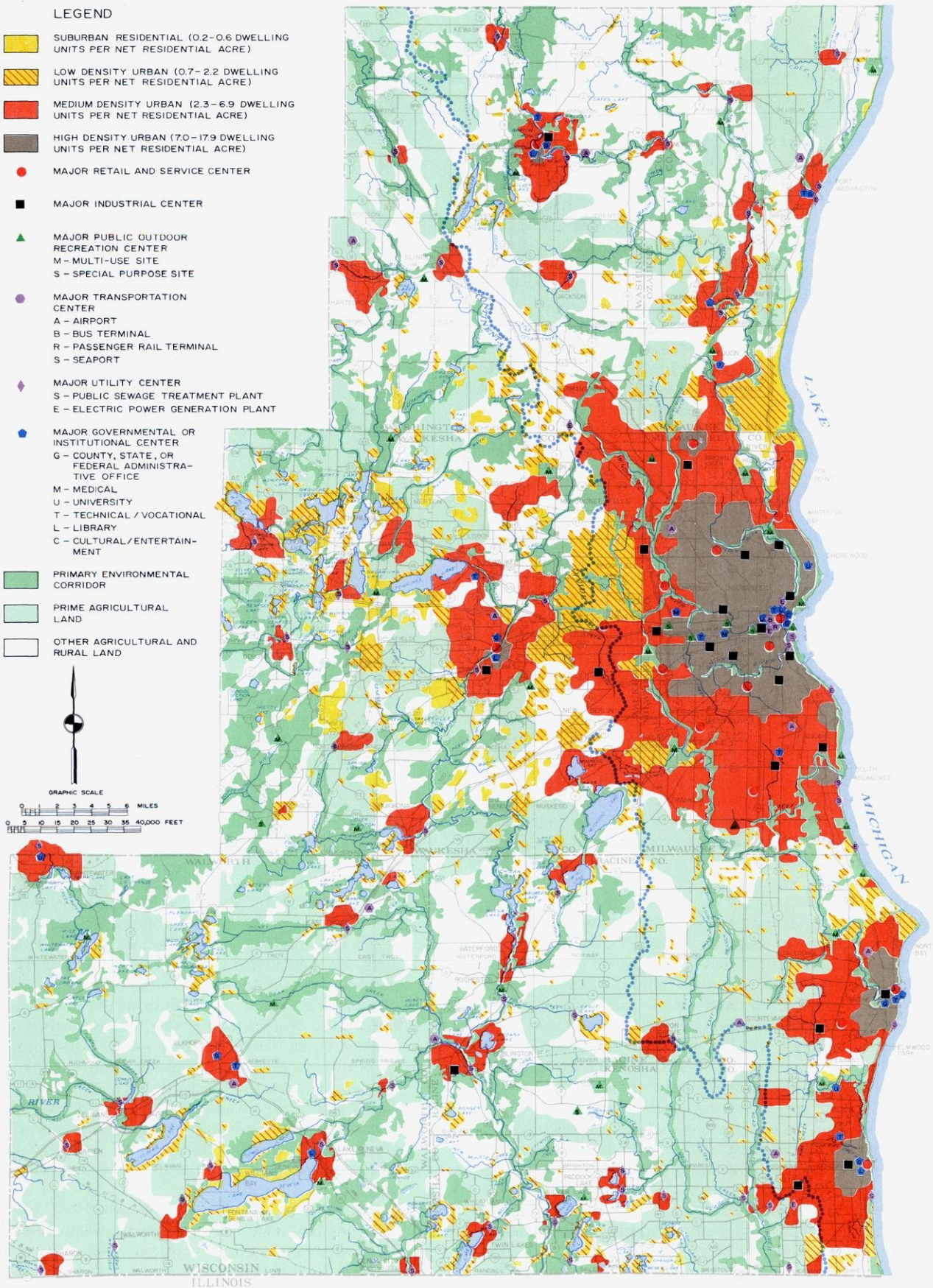
THE RECOMMENDED LAND USE PLAN

The recommended new regional land use plan for the design year 2000 is shown in graphic summary form on Map 130 and on the large plan map in the pocket attached to the back cover of this report. The basic concepts underlying the new land use plan are essentially the same as those underlying the regional land use plan for the year 1990. That plan was adopted by the Commission in 1966.

Like the adopted year 1990 land use plan, the recommended new land use plan for the design year 2000 advocates a return to the historic development trends that were evident within the Region prior to 1950, with new urban development proposed to occur largely in concentric rings outward from, and generally along, the full periphery of the established urban centers of the Region. The recommended new land use plan seeks to centralize land use development to the greatest degree practicable; to encourage new urban development to occur at densities consistent with the provision of public centralized sanitary sewer, water supply, and mass transit facilities and services; to encourage new urban development to occur only in areas covered by soils well-suited to urban use and not subject to special hazards, such as flooding; and to encourage new urban development and redevelopment to occur in areas in which essential urban facilities and services are available—particularly the existing urban centers of the Region—or into which such facilities and services can be readily and economically extended. Thus, while the plan continues to recognize the importance of the urban land market in determining the location, intensity, and character of

Map 130

FINAL RECOMMENDED REGIONAL LAND USE PLAN FOR SOUTHEASTERN WISCONSIN: 2000



The proposed new year 2000 regional land use plan was designed for a resident population level of about 2.2 million persons, an increase of about 463,000 persons over the 1970 level. To accommodate this increase the plan proposes to convert an additional 113 square miles of land from rural to urban use—less than one-half of the projected 235 square miles of land that would be converted under a continuation of existing trends. The plan seeks to encourage new urban development only in those areas of the Region which are covered by soils suitable for such development, which are not subject to special hazards such as flooding, and which can be readily provided with such urban services as sanitary sewer, water supply, and mass transit—the yellow, orange, and brown areas on the plan map. Development would be encouraged to occur at medium densities in planned neighborhood units providing a wide range of housing types and styles. The plan also seeks to preserve all of the remaining primary environmental corridors—the dark green areas on the plan map—in essentially natural open uses thus protecting the best remaining woodlands, wetlands, and wildlife habitat areas as well as the undeveloped shorelands and floodland, surface waters, and ground water discharge and recharge areas from incompatible development. Finally, the plan seeks to preserve almost all of the remaining prime agricultural areas of the Region—the light green areas on the plan map—in agricultural use.

Source: SEWRPC.

future urban development, it proposes to regulate to a greater degree than in the past the effect of this market on development in order to promote a more orderly and economic settlement pattern; to avoid further intensification of the existing and creation of new areawide developmental and environmental problems and to avoid the creation of more of these types of problems; and to generally channel the results of market forces into better conformance with sound areawide land use development objectives.

Urban Development and Density

The recommended regional land use plan envisions converting about 113 square miles of land from rural to urban use over the period 1970 through 2000, substantially less than the approximately 235 square miles which would have to be converted under a continued decentralization of urban development. The degree of centralization envisioned in the new plan is indicated by the fact that more than 60 percent of all new urban residential land and about 49 percent of the incremental resident population would be located within 20 miles of the Milwaukee central business district. The plan envisions that new urban development would occur primarily in planned neighborhood development units at medium-density population levels; that is, at about four dwelling units per net residential acre, or about 5,000 persons per gross square mile. The plan envisions that by the year 2000 about 92 percent of all urban land and about 93 percent of all the people in the Region would be served with public sanitary sewer service.

The plan recognizes that there will continue to be some demand for rural, or "country," living by nonfarm people. To a large extent in past years, this demand has been met through the development of subdivisions served by septic tanks and private wells with lot sizes ranging from less than one to three acres or more. The new regional land use plan seeks to discourage this kind of development since such growth represents neither rural nor urban development. Rather, the plan recommends that this portion of the housing market be satisfied through very low-density country estate-type development with lot sizes averaging at least five acres per dwelling unit. This type of rural residential development can effectively satisfy the demands for those nonfarm people who want to live in rural areas. With proper attention to soil and other natural resource base limitations, such development can be sustained without public sanitary sewer, water supply, or urban storm drainage facilities; high-value woodland and wetland areas can be preserved; and wildlife can continue to sustain itself in the area. The plan envisions that up to 10 percent of the forecast increase in regional population can be accommodated through such truly rural residential development.

Major Regional Centers

Major regional activity centers specifically addressed in the regional land use plan include retail and service, industrial, and recreational centers. There were 12 major retail and service centers in 1970. The regional plan for 2000 envisions retaining 11 of these existing major centers and adding five new major retail and service centers. One of these new major centers—Northridge in Milwaukee—has already been developed. The second new major center—called Racine West—would supplant the existing Elmwood Plaza shopping area as a major center, and has been actively proposed for development by 1980. A third new major retail and service center would be located in the City of Oak Creek. The remaining two new centers function today as the central business districts of the Cities of West Bend and Waukesha. The plan envisions that these two central business districts would be strengthened and improved through expansion in retail and service floor space so that by the year 2000 they could meet the criteria established for designation as a major regional center. Seven of the major retail and service centers that had been included in the adopted 1990 plan were not incorporated into the new 2000 plan, in part because of the lower design population level used in the preparation of the 2000 plan and in part due to the changing distribution of the regional population and concomitant changes in shopping patterns. These centers included one at the western edge of the City of Kenosha, one at the intersection of N. 21st Street and W. North Avenue in the City of Milwaukee, one in the Village of Germantown, one in the Village of Menomonee Falls, one in the City of New Berlin, and the central business districts of Burlington and Oconomowoc.

There were 17 major industrial centers in the Region in 1970. All 17 of these areas—including the major center in the Menomonee River Valley in the City of Milwaukee—are proposed in the recommended new regional land use plan to be retained, and five new major industrial centers would be added. All five of these centers were proposed in the 1990 land use plan and in 1970 were under initial stages of development. These five centers are located on the western edge of Kenosha, in the Granville portion of the City of Milwaukee, and in the Cities of Oak Creek, Burlington, and Waukesha.

Due in part to significant implementation of the 1990 regional land use plan recommendations, there were in 1970 a total of 27 major public outdoor recreation centers in the Region. Thus, the new regional land use plan calls for the acquisition and development of only two new major public parks—parks having a site area of 250 acres or more: one on Sugar Creek in the Town of Lafayette, Walworth County, and the other in Paradise Valley in the Town of West Bend, Washington County. In addition, the plan calls for additional land acquisition at the site of one existing park—Monches Park in the Town of Merton, Waukesha County. These major public outdoor recreation center recommendations are the same as those included in the regional park and open space plan prepared and adopted by the Commission in 1977.

Other regional activity centers identifed on the plan maps include major airports sited as recommended in the adopted regional airport system plan; sewage treatment plants, sited as recommended in the adopted regional sanitary sewerage system plan; major libraries, sited as recommended in the adopted regional library system

plan; county, state, and federal administrative offices; major medical centers; universities; technical and vocational schools; and cultural and entertainment centers.

Primary Environmental Corridors

The most important elements of the natural resource base of the Region, including the best remaining woodlands; wetlands; wildlife habitat areas; surface waters and associated shorelands and floodlands; areas covered by organic soils; areas containing rough topography and significant geological formations; scenic, historic, and scientific sites; groundwater recharge and discharge areas; existing park sites; and the best remaining potential park and related open space sites have been found to occur largely together in linear patterns in the natural landscape. These linear patterns have been termed primary environmental corridors. Like the 1990 regional land use plan, the year 2000 regional land use plan proposes that these environmental corridors be protected and preserved in essentially natural, open space use. Such protection and preservation is considered essential to the protection and wise use of the natural resource base; essential to the preservation of the Region's cultural heritage and natural beauty; and important to the enrichment of the physical, intellectual, and spiritual development of the resident population, as well as to the prevention of new and the intensification of existing environmental problems such as flooding and water pollution. The topography, soils, and flood hazards existing in these corridors, moreover, make them poorly suited to intensive urban development of any kind, but well-suited to recreational and conservancy uses.

Together these primary environmental corridors encompass about 542 square miles, or about 20 percent of the area of the Region. Of this total, about 437 square miles, or 16 percent of the area of the Region, is considered "net" corridor; that is, not in an urban land use or covered by surface water. The regional park and open space plan adopted by the Commission in 1977 includes definitive recommendations for the protection and preservation of these lands, including identifying which corridors should be publicly acquired and which should be preserved through private ownership and appropriate land use regulation. About 72 square miles, or 16 percent of the net corridor area, are already publicly owned. The adopted regional park and open space plan calls for public acquisition of an additional 110 square miles of net corridor, or an additional 25 percent. The remaining 255 square miles of net corridor land is recommended to be protected through appropriate local use controls.

Prime Agricultural Lands

Like the 1990 regional land use plan, the design year 2000 regional land use plan proposes to preserve to the greatest extent practicable those areas identified as prime agricultural lands. In 1970 these lands totaled about 746 square miles, or 28 percent of the area of the Region. The year 2000 plan proposes to convert to urban use only those prime agricultural lands which have already been committed to urban development due to the proximity to existing and expanding concentrations of urban uses and the prior commitment of heavy capital investments in utility extensions. Only about 8,000 acres, or about 2 percent, of the prime agricultural lands would be converted to urban use under the plan.

Relation of Recommended Plan to Land Use Development Objectives

Implementation of the recommended regional land use plan would meet the social, physical, and economic needs of the existing and probable future resident population of the Region by providing a balanced allocation of space to each of the various major land use categories and by achieving the compatible arrangement of land uses that would avoid or minimize hazards and dangers to health, safety, and welfare and would at the same time maximize amenity and convenience in terms of the accessibility to supporting land uses.

Implementation of the recommended regional land use plan would protect and enhance the natural resource base of the Region, particularly the soils, inland lakes and streams, wetlands, woodlands, and wildlife habitat, and would assist in maintaining a sound ecological balance between the activities of man and the natural environment which supports him. To this end, the plan allocates new urban and rural development only to those areas of the Region which are covered by soils well-suited to such development. In particular, the plan seeks to avoid development requiring onsite septic tank sewage disposal systems in those areas of the Region covered by soils unsuited to the use of such systems, thereby avoiding the creation of water pollution problems and of public health hazards. Implementation of the plan would avoid intensification of existing and creation of new environmental problems, such as water pollution and flooding; would protect the shorelines of lakes and perennial streams from incompatible development; would protect the floodways and floodplains of perennial streams and watercourses from urban encroachment; and would protect the remaining woodland and wetland areas from destruction through improper urban or rural development. Implementation of the plan would also maintain the remaining high-value resource areas of the Region in a wholesome state in order to assure a suitable habitat for the maintenance of wildlife within the Region.

Implementation of the recommended regional land use plan would permit the more economical provision of public utility and other essential services to future urban development. The plan in this respect specifically recognizes the interdependence between the land use pattern and the transportation and public utility systems which serve and sustain it, and seeks to encourage urban development only in those areas of the Region which can be readily provided with gravity drainage sanitary sewer service and public water supply. Implementation of the plan would also maximize the use of existing public utility and transportation facilities—particularly mass transit—and require the provision of transportation and utility services only to those areas of the Region which should be allocated to urban use.

Implementation of the recommended regional land use plan would provide for the development and conservation

of residential areas within a physical environment that is healthy, safe, convenient, and attractive, and would assure the preservation and provision of enough open space land within the Region to enhance the total quality of the regional environment, lend form and structure to urban development, and facilitate a wide range of outdoor recreational activities.

Finally, implementation of the recommended regional land use plan would preserve the best remaining agricultural areas of the Region for agricultural use, thus contributing to the economic base of the Region, providing agricultural products for potential use by the resident urban population, and lending form and structure to urban development.

The recommended new regional land use plan was unanimously recommended for adoption by both the Technical Advisory and Citizens Advisory Committees which assisted the Commission in the plan reevaluation. The recommended plan is a refinement of the controlled centralization alternative land use plan presented at the extensive public informational meetings and public hearings held throughout the Region in 1974, 1976, and 1977. Public reaction at those meetings and hearings was nearly unanimous in favor of selecting the controlled centralization alternative over the controlled decentralization alternative also considered in the plan reevaluation process. Acceptance of the recommended new plan would mean a rejection of that alternative which would have sought to accommodate the continued diffusion of low-density urban development within the Region. Acceptance of the new plan would also mean, in effect, rejection of three of the four alternative land use plans explored at the time of the adoption of the initial regional land use plan in 1966: the satellite city plan, the corridor plan, and the uncontrolled decentralization plan.[1]

It should be noted that, based upon information provided at the extensive series of public informational meetings and public hearings held on the proposed new plan and the alternatives thereto, the recommended regional land use plan, as presented at the public hearings, was modified in three ways, those modifications being reflected in the plan as set forth in graphic summary form on Map 130 and on the large plan map contained in the pocket attached to the back cover of this report. First, the prime agricultural land preservation element was modified to reflect the more recent and more extensive delineations of prime agricultural land in Walworth County. Second, the plan was modified to reduce the geographic scope of the major public outdoor recreation center called for at Sugar Creek in the Town of Lafayette, Walworth County, to reflect a county park site of about 250 acres. Finally, the plan was modified to reflect a legislative commitment to develop a major special purpose outdoor recreation center on the abandoned Bong Air Force Base in Kenosha County.

[1] *See SEWRPC Planning Report No. 7, The Regional Land Use-Transportation Study, Volume 2, Forecasts and Alternative Plans—1990, June 1966, Chapter V, "Regional Development Alternatives."*

The Recommended Land Use Plan—
a Framework for Policy Formulation

The graphic presentation of the recommended new regional land use plan for the year 2000, as shown on Map 130 and on the large plan map enclosed in the pocket attached to the back cover of this report, indicates the recommended spatial distribution of urban land within the Region in the year 2000 by specific urban density category, as well as the locations of major concentrations of commercial, industrial, recreational, and governmental and institutional land uses, and transportation, communication, and utility land uses. The plan maps also identify the primary environmental corridor and prime agricultural lands designated by the Commission. The land use plan map thus represents a traditional approach to the graphic display of a land use plan, emphasizing the desired physical location and arrangement of the various land uses required to meet the socioeconomic needs of the Region.

An alternative approach to the graphic display of the recommended year 2000 regional land use plan is set forth on Map 62 in Chapter VII of this report. Whereas the traditional approach portrays the recommended plan within the context or urban residential densities and specific concentrations of major land uses, this alternative portrays the plan within a "development policy framework" context. Viewed within this context, and as indicated on Map 62 in Chapter VII, the land use plan would divide the Region into two essentially different areas: an urban service area and a rural service area. Different development policies to guide future land use development would be implemented within each of these two service areas, the policies being keyed to the adopted regional land use development objectives. The policies would seek to restrict urban growth in the rural service areas through proper zoning and other land use controls while encouraging the preservation of agricultural and other open space lands. The policies would seek to encourage orderly urban growth in the urban service areas through the timely extension of public facilities and services, and through proper zoning and other land use controls.

Urban Service Area

The urban service area would be further divided into two components: that allotted to the outward expansion of the Milwaukee, Racine, and Kenosha urbanized areas, and that allotted to the outward expansion of 12 free-standing urban growth centers. The urban service area would, by the design year of the plan, encompass an aggregate area of about 516 square miles, or about 81 percent of the total urban land in the Region. The resident population of this urban service area would be an estimated 1.88 million, or about 85 percent of the total regional population. The urban service area would also provide about 939,000 jobs, or about 93 percent of the total regional employment. A full range of urban services and facilities would be provided within the urban service area, including centralized sanitary sewer and water supply, solid waste collection, police, fire, and rescue services, and in the Milwaukee, Racine, and Kenosha urbanized areas, mass transit facilities.

The Milwaukee, Racine, and Kenosha urbanized areas would by the design year of the plan encompass a total area of 453 square miles, or about 88 percent of the total areal extent of the urban service area within the Region and 71 percent of the total 635 square miles of urban land within the Region. These three urbanized areas would have an estimated design year population level of about 1.71 million, or about 91 percent of the design year urban service population and 77 percent of the total design year regional population. They would also provide an estimated 854,800 jobs, or 91 percent of the design year urban service area employment and 84 percent of the total design year regional employment.

The growth management policy for the Milwaukee, Racine, and Kenosha urban areas would specifically seek to encourage the development and redevelopment of these urban areas in planned residential neighborhood units. Areas designated on Map 62 as "urban service area additions" would utilize this neighborhood concept. All new residential development would be properly serviced by public sanitary sewer and water supply facilities, and would contain within the immediate vicinity of each dwelling unit the full complement of public facilities needed by the family in its daily activities, such as elementary school and church and local park and convenience shopping centers. Also, all new residential development would provide ready access from residential areas to the regional transportation system. Such a policy would not only promote the efficient provision of community facilities and services to residential areas but would provide for the development of stable residential areas containing a wide range of housing types, designs, and costs, and would provide a desirable environment for family life.

Areas designated on Map 62 as "fully developed" and as "in fill" could also utilize the neighborhood unit concept in development proposals but in a somewhat different manner. Instead of planning for new urban growth in such fully developed areas, existing neighborhood unit boundaries would be determined and policies promulgated which would seek to conserve and rehabilitate not only the residential portions but the commercial, industrial, and recreational components of such neighborhoods.

The free-standing urban growth centers represent concentrations of urban activity outside of the Milwaukee, Racine, and Kenosha urbanized areas in predominantly rural areas of the Region. Each of the 12 proposed free-standing urban growth centers would have a resident population in the design year of at least 7,000 persons and a diversified economic base sufficient to provide at least 2,000 jobs. Altogether the 12 free-standing urban growth centers proposed in the plan would, by the design year, encompass an area of 63 square miles, or about 12 percent of the total areal extent of the urban service area, and about 10 percent of the total urban land in the Region. Together these centers would have an estimated year 2000 resident population level of about 179,000 persons, or about 9 percent of the total urban service area population and about 8 percent of the total regional population. Such centers would together provide an estimated 84,500 jobs, or about 9 percent of the total urban service area employment and 9 percent of the total regional employment. Growth management policies to be encouraged within these free-standing growth centers would be similar in most respects to those instituted in the Milwaukee, Racine, and Kenosha urbanized areas.

Rural Service Area

The proposed rural service area consists of all lands in the Region outside the Milwaukee, Racine, and Kenosha urbanized areas and the 12 free-standing growth centers. The rural service area, while encompassing 2,173 square miles of land area, or 81 percent of the total area of the Region, would contain only about 335,000 persons, or 15 percent of the design year regional population level, and would provide about 76,700 jobs, or about 7 percent of the design year employment level. The rural service area would, however, include an overwhelming majority of the regional agricultural and open space lands, as well as 28 rural community centers. Like the free-standing growth centers, almost all of these rural community centers would be provided with urban-type facilities and services, including centralized sanitary sewer and public water supply facilities. Such areas would, however, lack the population concentration and the diversified economic base to sustain a large employment level. Growth management policies to be encouraged in the rural service area include policies to preserve agricultural areas which, because of their unique productive capability, should remain indefinitely in open natural use, as well as other natural open areas containing significant elements of the natural resource base; and to maintain the stability of the rural community centers.

Thus, the regional land use plan, when viewed within a development framework context, highlights the rural-urban dichotomy which should exist in the Region in the design year of the plan with respect to land use. The graphic display of the plan in this context, as shown on Map 62 in Chapter VII of this report, clearly indicates a stratification of urban areas ranging from rural community centers to free-standing growth centers to contiguous urban growth concentrations. The description of the latter by the categories of "fully developed areas," "infill areas," or "urban service area additions," rather than by ultimate residential density as indicated in the more traditional land use plan shown on Map 130, facilitates a better understanding of the various growth management policies which would have to be encouraged in order to implement the recommended land use plan for the year 2000 within each of these areas.

THE RECOMMENDED TRANSPORTATION PLAN

The growth and change anticipated to occur within southeastern Wisconsin will generate demands for additional travel and for improved transportation facilities and services. Total travel demand generated within the Region is anticipated to increase by more than 28 percent, from a total of about 4.5 million person trips per average weekday in 1972 to more than 5.7 million such trips by the year 2000. Total vehicle miles of travel gen-

erated is anticipated to increase by more than 49 percent from about 20.1 million to 30.1 million miles per average weekday. The new year 2000 regional transportation system plan recommended in this report seeks to provide the Region with a safe, efficient, and economical transportation system which can effectively serve the existing and probable future travel demand within the Region, which will meet the recommended regional transportation system development objectives, and which will serve and promote the recommended land use plan. The final recommended regional transportation plan for the Region is shown on Map 131.

During preparation of the new plan, the Regional Planning Commission had to grapple with a serious division of public opinion as to whether or not any additional freeways should be constructed in Milwaukee County. This division of opinion reflects many considerations. Certain elected officials and interested citizens expressed concern about the escalating cost of constructing freeways, particularly in urban areas; the number of housing units and businesses that would have to be displaced by the construction of certain freeway segments; uncertainties as to future population and employment levels and motor fuel availability; and a belief that additional freeway construction would contribute to further population loss in the City of Milwaukee. Other elected officials and the business and labor community stressed the importance of an integrated freeway system to the social and economic well-being of not only the Region as a whole but of the central city as well. Since the early 1970's, this division of opinion has virtually halted freeway construction in Milwaukee County, with but two notable exceptions, the Daniel Webster Hoan Memorial Bridge over the harbor entrance and the Airport Spur Freeway. In fact, this division of opinion prolonged the process of preparing a new regional transportation plan by two years over the schedule originally anticipated.

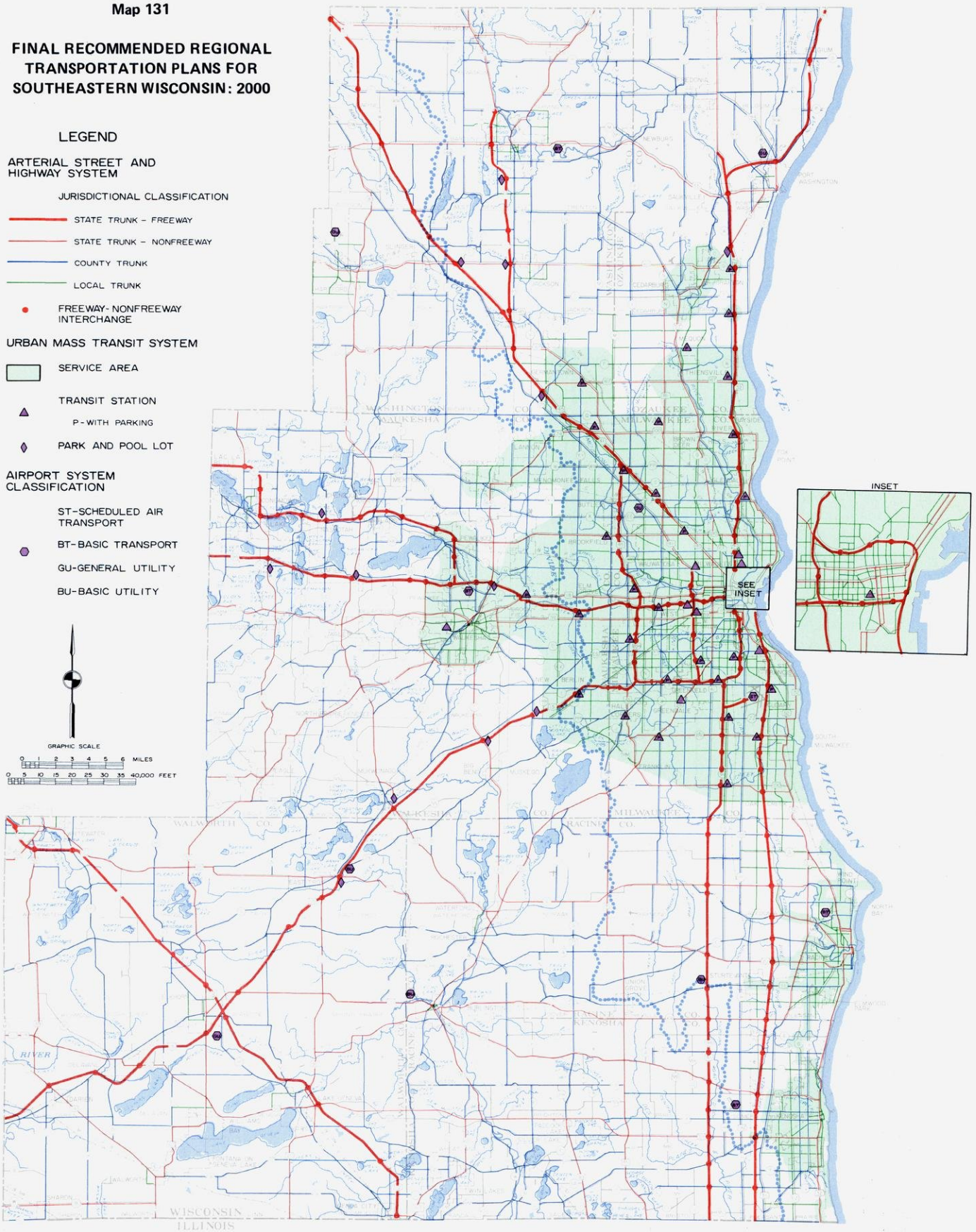
As a direct result of changes in the forecasts of probable population and employment growth and attendant traffic demand and in legislative and fiscal constraints and changes in the degree of public support for and acceptance of freeways, the Commission decided to remove a number of previously planned freeways from the new transportation plan, including the Metropolitan Belt Freeway, the Bay Freeway from Pewaukee to Whitefish Bay, the Stadium Freeway-North, including the so-called "gap closure" from the present northerly terminus of the Stadium Freeway-North to the present southerly terminus of the Fond du Lac Freeway, the Park Freeway-West, and the Racine Loop Freeway. In addition, in an attempt to deal with the uncertainties involved the Commission determined that, with respect to the freeway system in Milwaukee County, the new transportation plan would consist of two tiers. Under this two-tier approach, the following uncompleted freeway segments in Milwaukee County would remain on the new long-range system plan: the Stadium Freeway-South from the East-West Freeway to the Airport Freeway; the Park Freeway-East and Lake Freeway-North from the present terminus of the Park Freeway-East at N. Milwaukee Street to the East-West Freeway (the so-called downtown loop closure); and the Lake Freeway from the south end of the Daniel Webster Hoan Memorial Bridge to the Racine County line. For an indeterminate period of at least a decade, however, no further work would be undertaken to design and construct these proposed freeway segments with but two exceptions: the Stadium Freeway-South from its current terminus at W. National Avenue to a new terminus at W. Lincoln Avenue, a distance of 0.8 mile; and the Lake Freeway-South from its current terminus at Carferry Drive-South, a distance of 3.1 miles, to a new terminus at E. Layton Avenue. In all of the other proposed freeway corridors in Milwaukee County and in the Lake Freeway corridor in Kenosha and Racine Counties, the lower, or short-term, tier of the plan would consist of a combination of measures intended to reduce the anticipated peak-hour travel demand while making less capital-intensive improvements in the contested freeway corridors. The proposed freeways included in the lower tier represent facilities which the Commission studies indicate are needed now and whose construction is warranted to preserve and enhance the quality of life within, and the economic life of, the Region. The proposed freeways included in the upper tier represent facilities which Commission studies indicate will be needed if actual regional population, employment, urban development, and travel demand increase in accordance with the forecasts on which the long-range system plan is in part based.

The attempts to reduce vehicular travel demand would consist of the institution of auto use disincentives, particularly in terms of the parking rate structure in "downtown" Milwaukee, extensive freeway ramp metering, increased carpooling and vanpooling, and improved mass transit service. Such efforts would be designed to encourage a shift from the automobile mode to transit and other high vehicle-occupancy modes of travel. If these efforts are successful, travel demand would be modified and it may not be necessary in the long-term, or upper tier of the plan to ever construct the remaining uncompleted freeway segments. The suggested steps toward reducing peak-hour travel demand rather than increasing transportation system supply represent an extension and refinement of the Commission's historic approach to transportation planning. The low-capital intensive improvements in the contested freeway corridors would consist largely of minor freeway modifications and ramp improvements to effect better transitions between "stub ends" of the freeway system and the surface arterial system and traffic engineering improvements on existing arterial streets to better manage traffic flow. While all of the remaining contested freeways would be included in the upper, or long-term, tier of the plan, only the two above-described Milwaukee County freeway segments, together with rural freeway segments in Walworth, Washington, and Waukesha Counties, would be included in the lower, or short-term, tier of the plan.

The two-tier plan concept envisions that, if at some future date it is determined that actions to modify travel demand have been effective and that the freeway "stub end" and associated surface arterial improvements are adequately accommodating travel demand, the steps can

Map 131

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLANS FOR SOUTHEASTERN WISCONSIN: 2000



The final recommended regional transportation system plan for the year 2000 is composed of four elements: a freeway element, a standard surface arterial element, an urban mass transit element, and a transportation system management element. The freeway element contains a total of 336 miles of facilities; would comprise about 9 percent of the total arterial street and highway system in the plan design year; and would carry about 42 percent of the total of 30.1 million vehicle miles of travel anticipated to occur on an average weekday in the Region in the design year. About 239 miles, or 71 percent of the freeway system mileage, were either open to traffic as of January 1978 or fully committed to construction. About 97 miles, or 29 percent of the freeway system mileage, consists of proposed new freeways. The standard surface arterial element is proposed to include a total of 3,190 miles of facilities, or about 81 percent of the total arterial street and highway system. About 2,847 miles, or about 89 percent of the total standard surface arterial mileage, consists of arterial facilities open to traffic in 1972; about 193 miles, or about 6 percent of the mileage, is comprised of collector and land access streets open to traffic in 1972 and which will be required to perform an arterial function by the year 2000; and about 150 miles, or about 5 percent of the mileage, is comprised of new facilities. The urban mass transit system element of the plan, designed to serve the three urbanized areas—Kenosha, Milwaukee, and Racine—could be expected to carry about 335,000 person trips daily, an increase of 150,800 person trips over the 1972 level, or about 6 percent of the total 5.75 million person trips anticipated to occur daily in the Region. The plan provides for the expansion of service in all three areas from about a total of 1,201 round-trip route miles to a total of about 3,073 round-trip route miles by the year 2000, an increase of more than 180 percent over 1972 service levels. In the Milwaukee urbanized area, this system should be comprised of three levels of service: a primary service, consisting of vehicles operating between transit stations in a modified rapid transit mode on freeway facilities; a secondary service, consisting of vehicles operating on standard surface arterials in an express mode; and a tertiary service, consisting of vehicles operating on arterial and collector streets with frequent stops. The plan proposes a total of 38 transit stations, of which six are presently in existence, located along the primary system. The recommended plan also contains a management element, including the recommended expansion of freeway ramp metering to provide the level of service on the freeway system adequate for the provision of primary transit service; the use of curb parking restrictions to permit the full utilization of the existing street and highway system capacity; and the promotion of carpooling, with the continued support of existing carpooling programs and the construction of additional carpool parking lots. These four transportation plan elements would meet the existing and probable future travel demand within the Region through the plan design year 2000 with a minimum of urban disruption and capital investment.

Source: SEWRPC.

be taken to formally remove the remaining freeway proposals from the long-range plan. On the other hand, if it is the consensus at such time that travel demand-modification efforts have not worked well and that the freeway "stub end" and associated improvements do not adequately provide the needed transportation service, then work could proceed again toward the design and construction of the freeways. In the meantime, the plan recommends that all right-of-way currently cleared for the remaining freeway segments be held in a transportation land bank, with appropriate consideration given to the use of the land for park and open space purposes. The plan envisions that the lands involved would be landscaped and well-maintained and made available for play areas and other open space activities that do not involve heavy capital investment. The plan also recommends that any currently undeveloped lands needed to accommodate construction of those freeways included in the upper, or long-term, tier of the plan continue to be held in open use. This would be done through official mapping on the part of the state, county, and local units of government involved and, if such official mapping does not accomplish the objective of holding the land in open space use, through public purchase of the lands involved and the placement of such lands in the transportation land bank.

The recommended regional transportation plan consists of four major components: freeways, standard surface arterial streets and highways, mass transit facilities and services, and transportation system management recommendations. Each of these components is briefly discussed in the following sections.

Freeways

The recommended regional freeway system for the year 2000 is shown on Map 132 and is quantified in Table 382. As of January 1, 1978, there were nearly 231 miles of freeways in the Region open to traffic. An additional eight miles of freeways were considered to be fully committed, including the Airport Spur Freeway currently under construction and the completion of the conversion of existing USH 16 to a freeway near Pewaukee and west of STH 83 to Oconomowoc.

The recommended transportation plan proposes a total of 60.0 miles of new freeways in the lower tier, including:

1. Construction of the West Bend Freeway (USH 45) in Washington County from STH 145 northerly to existing USH 45 north of the City of West Bend.

2. Completion of the conversion from an expressway to a freeway of existing USH 41 in Washington County from USH 45 northerly to the Washington-Dodge County line.

3. Completion of USH 12 Freeway in Walworth County from the City of Elkhorn northwesterly to the City of Whitewater.

4. Construction of the USH 16 Freeway bypass of the City of Oconomowoc in Waukesha County.

5. Extension of the existing Stadium Freeway-South in Milwaukee County from its current terminus at W. National Avenue southerly to W. Lincoln Avenue.

Table 382

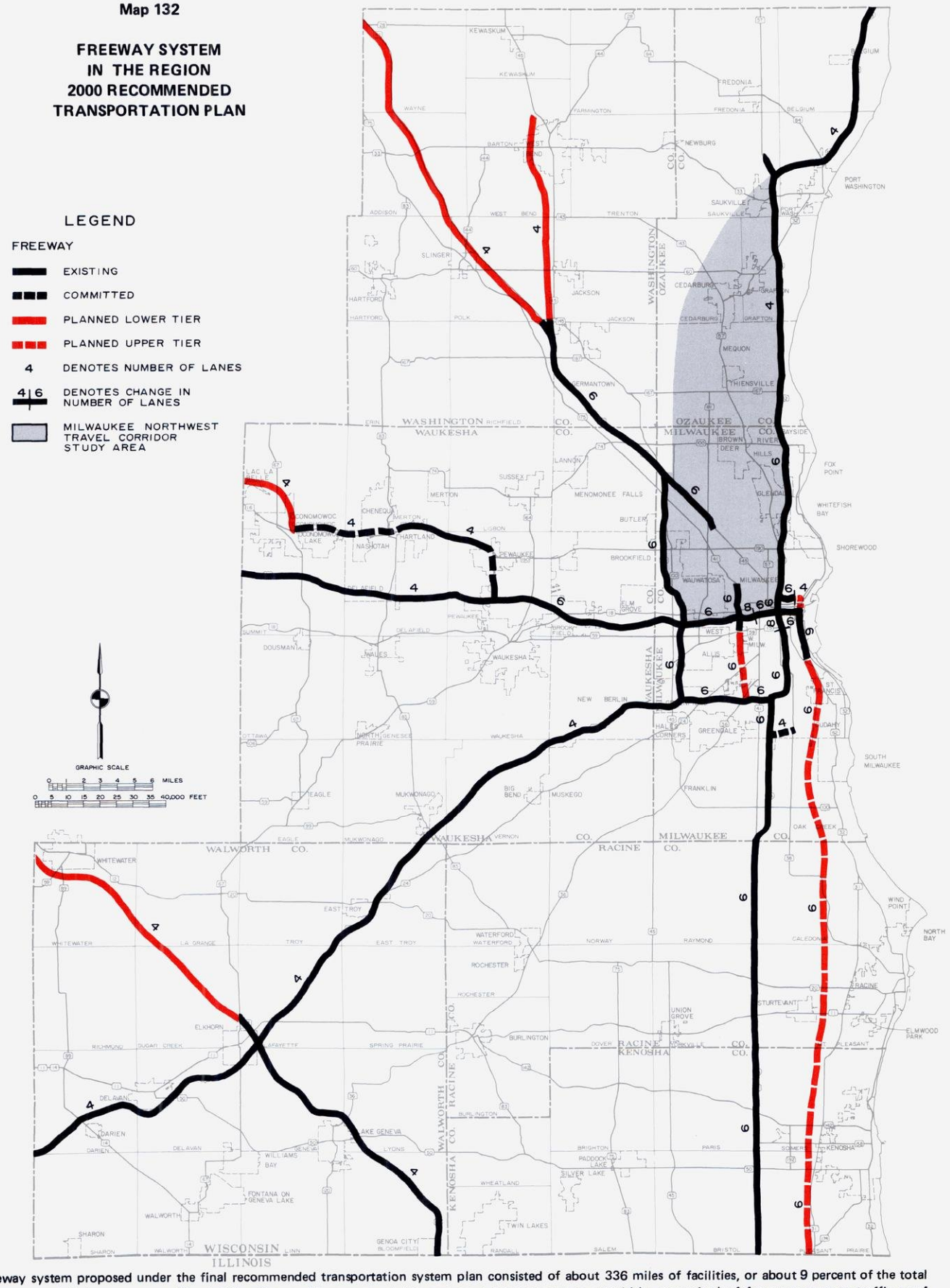
EXISTING, COMMITTED, AND PLANNED FREEWAYS IN THE REGION: 2000 RECOMMENDED TRANSPORTATION PLAN

Freeway	Existing January 1, 1978	Number of Miles			Total
		Committed	Planned		
			Lower Tier	Upper Tier	
Airport	5.1	--	--	--	5.1
Airport Spur	--	1.4	--	--	1.4
East-West	33.5	--	--	--	33.5
Fond du Lac	4.5	--	--	--	4.5
Lake	2.6	--	3.1	33.3	39.0
North-South	78.0	--	--	--	78.0
Park	1.2	--	--	0.5	1.7
Rock	48.7	--	--	--	48.7
Stadium	2.7	--	0.8	3.3	6.8
USH 12	19.1	--	17.0	--	36.1
USH 16	8.3	7.0	5.4	--	20.7
USH 41	11.3	--	21.0	--	32.3
West Bend	1.0	--	12.7	--	13.7
Zoo	14.5	--	--	--	14.5
Total	230.5	8.4	60.0	37.1	336.0

Source: SEWRPC.

Map 132

FREEWAY SYSTEM IN THE REGION 2000 RECOMMENDED TRANSPORTATION PLAN



The freeway system proposed under the final recommended transportation system plan consisted of about 336 miles of facilities, or about 9 percent of the total arterial street and highway system. About 231 miles, or 78 percent, of this proposed freeway system, would be comprised of freeways open to traffic as of January 1978; about 8 miles, or nearly 3 percent of the proposed system, would be comprised of facilities considered to be committed to construction; and about 97 miles, or about 29 percent of the proposed system, would be comprised of planned new facilities. Under the new plan, the proposed freeway system would be comprised of two categories: a lower tier, for which implementation should proceed immediately, and an upper tier, for which implementation would not proceed beyond the phase of right-of-way preservation for at least a decade and until the effectiveness of low-capital intensive improvements proposed in lieu of these freeways has been demonstrated. The proposed lower-tier facilities would total about 60 miles, or nearly 18 percent of the total freeway system. The upper-tier facilities would total about 37 miles, or 11 percent of the total freeway system.

Source: SEWRPC.

6. Extension of the existing Lake Freeway-South in Milwaukee County from the south end of the Hoan Memorial Bridge at E. Carferry Drive southerly to E. Layton Avenue.

In addition, 11.6 miles of existing freeways are recommended for significant improvement in the lower tier, including:

1. Construction of two additional travel lanes on IH 43 in Milwaukee and Ozaukee Counties from W. Henry Clay Street northerly to STH 167.

2. Reconstruction of the existing Stadium Freeway-South in Milwaukee County, including the provision of two additional travel lanes from the Stadium Interchange (IH 94) southerly to the present terminus at W. National Avenue.

3. Provision of two additional lanes on existing IH 94 in Waukesha County from the Goerkes Corners Interchange (USH 18) westerly to the USH 16 Interchange near Pewaukee.

It is further recommended in the lower tier of the plan that right-of-way be acquired for the proposed Lake Freeway-South in Kenosha, Milwaukee, and Racine Counties southerly from E. Layton Avenue in the City of St. Francis to the Illinois state line and that a standard surface arterial capable of later ready conversion to a freeway be constructed. In addition, it is recommended that a series of special studies be conducted to deal with traffic at the four existing and two proposed freeway "stub ends" in Milwaukee, and that a special study be conducted of the transportation needs of northwestern Milwaukee County and southwestern Ozaukee County, which would have been served by the previously planned Park Freeway-West and Stadium Freeway-North.

The recommended transportation plan includes a total of 37.1 miles of proposed freeways in the upper tier, including:

1. Completion of the Park Freeway-East in Milwaukee County easterly from the current terminus at N. Milwaukee Street to the proposed Lake Freeway-North.

2. Completion of the Lake Freeway-North in Milwaukee County northerly from the existing Lake Interchange (IH 794) to the proposed Park Freeway-East.

3. Completion of the Lake Freeway-South in Kenosha, Milwaukee, and Racine Counties southerly from E. Layton Avenue in the City of St. Francis to the Illinois state line.

4. Completion of the Stadium Freeway-South, southerly from W. Lincoln Avenue to the existing Airport Freeway (IH 894).

Standard Surface Arterial Streets and Highways

In 1972, the surface arterial street and highway system in the Region consisted of about 2,847 miles. By the year 2000, this surface arterial system would be increased under the recommended regional transportation plan by about 343 miles. This additional mileage reflects primarily the addition of existing nonarterial facilities to the arterial system. The construction of new surface arterial facilities would total only about 150 miles under the recommended plan.

Table 383 summarizes by county and by arterial facility type the improvements proposed under the entire arterial street and highway system in the recommended plan. The improvements may be categorized as system preservation, system improvement, and system expansion efforts. System preservation includes all arterial improvement projects required to maintain the structural adequacy and serviceability of the existing arterial system without significantly increasing the capacity of that system. This would include all projects classified as resurfacing and reconstruction for the same capacity; that is, without significant widening. System improvement includes all projects which would significantly increase the capacity of the existing system through street widening or relocation. System expansion includes all projects which would significantly increase the capacity of the existing system through construction of new facilities.

Under the recommended plan, about 2,621 miles would fall into the system preservation category, representing about 74 percent of the total arterial system. This includes 196 miles where no work is required, 1,545 miles where only resurfacing is required, and about 880 miles where reconstruction to the same capacity is required. About 721 miles, or almost 21 percent, would fall into the system improvement category, including 677 miles that would be reconstructed for additional capacity—significant street widening—and 44 miles involving new construction of a replacement facility. The remaining 184 miles, or 5 percent, would fall into the system expansion category, where new construction of new facilities is required.

Mass Transit Facilities and Services

The recommended regional transportation plan includes transit system development proposals for the three urbanized areas of the Region—Milwaukee, Kenosha, and Racine. The base transit fare is recommended to remain at the relative level of $0.50 in the Milwaukee urbanized area and at the relative level of $0.25 in the Kenosha and Racine urbanized areas, these fares being expressed in 1975 dollars. If general price inflation continues, it should be anticipated that increases in the base transit fare would occur in order to offset the effects of such inflation and keep the fare box revenues at the relative levels envisioned in the plan.

In the Milwaukee urbanized area, the plan envisions the provision of three levels of transit service. The primary level of service is intended to link the major activity

Table 383

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2000 RECOMMENDED TRANSPORTATION PLAN

Arterial Facility Type	System Preservation				System Improvement			System Expansion		
	No Work Required (miles)	Resurface (miles)	Reconstruct for Same Capacity (miles)	Percent of Total	Reconstruct for Additional Capacity (miles)	New Construction—Replacement Facility (miles)	Percent of Total	New Construction—New Facility (miles)	Percent of Total	Total (miles)
Kenosha County										
Freeway	--	12.1	--	49.8	--	--	--	12.2	50.2	24.3
Standard Arterial	0.9	128.2	114.2	72.6	70.0	9.7	23.8	12.3	3.7	335.3
Subtotal	0.9	140.3	114.2	71.0	70.0	9.7	22.2	24.5	6.8	359.6
Milwaukee County										
Freeway	9.8	53.0	--	73.5	5.4	--	6.3	17.6	20.6	85.4
Standard Arterial	62.5	319.0	72.5	65.9	219.7	3.7	32.4	11.9	1.7	689.3
Subtotal	72.3	372.0	72.5	66.7	225.1	3.7	29.5	29.5	3.8	774.7
Ozaukee County										
Freeway	16.8	8.8	--	92.8	2.0	--	7.2	--	--	27.6
Standard Arterial	4.0	145.3	89.8	84.4	38.6	2.0	14.3	3.6	1.3	283.3
Subtotal	20.8	154.1	89.8	85.1	40.6	2.0	13.7	3.6	1.2	310.9
Racine County										
Freeway	--	12.0	--	49.8	--	--	--	12.1	50.2	24.1
Standard Arterial	5.7	119.7	182.3	73.6	81.7	5.9	20.9	22.9	5.5	418.2
Subtotal	5.7	131.7	182.3	72.3	81.7	5.9	19.8	35.0	7.9	442.3
Walworth County										
Freeway	50.3	--	--	74.9	--	--	--	16.9	25.1	67.2
Standard Arterial	9.3	226.8	133.9	88.9	22.0	10.2	7.8	13.8	3.3	416.0
Subtotal	59.6	226.8	133.9	87.0	22.0	10.2	6.6	30.7	6.4	483.2
Washington County										
Freeway	2.2	6.4	--	20.3	21.1	--	49.8	12.7	29.9	42.4
Standard Arterial	1.8	218.7	112.8	84.3	40.2	6.8	11.9	14.9	3.8	395.2
Subtotal	4.0	225.1	112.8	78.7	61.3	6.8	15.6	27.6	6.3	437.6
Waukesha County										
Freeway	14.1	35.6	--	76.9	8.8	--	13.6	6.1	9.5	64.6
Standard Arterial	18.5	259.7	174.9	69.4	167.0	6.0	26.5	26.7	4.1	652.8
Subtotal	32.6	295.3	174.9	70.1	175.8	6.0	25.3	32.8	4.6	717.4
Southeastern Wisconsin Region										
Freeway	93.2	127.9	--	65.8	37.3	--	11.1	77.6	23.5	336.0
Standard Arterial	102.7	1,417.4	880.4	75.3	639.2	44.3	21.4	106.1	3.3	3,190.1
Total	195.9	1,545.3	880.4	74.3	676.5	44.3	20.4	183.7	5.3	3,526.1

Source: SEWRPC.

centers—such as commercial, industrial, institutional, and recreational centers—to each other and to the various residential communities in the area. Primary service is characterized by relatively high operating speeds but relatively low accessibility. The primary service envisioned in the plan would include no true rapid transit; that is, transit service provided over exclusive fully grade-separated rights-of-way. All of the primary service in the plan would be of the modified rapid transit type; that is, provided by the operation of motor buses in mixed traffic on freeways and, in some cases, over surface arterial streets on route extensions. The primary transit service would be supported by the recommended implementation of a comprehensive freeway operational control system for the Milwaukee urbanized area, including freeway mainline and ramp traffic monitoring, ramp metering with traffic signals operating from a centralized control, traffic accident incident detection and management, and driver information systems. Buses and other high-occupancy vehicles, such as carpools and vanpools, would be accorded preferential access to the freeways via exclusive ramps or lanes. The objective of the system would be to enable the provision of a high-quality transit service on free-flowing uncongested freeways.

The primary transit network proposed in the plan is shown in red on Map 133. Such primary transit service would be provided over a total of 80 miles of freeway facility, with nonfreeway extensions of such service provided over 27 miles of surface arterial facilities. The vehicles providing primary service would also perform a collection/distribution service for the transit station located at the beginning and end of each primary transit route. A total of 38 transit stations would be established along the primary transit system, of which six stations are already in existence (see Table 384).

The primary service system is closely related to implementation of the previously described upper tier of freeway facilities. If the upper tier of freeway facilities is not ultimately constructed, then the primary transit network would have to be redesigned, rerouting some service to existing freeways and providing the best

Table 384

SELECTED CHARACTERISTICS OF PRIMARY TRANSIT STATIONS IN THE MILWAUKEE URBANIZED AREA: 2000 RECOMMENDED TRANSPORTATION PLAN

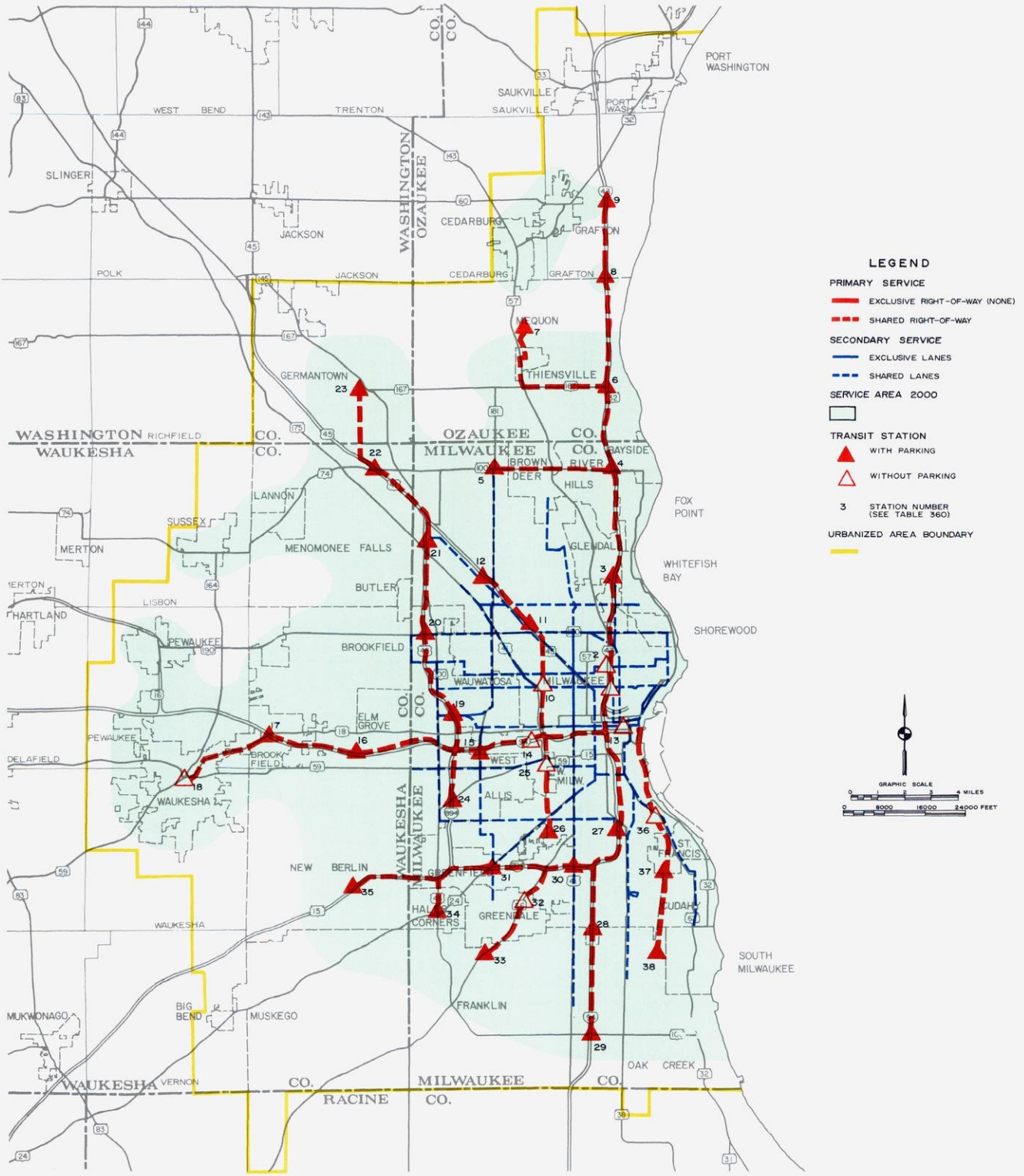
Transit Station Identification					Type of Service				Passenger Facilities		
Primary Service Corridor	Number[a]	Name	Civil Division	Status	Primary	Secondary	Tertiary	Collection-Distribution	Shelter	Number of Parking Spaces	Buses per Peak Hour in Peak Direction
East Side	1	W. North Avenue	City of Milwaukee	Proposed	X	X	X		X	--	24
	2	W. Locust Street	City of Milwaukee	Proposed	X	X	X		X	--	14
	3	Northshore	City of Glendale	Existing	X	X	X	X	X	200	6
	4	W. Brown Deer Road	Village of River Hills	Existing	X		X	X	X	325	8
	5	Northridge	City of Milwaukee	Proposed	X	X	X		X	150	4
	6	STH 167—Mequon	City of Mequon	Proposed	X		X	X	X	300	6
	7	MATC—Mequon	City of Mequon	Existing	X		X		X	100	6
	8	CTH C—Grafton	Town of Grafton	Proposed	X				X	100	4
	9	CTH Q—Grafton	Town of Grafton	Proposed	X		X	X	X	325	4
Northwest	10	N. Sherman Boulevard	City of Milwaukee	Proposed	X	X	X		X	--	9
	11	Capitol Court	City of Milwaukee	Proposed	X	X	X		X	200	9
	12	W. Silver Spring Drive	City of Milwaukee	Proposed	X	X	X		X	150	5
East-West	13	Downtown Milwaukee	City of Milwaukee	Proposed	X	X	X	X	X	--	159
	14	VA Center	City of Milwaukee	Proposed	X				X	--	7
	15	State Fair Park	City of Milwaukee	Proposed	X	X	X		X	300	14
	16	Brookfield Square	City of Brookfield	Proposed	X		X	X	X	100	5
	17	Goerke's Corners	Town of Brookfield	Existing	X		X	X	X	300	10
	18	Waukesha	City of Waukesha	Proposed	X		X	X	X	--	10
Zoo Freeway-North	19	Watertown Plank Road	City of Wauwatosa	Existing	X	X	X	X	X	250	12
	20	W. Capitol Drive	City of Wauwatosa	Proposed	X	X	X	X	X	300	8
	21	W. Good Hope Road	City of Milwaukee	Proposed	X		X	X	X	300	3
	22	STH 74—Menomonee Falls	Village of Menomonee Falls	Proposed	X		X	X	X	300	4
	23	Mequon Road—Germantown	Town of Germantown	Proposed	X		X		X	150	2
Zoo Freeway-South	24	W. National Avenue	City of West Allis	Proposed	X		X	X	X	350	14
Stadium Freeway-South	25	W. National Avenue	Village of West Milwaukee	Proposed	X	X	X		X	--	6
	26	W. Morgan Avenue	City of Milwaukee	Proposed	X		X	X	X	100	6
IH 94-South	27	W. Morgan Avenue	City of Milwaukee	Proposed	X	X	X	X	X	200	14
	28	W. College Avenue	City of Milwaukee	Existing	X		X	X	X	375	9
	29	W. Ryan Road	City of Oak Creek	Proposed	X		X		X	375	3
Airport Freeway	30	S. 27th Street	City of Milwaukee	Proposed	X	X	X	X	X	375	8
	31	S. 76th Street	City of Greenfield	Proposed	X	X	X	X	X	300	11
	32	W. Grange Avenue	Village of Greendale	Proposed	X		X		X	--	3
	33	W. Rawson Avenue	City of Franklin	Proposed	X		X		X	200	3
	34	Hales Corners	Village of Hales Corners	Proposed	X		X	X	X	325	6
	35	Moorland Road—New Berlin	City of New Berlin	Proposed	X		X		X	100	2
Lake Freeway	36	E. Oklahoma Avenue	City of Milwaukee	Proposed	X	X	X		X	--	17
	37	E. Layton Avenue	City of Cudahy	Proposed	X		X	X	X	200	8
	38	E. Rawson Avenue	City of Oak Creek	Proposed	X		X	X	X	425	9

[a] *See Map 133.*

Source: SEWRPC.

Map 133

TRANSIT SYSTEM IN THE MILWAUKEE URBANIZED AREA: 2000 RECOMMENDED TRANSPORTATION PLAN



Under the final recommended transportation plan, transit service would be provided over 3,073 round-trip route miles of transit line in the Milwaukee urbanized area. Of this total, 1,052 route miles would provide primary service, 361 route miles secondary service, and 1,660 route miles tertiary service. The system would require the operation of about 1,027 buses during peak ridership periods. This would represent an increase of 2,012 round-trip route miles and 585 buses over 1972. The plan also recommends the provision of 38 public park and ride transit stations, an increase of 34 stations over 1972.

Source: SEWRPC.

level of service possible over surface arterial streets, particularly in the northwest travel corridor of Milwaukee County.

The secondary level of transit service envisioned in the plan would provide express bus service over arterial streets, with stops generally located at intersecting transit routes. Thus, secondary service is distinguished from primary service in that it provides a greater degree of accessibility at somewhat slower operating speeds. Under the recommended plan, secondary service would be provided over 14 individual transit routes with exclusive transit lanes—traffic lanes where only buses would be allowed during specified hours of the day—on six arterial streets. The exclusive transit lanes would total nearly 10 miles (see Table 385). Shared secondary transit service would be provided over a total of about 146 miles of arterial facilities.

The tertiary level of mass transit service envisioned in the plan consists of local transit service provided primarily over arterial and collector streets, with frequent stops for passenger boarding and alighting. Under the recommended plan, extensive additions to the tertiary or local transit service routes would be provided. The plan envisions the ultimate extension of tertiary transit service to all of the Milwaukee urbanized area, including low-density urban residential areas in southern Ozaukee and Washington Counties and eastern Waukesha County. In these areas the tertiary level of service would be either the traditional fixed-route service or some form of nontraditional transit service, such as route deviation, subscription, dial-a-ride, or shared-ride taxi service.

In the Kenosha and Racine urbanized areas, only the tertiary or local level of mass transit service is envisioned in the plan. Significant improvements in mass transit service in these two urbanized areas have taken place in recent years in accordance with transit development programs previously prepared by the Commission in cooperation with the Cities of Kenosha and Racine. Consequently, the recommended regional transportation plan for 2000 envisions only relatively minor route extensions and changes to reflect the anticipated expansion of these urbanized areas. Map 134 identifies the proposed transit service areas and suggested route systems for the year 2000 in the Kenosha and Racine areas.

Transportation System Management Recommendations

In addition to the arterial street and highway and transit facility and service recommendations described above, the recommended regional transportation plan for 2000 includes four major transportation system management recommendations. These management recommendations

Table 385

EXCLUSIVE TRANSIT LANES ON STANDARD ARTERIAL STREETS IN THE MILWAUKEE URBANIZED AREA: 2000 RECOMMENDED TRANSPORTATION PLAN

Arterial Street			Exclusive Transit Lane				
	Limits					Number of Buses in	
Name	From	To	Type	Direction	Duration	Peak Hour	Remarks
N. 27th Street	W. St. Paul Avenue	W. Capitol Drive	Curb Lane	Southbound	6:00 a.m.-6:00 p.m.	19	Requires removal of curb parking.
			Curb Lane	Northbound	6:00 a.m.-6:00 p.m.	26	Requires removal of curb parking.
N. Farwell Avenue	E. Ogden Avenue	E. North Avenue	Curb Lane	Southbound	6:00 a.m.-9:00 a.m.	37	Requires removal of curb parking.
				Southbound	3:00 p.m.-6:00 p.m.	44	
N. Prospect Avenue	E. Kilbourn Avenue	E. North Avenue	Curb Lane	Northbound	6:00 a.m.-9:00 a.m.	38	Requires removal of curb parking.
				Northbound	3:00 p.m.-6:00 p.m.	44	
Kenwood Boulevard	N. Downer Avenue	N. Oakland Avenue	Curb Lane	Westbound	6:00 a.m.-6:00 p.m.	119	Requires removal of curb parking.
E. and W. Wells Street	N. Prospect Avenue	N. 10th Street	Contra-flow Curb Lane	Westbound	All day	68	Requires removal of curb parking, median construction, and replacement of Wells Street Bridge over Milwaukee River.
W. Wisconsin Avenue	N. 10th Street	N. 35th Street	Curb Lane	Eastbound	6:00 a.m.-9:00 a.m.	75	Requires removal of curb parking.
				Westbound	3:00 p.m.-6:00 p.m.	98	

Source: SEWRPC.

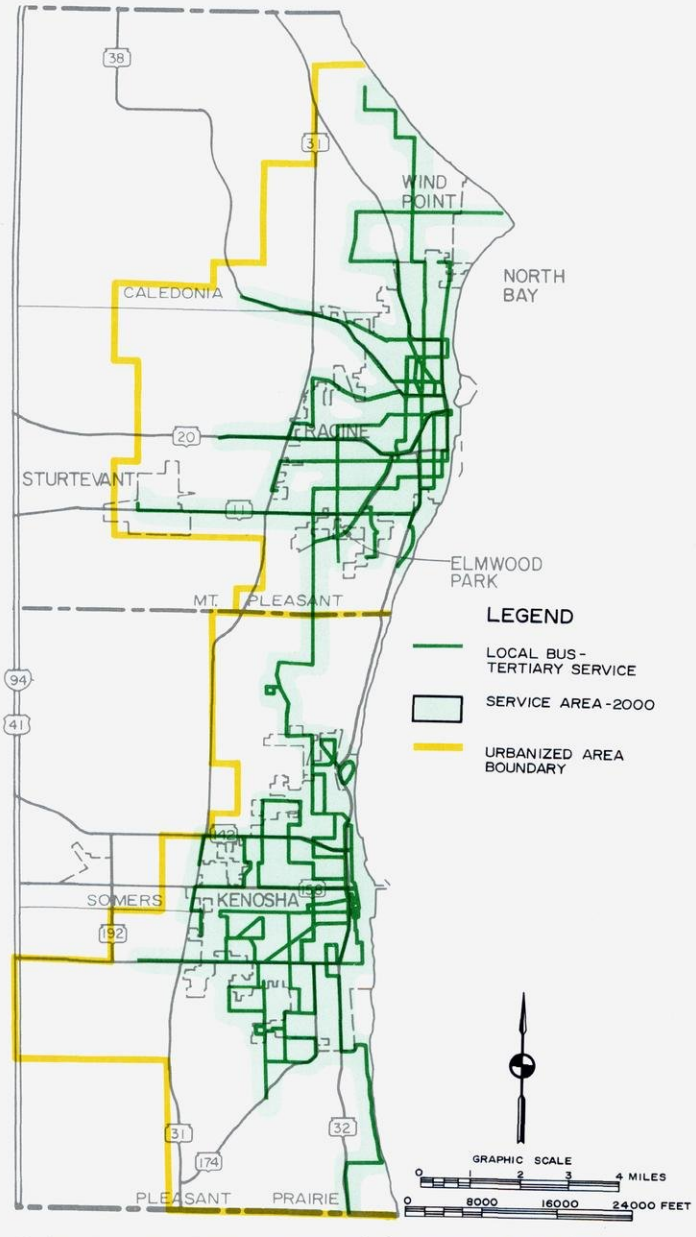
are designed to accomplish four objectives: to ensure that maximum use is made of existing transportation facilities before commitments are made to new capital investment; to encourage use of high-occupancy vehicles, including buses, vans, and carpools; to reduce vehicle use in congested areas; and to effect motor fuel savings. Together these actions seek to modify travel demand through reductions in vehicular traffic during the peak period, thereby better adjusting such demand to available transportation system capacity. The Commission has also prepared a comprehensive, short-range transportation systems management plan—a plan fully coordinated with the long-range facilities plan set forth in this report. The four system management recommendations briefly described below were derived from the analyses conducted as part of the long-range planning process. Additional short-range transportation system management recommendations are also being considered by the Commission. The four management recommendations flowing from the long-range plan are as follows:

Freeway Operational Control System: In the Milwaukee urbanized area, the plan recommends that a freeway operational control system be expanded to constrain access to the freeway system during peak hours, and thereby to ensure high rates of traffic flow at reasonable operating speeds. Such a system would consist of interconnected, demand responsive ramp meters; priority access for high occupancy vehicles; improved driver information; and accident incident management procedures. Currently, during certain periods of the day the traffic flow on the freeway system "breaks down" and stop and go conditions are experienced. When that occurs both traffic volumes and average vehicle speeds are substantially reduced. There are several purposes for recommending an extensive freeway operational control system. One is to achieve better driving conditions for the freeway user during peak periods of travel. A second is to ensure that high occupancy vehicles—buses, vans, and carpools—can travel at reasonable speeds on the freeway system, thus averting the need to provide additional capital intensive facilities, such as exclusive transit rights-of-way. It is envisioned in the plan that such high occupancy vehicles would have preferential access to the freeway system over low occupancy automobiles via specifically designed bypasses at freeway entrance ramps. The third purpose is to seek to better utilize the total capacity of the arterial street and highway system. Commission simulation modeling of this system indicates that there is currently unused surface arterial street capacity that can be more effectively utilized through the redirection of some traffic now using freeways.

It is envisioned that the control system would continuously measure traffic volumes on the freeway system through an interconnected series of traffic sensing devices. As traffic volumes approach the level beyond which the operation of express buses on freeways would deteriorate, fewer low-occupancy automobiles and trucks would be permitted on the system. At times some entrance ramps could be closed entirely. To ensure the proper functioning of this system, ramp meters would be provided throughout the metropolitan area. If successful, this

Map 134

TRANSIT SYSTEM IN THE KENOSHA AND RACINE URBANIZED AREAS: 2000 RECOMMENDED TRANSPORTATION PLAN



Under the preliminary recommended transportation plan, the transit system for the Kenosha and Racine urbanized areas would consist of approximately 147 round-trip route miles of transit line in the Kenosha urbanized area, and 153 round-trip route miles of transit line in the Racine urbanized area, requiring a total of 33 buses in the Kenosha urbanized area and 38 buses in the Racine urbanized area for service during peak ridership periods. This would represent an increase of 88 round-trip route miles and 21 buses in the Kenosha area and 72 round-trip route miles and 28 buses in the Racine area over 1972.

Source: SEWRPC.

management recommendation would avoid the need to give any further consideration to the construction of capital intensive transitways in the major travel corridors in the Milwaukee area. One such facility—in the east-west travel corridor of Milwaukee County—was included in the 1990 plan but has not been constructed due to opposition in the Milwaukee County Board.

Curb Parking Restrictions: The plan recommends that, as necessary, curb parking on arterial streets be prohibited during peak hours of travel in order to ensure that all available arterial street capacity is effectively used before commitments are made for additional capital investment in arterial street facilities. The plan identifies those urban arterial streets where it is envisioned that peak-hour curb parking prohibitions will be necessary. In some cases, such restrictions have already been placed in effect. In other cases, it will be necessary for local municipalities to impose such prohibitions as traffic volumes increase over the years. It will be particularly important to coordinate this management recommendation with the freeway control system management recommendation, since it is anticipated that some traffic may be directed from the freeways to the surface arterial street system by the waiting lines at the freeway on-ramps, and this traffic will in some cases make necessary curb parking restrictions during the peak hour on arterial streets where such parking is now permitted, in part, to ensure the free movement of local transit buses on those arterials.

Carpool Facilities and Promotion: The plan recommends that a continuing carpooling promotional program be established in the Milwaukee area, and that offstreet parking facilities be provided in fringe areas to aid in the promotion of carpooling. There were six carpool parking lots in operation at key freeway interchanges in the outlying areas of the Region in 1978. These are located at the following intersections: IH 43 and STH 57 in Ozaukee County; IH 94 and STH 164 in Waukesha County; IH 94 and STH 67 in Waukesha County; STH 15 and CTH Y in Waukesha County; and STH 15 and CTH F and STH 15 and STH 83 in Waukesha County. The plan recommends that carpool lots continue to be established throughout the metropolitan area as demand may warrant. These include proposed lots at the following interchanges: USH 41-45 and Lannon Road, USH 41 and STH 60, USH 45 and STH 60, and USH 45 and Paradise Road, all in Washington County; USH 16 and CTH C and IH 94 and STH 83 in Waukesha County; and STH 15 and STH 20 in Walworth County. The enumeration of the foregoing additional interchanges as possible locations for carpooling parking lots is not meant to preclude the establishment of such lots at other locations. In this respect the plan envisions that these lots would be developed wherever needed, preferably on available excess highway right-of-way.

Rate Structure: In addition to the foregoing three area-wide transportation system management recommendations, the plan seeks to impose disincentives to the use of the automobile, particularly for work trips made to the Milwaukee central business district, while at the same time providing an incentive for transit use. Transit trips to the downtown Milwaukee area have declined significantly from about 50,500 per day in 1963 to about 29,000 per day in 1972. The plan seeks to reverse this decline and encourage increased transit use to this area. The specific automobile disincentive recommended in the plan is the institution of a parking fee structure that would encourage short-term parking for trips made to downtown Milwaukee for shopping, recreation, and personal business purposes, particularly during the off-peak period, and discourage long-term parking and increase mass transit use for work trip purposes. The plan recommends that the City of Milwaukee conduct a special implementation study to determine the precise mechanism to impose the necessary parking fee structure.

Plan Performance and Costs

Implementation of the recommended transportation plan will provide the Region with an integrated, balanced transportation system providing the appropriate types of transportation service needed by all of the various subareas of the Region at an adequate level of service. It will achieve economy and efficiency in the provision of transportation services while supporting essential economic and social activities. Implementation of the plan will achieve a balance, not only between travel demand and the spatial configuration and capacity of highway facilities but also between the utilization of the automobile and mass transit vehicles as modes of transportation, and will result in the alleviation of traffic congestion, in the reduction of travel time between component parts of the Region, in the reduction of accident exposure, and in an increased measure of travel safety.

Selected characteristics of the recommended new year 2000 transportation system plan are set forth in Table 386. If the recommended new regional transportation system plan for the year 2000 is implemented, automobile availability may be expected to increase from about 705,000 in 1972 to about 1,003,000 in the design year of the plan, an increase of about 42 percent. This represents nearly 165,000 fewer vehicles than forecast under a continuation of existing trends, and represents the anticipated impact of improved levels of mass transit service and of a more centralized and higher density land use development pattern on automobile ownership patterns. The number of internal person trips generated within the Region on an average weekday may be expected to increase from 4.46 million in 1972 to about 5.75 million in the year 2000, a 29 percent increase. The number of mass transit trips made within the Region on an average weekday may be expected to increase from about 184,000 in 1972, or about 4 percent of the total person trips generated within the Region on an average weekday, to about 335,000 in the design year, or about 6 percent of the total person trips generated, an almost 82 percent increase in transit travel and a reversal of long-standing historic trends within the Region.

Vehicle miles of travel on an average weekday within the Region may be expected to increase from about 20.1 million in 1972 to about 30.1 million in the design

Table 386

RECOMMENDED REGIONAL TRANSPORTATION PLAN SELECTED SYSTEM CHARACTERISTICS FOR THE SOUTHEASTERN WISCONSIN REGION

Plan Element	1972	Change 1972-2000 Number	Change 1972-2000 Percent	2000
Arterial Street and Highway System				
Freeway (miles)	163	173	106.1	336
Standard Arterial (miles)	2,847	343	12.0	3,190
Total (miles)	3,010	516	17.1	3,526
Mass Transit System-Milwaukee				
Round-Trip Route Miles				
Primary	150	902	601.3	1,052
Secondary	56	305	544.6	361
Tertiary	855	805	94.2	1,660
Total	1,061	2,012	189.6	3,073
Special Facilities				
Transitway (miles)	--	--	--	--
Exclusive Lanes (miles)	--	9.5	--	9.5
Stations	--	38	--	38
Number of Buses Required	442	585	132.4	1,027
Basic Fare	$0.40	$0.10	25.0	$0.50
Average Total CBD Work Trip Parking Free	$0.38	$0.03	7.9	$0.41
Mass Transit System-Kenosha				
Round-Trip Route Miles	59	88	149.2	147
Number of Buses Required	12	21	175.0	33
Basic Fare	$0.25	--	--	$0.25
Mass Transit System-Racine				
Round-Trip Route Miles	81	72	88.9	153
Number of Buses Required	10	28	280.0	38
Basic Fare	$0.40	-$0.15	-37.5	$0.25
Travel Demand Characteristics				
Automobile Availability (thousands)	705	298	42.3	1,003
Average Weekday Internal Person Trips (millions)	4.46	1.29	28.9	5.75
Average Weekday Transit Trips	184,200	150,800	81.9	335,000
Proportion of Trips Made by Transit (percent)	4.1	1.7	--	5.8
Estimated Yearly Transit Revenue Passengers (millions)	53.7	43.2	80.4	96.9
Historical Equivalent of Proposed Transit Utilization (year)	--	--	--	1963
Vehicle Miles of Travel				
Total (millions)	20.12	10.01	49.7	30.13
On Freeway (millions)	6.21	6.40	102.9	12.61
Percent of Total on Freeway	31	63.9	--	41.9
Arterial Street and Highway Congestion				
Over Capacity (miles)	166	-127	-77	39
Over Capacity (percent of total system)	6	-5	--	1
At Capacity (miles)	152	192	126	344
At Capacity (percent of total system)	5	5	--	10
Proportion of Total Person Travel on Safest Facilities				
Freeways (percent)	30	10	33.3	40
Mass Transit (percent)	4	--	--	4
Motor Fuel Consumption (millions of gallons)				
Average Annual, Assuming Automobile Fleet Efficiency of 19 MPG in Year 2000	576	158	27.4	734
Average Annual, Assuming Automobile Fleet Efficiency of 27 MPG in Year 2000	576	-50	-8.7	526
Noise				
Miles of Transportation Facilities Exceeding 70 dba	712	557	78.2	1,269
Dislocation				
Number of Residential Units	--	777	--	777
Number of Nonresidential Structures	--	87	--	87

Source: SEWRPC.

year, a 50 percent increase. Of this total, about 42 percent can be expected to be made on freeway facilities, assuming that the upper tier of the plan is fully implemented, as compared to 31 percent in 1972. Arterial street and highway congestion represented by the number of miles of facilities operating over capacity may be expected to decrease from about 166 miles, or about 6 percent of the system in 1972, to about 39 miles, or about 1 percent of the system in the design year. The number of miles of facilities operating at design capacity, however, could be expected to increase from about 152 miles, or about 5 percent of the total system in 1972, to about 344 miles, or about 10 percent, of the total system in the design year. Annual motor fuel consumption in the design year, assuming that federally mandated automobile fleet efficiency requirements are fully carried out, is expected to approximate 526 million gallons in the design year, or about 50 million gallons fewer than that consumed in the Region in 1972, a 9 percent reduction.

If the upper tier of the plan is fully carried out, it is estimated that 777 residential units would have to be relocated, together with 87 nonresidential structures. A total of 710 of these residential units and 64 of these nonresidential units lie directly in the path of planned freeways. If the upper tier of the plan is not implemented in Milwaukee County, total dislocation would be reduced to 686 residential units and 73 nonresidential units.

The total costs, in constant 1975 dollars, of fully implementing the highway portion of the recommended new regional transportation system plan would approximate $136.1 million annually over the approximately 25-year plan implementation period, of which $92.7 million would be required for construction and $43.4 million for operation and maintenance. The average annual expenditure for arterial street and highway construction would approximate $73.8 million, or about 80 percent of the total plan construction costs. Of the arterial system construction costs, about $24.3 million per year, or 33 percent, would be required to preserve and maintain the existing highway system; an additional $29.1 million, or 39 percent would be required for projects which would improve the highway system by providing additional capacity through street widening and relocation; and $20.4 million per year, or 28 percent, would be required for system expansion projects, including the construction of new freeways and surface arterials.

The total annual cost of fully implementing the transit portion of the recommended new regional transportation system plan is estimated at $50.9 million, of which $7 million would be required for capital costs and $43.9 million for operating costs. Of the total capital costs, about $3.9 million, or 56 percent, would be required to preserve and maintain the existing transit system; an additional $0.5 million, or 7 percent, would be required for projects to improve transit service where such service is already provided; and the remaining $2.6 million, or 37 percent, would be required for the expansion of transit service, including the provision of new transit stations and extension of transit service into areas currently not served.

Total annual costs for the complete implementation of all elements of the proposed new plan would thus total approximately $187 million. Public financial studies conducted by the Commission indicate that approximately $218 million, including transit fare box revenues estimated to average $26 million per year, should become available annually for highway and transit purposes over the planning period, indicating the plan to be within the financial reach of the Region, provided that transportation receipts increase at the historic rates evidenced from 1960 to 1972. An alternate revenue forecast that assumes that the transit fares and tax per gallon on gasoline will not keep pace with inflation and that takes into account the proposed increases in fuel efficiencies for automobiles indicates that there would be an annual revenue shortfall of $1.8 million.

Thus, to fully implement the recommended plan, it would be essential to ensure that an inflation-resistant revenue structure be created for both transit and highway improvements.

PLAN IMPLEMENTATION

Chapter IX of this volume contains specific plan implementation recommendations directed at the concerned federal, state, and local units and agencies of government operating within the Region. These include recommendations concerning the implementation of the recommended regional land use plan through various land use control and public service and facility extension policies to be exercised by the state, county, and local units of government operating within the Region.

These detailed plan implementation recommendations will not be repeated here. Several particularly significant aspects of regional plan implementation, however, do warrant restatement here in summary form. First, it should be reiterated that the recommended regional land use and transportation plans, as presented in this report, are intended to comprise flexible guides to the sound physical development of the Region and, as such, are intended to be advisory to the local, state, and federal units and agencies of government and to private developers as these public and private bodies consider land use and transportation facility development matters within the Region. The regional plans should not be considered as an inflexible mold to which all future development within the Region must precisely conform. Rather, the regional plans are to be regarded as a point of departure against which land use and transportation system development proposals can be evaluated as they arise and, in the light of which, better development decisions can be made by all concerned. The regional plans are intended to be used as a framework around which both comprehensive community development plans and single-purpose facility system plans can be developed in a coordinated manner and, as such, are subject not only to continual reinterpretation but also to refinement and detailing at the county and local level.

Second, the adoption or endorsement of the recommended regional land use and transportation plans as guides to the sound development of the Region by the

local units of government and by the various state and federal agencies concerned is highly desirable and, in some cases, essential in order to secure a common understanding of areawide development objectives and to permit the necessary plan implementation work to be cooperatively programmed and jointly executed.

Third, plan implementation action policies and programs must not only be preceded by plan adoption or endorsement but must also emphasize the most important and essential elements of the plan and those areas of action which will have the greatest impact on guiding and shaping development in accordance with the recommended plan. Two major criteria should be used to determine which plan elements are truly regional in character or influence and are, therefore, essential to the attainment of regional development objectives: 1) the importance of the plan elements to the wise and judicious use of the underlying and sustaining natural resource base; and 2) the importance of the plan elements to the functional relationships existing between land use and the demand for major utility, recreation, and transportation facilities.

In light of these criteria, it would appear that the regional development objectives and plans can be substantially met if the Commission and its constituent local units of government and the affected state and federal agencies can significantly influence the spatial location and size or capacity of only four aspects of regional development: the major transportation routes, particularly the freeway, connecting major arterial street and highway, and modified rapid transit facilities; the major park and open-space reservations, including the major drainageways; the public sanitary sewerage facility service areas; and the public water supply facility service areas.

Fourth, the importance of close coordination and cooperation between the local units of government and the various state and federal agencies to plan implementation cannot be overemphasized. Responsibilities for achieving such coordination and cooperation on a voluntary basis within the traditional framework of government in Wisconsin have been assigned to the Commission by the State Legislature, and the Commission is being utilized by both local municipalities and by certain state and federal agencies for the attainment of the necessary coordination and cooperation.

Even more intensive utilization of the Commission as a center for the attainment of close coordination of the many planning and plan implementation activities which are carried on within the seven-county Region must be made in the future if the regional plans are to be implemented and a more efficient, economical, attractive, and healthful environment achieved within the Region. Advisory review of the location and size of major public works facilities by the Commission is essential for the effective development of transportation, utility, and community facilities within the Region, which must not only comprise efficient systems as such but which must properly serve and promote the desired regional land use pattern; for abatement of costly duplication of effort and unnecessary expenditure of public funds; and for the preservation and protection of the underlying and sustaining natural resource base. Such review by the Commission may be obtained by contract or by request, or may be required by state and federal legislation.

Fifth, implementation of the regional plans will not be brought about by massive action of some one unit or agency of government. Rather, implementation of the regional plans will be brought about through literally thousands of development decisions made on a day-to-day basis over a period of many years by many private investors and by many public administrators operating at the local, areawide, state, and federal levels of government. It is extremely important that the individuals, corporations, or agencies making these decisions be aware of, and understand the development proposals set forth in the recommended regional land use and transportation plans so that these plans will receive proper consideration in the development decisions.

Finally, regional plan implementation can be achieved only within the context of a continuing, comprehensive, cooperative, areawide planning effort, through which the planning inventories and forecasts on which the regional plans are based are updated, monitored, and revised; through which the plans themselves are reappraised and, if necessary, revised to accommodate changing conditions; and through which the plans are interpreted on a day-to-day basis to local, state, areawide, and federal units and agencies of government and to private investors and developers as the need to make development decisions arises. In this respect, it should be stressed that planning does not and cannot concern itself with future decisions; that is, with "things that should be done in the future." Rather, it must be recognized that decisions exist only in the present and that planning is necessary just because decisions can only be made in the present, yet cannot be made for the present alone. The question, therefore, that faces public officials, private investors, and interested citizen groups within the Region concerning implementation of the recommended regional land use and transportation plans is not what should be done tomorrow to bring about the plans but, rather, what must be done today in the light of the plans to get ready for an uncertain tomorrow. In a highly complex and dynamic urbanizing region such as southeastern Wisconsin, one key decision, or the lack of such a decision, may commit the Region as a whole and its many constituent units and agencies of government to a given course of action, sometimes irrevocably. This is particularly true in the field of public works development, where a decision to build one important link in a system must commit the entire system for a generation or more to come.

CONCLUSION

In concluding this summary description of the proposed new year 2000 regional land use and transportation system plans, it is instructive and useful to briefly compare and contrast the new plans with the prior plan adopted in 1966. The planning periods are roughly the same, so the numbers are comparable. The initial land

use plan forecast a population growth of one million people; the new land use plan only 460,000. The prior plan foresaw 350,000 new jobs; the new plan only 267,000. The prior plan sought to place more than 74 percent of new urban development in the Region within 20 miles of downtown Milwaukee; in the new plan, this has dropped to 62 percent, this drop being due to a lack of vigorous implementation of the 1966 land use plan. And, while the initial land use plan provided for the conversion of 200 square miles of open land to urban use, the corresponding figure under the new plan is only 100 square miles. One obvious conclusion is that while the explosive growth which the 1966 land use plan sought to accommodate has slowed drastically, wasteful and resource-consumptive urban sprawl continues. The slowdown in growth has had some effect in slowing the sprawl, and the first land use plan has succeeded in channeling some of the continued growth into more efficient and less costly forms of urban development.

The initial transportation plan provided for a total regional freeway system of 444 miles, including 291 miles of new freeways. The new plan has a total regional freeway system of only 336 miles, including only 37.1 miles of new freeways in the upper tier, the implementation of which is to be held in abeyance, and only 60 miles of new freeway in the lower tier recommended for immediate implementation. Also, the previous transportation plan recommendation of exclusive bus transitways has been replaced by a systems management recommendation for a freeway operational control system. These recommendations resulted from extensive elected official and public involvement in the planning process and represent a change in emphasis and values from major expansions of the Region's transportation system to effective management of the system substantially as it exists today.

It should be pointed out that these apparently drastic changes—especially in the freeway system—of the new regional transportation plan resulted from, and are consistent with, the Commission's long-standing conception of a cyclical planning process. Having been proposed at the systems level in the first regional transportation plan, detailed location, design, and engineering work was completed for many of the planned freeway facilities recommended in the original plan and was initiated for all such facilities in the 1960's and early 1970's. As a result, it was possible to better define the precise costs and impacts—both positive and negative—of the proposed freeways and to consider the public official and community reaction to those costs and impacts in the next cycle of the planning process, of which this plan constitutes the final product. The planning process is envisioned as proceeding in a cyclical manner from a systems-level plan to detailed project plans, and, based on reactions to and acceptance of the project-level plans, back to a revised systems-level plan.

Thus, the anticipated growth and change which is expected to occur within southeastern Wisconsin over the next two to three decades presents the Region with both a somewhat different challenge and a somewhat different opportunity than that anticipated in the first land use and transportation plans which were adopted in 1966. One part of that challenge is how best to constructively shape the substantial additional new urban development which may still be expected to occur within the Region to the turn of the century. Public officials within the Region will be faced with the awesome task of deciding what form this new urban development should take and how it might best be served by the necessary transportation, utility, and public facility services. Failure to resolve these questions properly will result in irreparable damage to the land and water resources of the Region and in mounting problems of traffic congestion; water supply and pollution; inadequate drainage; widespread and costly flooding; and lack of adequate schools, parks, and other public facilities.

At the same time, the other aspect of that challenge which these officials must face is how, as the central cities and older suburban areas in the Region begin to lose population, to best preserve and enhance the quality of life in these declining areas, how to best continue to provide essential urban services, and how to best restructure and reorder the provision and administration of such services in these places of population decline. Failure to resolve these questions could eventually result in urban areas without centers, with large portions of the formerly densely populated cities largely abandoned by all but those too poor to escape.

However, this growth and change also provides a great opportunity in that a better overall regional settlement pattern can be evolved and past mistakes avoided; new growth and development can be adjusted to the underlying and sustaining resource base; preservation, rehabilitation, and redevelopment can be properly pursued to result in a better living environment in nongrowth areas; safer, more efficient, and more convenient transportation, utility, and public facility systems can be provided; and a better environment for life within the Region can be created.

Implementation of the recommended regional land use plan will provide the future Region with a balanced allocation of space to the various urban and rural land uses, an allocation which would properly meet the social, physical, and economic needs of the growing regional population. It will provide a spatial distribution of the various land uses which would result in a more compatible arrangement of land use and which would be properly related to the supporting transportation and utility systems in order to assure the economical provision of transportation and utility services. Most importantly, implementation of the land use plan will do much to assure the protection and wise use of the natural resources of the Region.

Implementation of the recommended transportation plan will provide the Region with an integrated transportation system which would effectively serve and promote a desirable regional land use pattern, meeting the anticipated future travel demand at an adequate level of service. It will provide a balanced transportation system, with appropriate types of both highway and transit

facilities provided for the various subareas of the Region. It will abate traffic congestion, reduce travel time and costs between component parts of the Region, and reduce accident exposure.

Implementation of—or failure to implement—the recommended plans will affect not only the efficiency of the transportation system, which must serve the Region for a generation to come and thereby directly affect the cost of living and of doing business within the Region, but also the overall quality of the environment within the Region for many generations to come. It is, therefore, hoped that government, business and industry, and interested citizen groups within the Region will take an active interest in the plan recommendations, which are completely advisory to all concerned, carefully reviewing their soundness and practicality, and, if in agreement with the plans, support and act toward their implementation.

APPENDICES

Appendix A

TECHNICAL COORDINATING AND ADVISORY COMMITTEE ON REGIONAL LAND USE-TRANSPORTATION PLANNING

The Technical Coordinating and Advisory Committee on Regional Land Use-Transportation Planning is divided into several functional subcommittees. Members of the Committee often serve on more than one subcommittee. The following key identifies the various functional subcommittees: 1) Land Use Subcommittee; 2) Highway Subcommittee; 3) Socioeconomic Subcommittee; 4) Natural and Recreation-Related Resources Subcommittee; 5) Transit Subcommittee; 6) Utilities Subcommittee; 7) Traffic Studies, Models, and Operations Subcommittee.

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TECHNICAL COORDINATING AND ADVISORY COMMITTEE ON REGIONAL LAND USE-TRANSPORTATION PLANNING (Continued)

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Appendix B

CITIZENS ADVISORY COMMITTEE ON THE FREEWAY-TRANSIT ELEMENT OF THE REGIONAL LAND USE-TRANSPORTATION PLAN REEVALUATION

Richard W. Cutler, Chairman ..... Attorney, Quarles and Brady, Milwaukee; Commissioner, SEWRPC
Mrs. Evelyn L. Petshek, Vice-Chairman ..... Commissioner, SEWRPC
Orren J. Bradley ..... President, Boston Store Department Stores, Milwaukee
Roger C. Cobb ..... Citizen Member, Milwaukee
James N. Elliott ..... President, Milwaukee Building and Construction Trades Council AFL-CIO, Milwaukee
Sebastian J. Helfer ..... Director of Campus Planning, Marquette University, Milwaukee
Leonard C. Hobert ..... Chairman of the Board, Gimbels Midwest, Milwaukee
Cynthia Kukor ..... Alderman, City of Milwaukee
Thomas P. Leisle ..... Supervisor, Ozaukee County
Harold A. Lenicheck ..... Citizen Member, Milwaukee
Thomas M. Spellman ..... Univeristy of Wisconsin-Milwaukee; West Side Citizens Coalition
Dr. Robert F. Purtell, Jr. ..... Citizen Member, Brookfield
John S. Randall ..... Citizen Member, Milwaukee
Lee G. Roemer ..... Citizen Member, Whitefish Bay
Dr. Eric Schenker ..... Chairman, Department of Business Administration, University of Wisconsin-Milwaukee
Dr. Abraham Scherr ..... Citizens Regional Environmental Coalition, North Lake
Wesley L. Scott ..... Executive Director, Milwaukee Urban League, Milwaukee
Bert J. Stitt ..... Citizen Member, Milwaukee
L. William Teweles ..... Citizen Member, Milwaukee

Appendix C

TASK FORCE ON SYNTHESIS OF THE NEW RECOMMENDED REGIONAL TRANSPORTATION PLAN FOR SOUTHEASTERN WISCONSIN

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Appendix D

ARTERIAL STREET AND HIGHWAY LINK CAPACITY

The procedure developed and used by the Commission in determining the traffic capacities of arterial network links has been described in detail in previous Commission publications.[1] As noted in Volume I of this report, a comparison indicated that arterial street and highway capacities calculated using the Commission's procedure were within 10 percent of capacities calculated using the procedure set forth in Highway Research Board (HRB) Special Report 87, Highway Capacity Manual—1965. Subsequent to the publication of Volume I of this report, the Commission's procedure was further reviewed to ascertain the reason for this difference. In this review it was noted that a basic assumption used in the development of the Commission procedure was that an intersection signal cycle load factor of 0.70 closely approximated the maximum attainable capacity of the intersection. The Highway Capacity Manual—1965 assumes that maximum capacity would be achieved at a load factor of 1.00, even though such a load factor as a practical matter can be seldom attained. The hourly capacity multipliers used in the Commission procedure were recalculated based on the HRB assumption with respect to intersection load factor at maximum capacity.

The results of the recalculation of the multipliers for the two-way and one-way arterial street and highway intersections are shown in Table D-1. Using the multipliers provided in the table to calculate the capacity of a four-lane arterial with a 24-foot intersection approach pavement width yields a 24-hour capacity of 17,200 vehicles per day for an intersection located in an intermediate type subarea in the Milwaukee urbanized area. Similar calculations using the Highway Capacity Manual—1965 result in a 24-hour capacity of 17,100 vehicles per day, within 1 percent of the capacity derived using the Commission's procedure. It was thus determined that the use of the hourly capacity multipliers contained in Table D-1, the multipliers in the table having been adjusted for the assumption that maximum capacity will be achieved at an intersection load factor of 1.00, will yield capacities equivalent to those obtained using the Highway Capacity Manual.

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[1] *SEWRPC Technical Record No. 2, Volume 2, "Capacity of Arterial Network Links."*

Table D-1

HOURLY CAPACITY MULTIPLIERS IN THE REGION BY TYPE OF AREA AT INTERSECTION (VEHICLES PER HOUR PER FOOT OF PAVEMENT WIDTH)

Type of Route	Type of Area - Inside Ring Four				Type of Area - Outside Ring Four			
	Downtown (1)	Intermediate (2)	Outlying (3)	Rural (4)	Downtown (1)	Intermediate (2)	Outlying (3)	Rural (4)
Freeways	100	100	100	100	76	76	76	76
Expressway	90	93	96	96	57	60	62	65
Two-Way Arterial	31	39	41	44	25	31	33	35
One-Way Arterial	36	42	46	49	29	33	38	41

Source: SEWRPC.

Appendix E

TRANSPORTATION SYSTEM ACCIDENT EXPERIENCE AND COST

Available data indicate that the type and beginning of accidents varies by highway facility type and by mode of travel. This variation is important to the proper evaluation of alternative surface transportation system plans, and accident experience can be expressed in monetary costs through the association of dollar values with fatalities, personal injuries, and with property damage. Such dollar values include property loss, medical and insurance expenses, and the loss of wages due to death or disabling injury.

Street and highway accident experience can be related directly to vehicle miles of travel on arterial facilities of various design types, and is normally expressed in terms of rates for accidents involving fatalities, personal injuries, and property damage per 100 million vehicle miles of travel. Accident rates for the Southeastern Wisconsin Region were developed by the Commission from county level accident data compiled by the Wisconsin Department of Transportation from 1969 through 1975. Separate accident rates were developed for freeway and nonfreeway segments of the highway system in order to reflect the safer design inherent in freeway facilities. Analysis of the data further indicated a need to develop a separate rate for Milwaukee County facilities, since these segments demonstrated an accident frequency significantly different than comparable segments in the remainder of the Region.

The rates that were obtained from these data were then adjusted upward to account for the difference between total accidents and reported accidents, since many property damage accidents and some injuries are never reported. Such unreported accidents constitute a real cost to the transportation system user and, therefore, should be considered in any analysis. The adjustment factors were derived from information contained in a National Cooperative Highway Research Program report.[1] The accident rates used in the plan evaluation are presented in Table E-1.

Unit costs for each type of accident were initially obtained from data provided by the National Safety Council which annually reports the average calculable per accident cost—including wage loss, medical expense, insurance administration cost, and property damage—by type of accident. The most recent study available from the National Safety Council is based on 1974 data.[2] Consequently, the reported costs were adjusted utilizing the series A consumer price index developed by the U. S. Department of Labor, Bureau of Labor Statistics, at the beginning of 1976. The unit costs used are set forth in Table E-2.

Transit accident experience is available in a form similar to that for highway accidents. Transit accidents are normally reported as passenger accidents, which approximately correspond to highway injury accidents, transit vehicle accidents which approximately correspond to highway property damage accidents, and fatal accidents which correspond to highway accidents including fatalities. The former include any on-board accident involving a personal injury as reported by the bus driver. The vehicle accident category includes all reported collisions with other vehicles, objects, and pedestrians. It should be noted that a passenger accident always involves a personal injury but that a vehicle accident, while usually involving property damage, may involve personal injury in the form of a collision with a pedestrian and, therefore, renders direct comparison of the accident experience between highways and transit difficult. Fatal accidents are defined the same for each mode.

Since the relationship between vehicle travel and passenger travel is not so direct for transit as it is for automobiles, transit accident experiences for fatalities and passenger accidents are expressed per 100 million passenger miles of travel, while transit vehicle accidents are expressed per 100 million bus miles of travel. The data used to develop transit accident rates, with the exception of passenger miles of travel, were obtained from Milwaukee Transport Services, Inc., for the years 1971 through 1974. Passenger miles of travel were determined from the 1972 Commission travel survey which identified an average transit trip length of 6.61 miles. Assuming that the average transit trip length remained constant from 1971 through 1974, transit passenger miles of travel for each year was then estimated as the product of the number of passengers and average trip length. The accident rates thus derived are presented in Table E-1. As most transit accidents are reported, no adjustment between reported and total accidents was deemed necessary.

In addition to accident data, the Milwaukee Transport Services, Inc., also reported the dollar amount expended in 1974 to settle all claims filed against it for passenger and vehicle accidents. The average cost per accident for both types was subsequently derived from these cost data and adjusted to reflect 1976 prices. Utilizing the same fatality cost that was used in the highway analysis, the derived transit accident costs are set forth in Table E-3.

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[1] *Paul J. Claffey and Associates, "Running Costs of Motor Vehicles as Affected by Road Design and Traffic," NCHRP Program Report No. 111, 1971, page 91.*

[2] *National Safety Council, Traffic Safety Memo No. 113, July 1975.*

Table E-1

ACCIDENT RATES AND COSTS FOR FREEWAYS, SURFACE ARTERIALS, AND MASS TRANSPORTATION IN COMPONENT PARTS OF THE REGION: 1975

Facility Type	Fatal Accident Rate	Fatality Rate	Injury Accident Rate	Injury Rate	Property Damage Accident Rate	Vehicle Accident Rate	Fatal Accident Cost	Injury Accident Cost	Property Damage Accident Cost	Vehicle Accident Cost[a]
Freeways[b]:										
Milwaukee County	0.66	0.73	65.16	89.15	569.24	N/A	$ 83,220	$419,005	$185,003	N/A
Remainder of Region	1.39	1.57	40.21	75.01	161.37	N/A	178,980	352,547	58,093	N/A
Surface Arterials[b]:										
Milwaukee County	4.13	4.17	358.38	516.00	2,379.03	N/A	$475,380	$2,425,200	$773,185	N/A
Remainder of Region	6.94	8.17	246.71	383.98	1,208.07	N/A	931,380	1,804,706	434,905	N/A
Mass Transportation										
Intraregional	N/A	0.51[c]	N/A	171.88[c]	N/A	5,077.35[d]	$ 58,140[c]	$ 53,283[c]	N/A	$1,675,526[d]

N/A indicates not applicable.

[a] *Accident costs were calculated using $114,000 per fatality, $4,700 per nontransit vehicle injury, $325 and $360 per nontransit vehicle property damage accident for Milwaukee County and the remainder of the Region, respectively, $310 per transit passenger accident, and $330 per transit vehicle accident.*

[b] *Accident rates and costs expressed as the number of accidents, fatalities, or injuries and the dollar costs per 100 million vehicle miles of travel.*

[c] *Accident rates and costs expressed as the number of fatalities or passenger accidents and the dollar costs per 100 million passenger miles of travel.*

[d] *Accident rate and cost expressed as the number of vehicle accidents and the dollar cost per 100 million bus miles of travel.*

Source: Wisconsin Department of Transportation; Milwaukee County Expressway and Transportation Commission; Milwaukee Transport Services, Inc.; National Safety Council; and SEWRPC.

Table E-2

UNIT COSTS BY TYPE OF ACCIDENT: 1976

Type of Accident	Calculable Cost
Fatality	$114,000.00
Injury	4,700.00
Property Damage Accident[a]	
Milwaukee County	325.00
Remainder of Region	360.00

[a] *Based on the National Safety Council cost per reported accident adjusted for unreported accidents at an assumed average cost of $175. Wisconsin Statutes require that accidents with property damage in excess of $200 be reported.*

Source: National Safety Council and Bureau of Labor Statistics.

Table E-3

TRANSIT ACCIDENT COSTS BY TYPE OF ACCIDENT: 1976

Type of Accident	Calculable Cost
Fatality	$114,000.00
Passenger Accident	310.00
Vehicle Accident	330.00

Source: Milwaukee Transport Services, Inc.

Appendix F

FORECAST OF PUBLIC HIGHWAY REVENUES

Preparation of the forecast of revenue available for highway related expenditures in the year 2000, set forth in Chapter III of this report, was complicated by two factors. First, a rapid decline in the purchasing power of the dollar over the past two decades rendered difficult any comparisons of highway revenues for different points in time. Second, variability over time in the amount of revenue available to the various levels of government rendered difficult the identification of trends within the data which could then be projected into the future.

The first problem, that of noncomparability of actual dollar amounts for different points in time, was addressed by converting the data to constant dollars. This was accomplished by utilizing the Milwaukee Series A Consumer Price Index (CPI) prepared by the Bureau of Labor Statistics, U. S. Department of Labor. Table F-1 presents the highway revenue data after conversion of that data to constant 1967 dollars.

The second problem, that of variability in governmental categories over time, was partially addressed by substituting more "typical" data for those data judged to be anomalous. This step was deemed necessary in that the use of anomalous data values in an already variable—i.e., not consistently or systematically increasing or decreasing—data series could significantly bias any forecasts developed from the data. Table F-2 presents the data used to develop the forecasts. In the state data series, it was necessary to substitute three data points to compensate for unusually high expenditures in the Region by the State for highway construction projects in the latter half of the 1960's. In this case, a graphic technique was utilized to obtain substitute data points, which were determined in current, or actual, dollars before conversion of the data series to constant dollars.

It should also be noted that, in the materials presented in Chapter III, a comparison was not made between the projected year 2000 revenue values, both absolute and relative amounts, and any one single historic revenue series due to the fluctuations from year to year. Any pattern resulting from such a comparison would depend heavily on the year used as a comparison base year. To avoid this problem, comparisons were made between the year 2000 projections and the average historic revenue amounts in constant 1967 dollars.

Table F-1

ACTUAL PUBLIC REVENUES AVAILABLE FOR HIGHWAY AND RELATED USES IN THE REGION: 1960-1972 (CONSTANT 1967 DOLLARS)

Government Type	Total Highway Revenues (in Millions of Dollars)						
	1960	1962	1964	1966	1968	1970	1972
Federal	$10.0	$ 23.4	$ 29.5	$ 18.1	$10.0	$ 23.1	$ 17.7
State	8.0	10.0	8.5	24.0	21.4	25.8	10.6
County	15.7	26.0	20.1	33.2	22.1	15.4	19.2
City	49.7	52.1	45.8	54.1	35.4	55.1	54.2
Village.	4.2	3.9	4.6	6.4	5.3	5.5	5.8
Town	3.4	3.5	3.3	4.2	4.5	4.4	5.4
Total	$91.0	$118.9	$111.8	$140.0	$98.7	$129.3	$112.9

Source: Wisconsin Department of Revenue, Bureau of Municipal Audit, Wisconsin Department of Transportation, and SEWRPC.

Table F-2

ACTUAL AND SUBSTITUTED PUBLIC REVENUES AVAILABLE FOR HIGHWAYS AND RELATED USES IN THE REGION: 1960-1972
(CONSTANT 1967 DOLLARS)

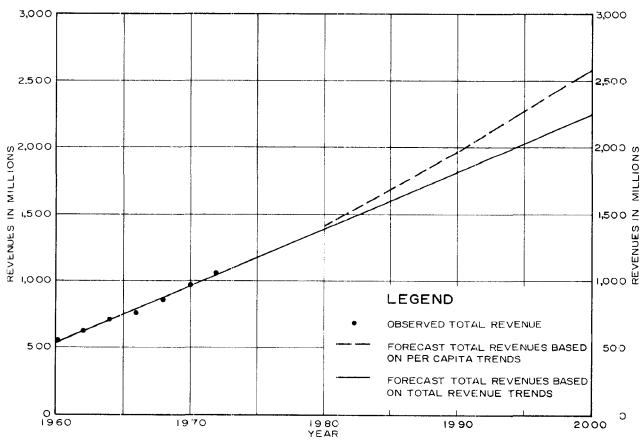
Government Type	Total Highway Revenues (in Millions of Dollars)						
	1960	1962	1964	1966	1968	1970	1972
Federal	$10.0	$ 23.4	$ 29.5	$ 18.1	$ 10.0	$ 23.1	$ 17.7
State.	8.0	10.0	8.5	10.4[a]	10.8[a]	10.5[a]	10.6
County	15.7	26.0	20.1	33.1	22.1	15.4	19.2
City	49.7	52.1	45.8	54.1	35.4	55.1	54.2
Village.	4.2	3.9	4.6	6.4	5.3	5.5	5.8
Town	3.4	3.5	3.3	4.2	4.5	4.4	5.4
Total	$91.0	$118.9	$111.8	$126.3	$ 88.1	$114.0	$112.9

[a] *Substituted values.*

Source: Wisconsin Department of Revenue, Bureau of Municipal Audit, Wisconsin Department of Transportation, and SEWRPC.

Figure F-1

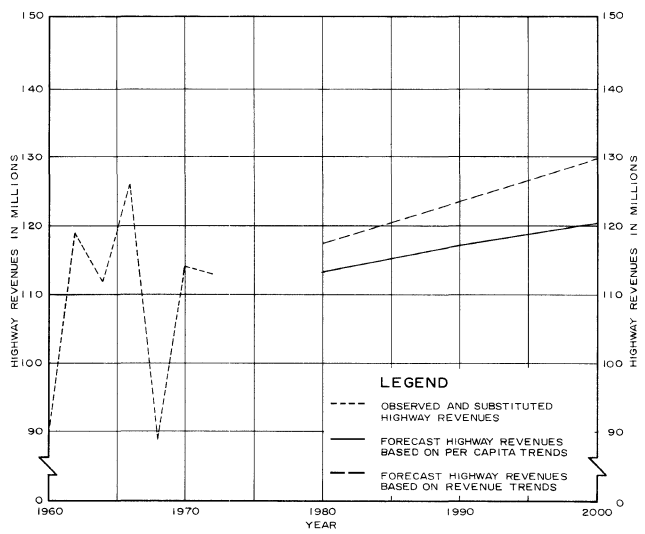
FORECAST TOTAL REVENUES AVAILABLE
IN THE REGION: 1980, 1990, AND 2000
(IN CONSTANT 1967 DOLLARS)



Source: SEWRPC.

Figure F-2

FORECAST HIGHWAY REVENUES AVAILABLE
IN THE REGION: 1980, 1990, AND 2000
(IN CONSTANT 1967 DOLLARS)



Source: SEWRPC.

Appendix G

DETAILED DATA—REGIONAL LAND USE PLANS

Table G-1

POPULATION, DWELLING UNITS, AND ACREAGE RANGES FOR EACH URBAN RESIDENTIAL DENSITY CLASS UTILIZED IN REGIONAL LAND USE PLAN PREPARATION

Category	Urban Residential Density Class			
	Suburban	Urban Low	Urban Medium	Urban High
Residential Development				
Gross[a]	640	640	640	640
Net[b]	524.8	512.0	454.4	422.4
Population				
Milwaukee County[c]				
Range	273- 905	906- 2,882	2,883-7,972	7,973-19,757
Average	681	1,596	5,200	13,179
Kenosha and Walworth Counties[d]				
Range	315- 1,044	1,045- 3,326	3,327-9,198	9,199-22,797
Average	786	1,842	6,000	15,207
Racine County[e]				
Range	326- 1,079	1,080- 3,437	3,438- 9,507	9,508-23,557
Average	812	1,903	6,200	15,714
Washington County[f]				
Range	347- 1,083	1,084- 3,659	3,660-10,120	10,121-25,000[h]
Average	865	2,026	6,600	16,728
Ozaukee and Waukesha Counties[g]				
Range	368- 1,219	1,220- 3,881	3,882-10,734	10,735-25,000[h]
Average	917	2,149	7,000	17,742
Dwelling Units				
Range	105- 348	349- 1,108	1,109- 3,066	3,067- 7,599
Number	262	614	2,000	5,069
Persons/Gross-Residential Acre				
Milwaukee County[c]				
Range	0.4-1.4	1.5-4.4	4.5-12.4	12.5-30.9
Average	1.1	2.5	8.1	20.6
Kenosha and Walworth Counties[d]				
Range	0.5-1.5	1.6-5.1	5.2-14.3	14.4-35.6
Average	1.2	2.9	9.4	23.8
Racine County[e]				
Range	0.5-1.6	1.7-5.3	5.4-14.8	14.9-36.8
Average	1.3	3.0	9.7	24.6
Washington County[f]				
Range	0.6-1.7	1.8-5.6	5.7-15.8	15.9-39.2
Average	1.4	3.2	10.3	26.1
Ozaukee and Waukesha Counties[g]				
Range	0.6-1.9	2.0-6.0	6.1-16.7	16.8-41.5
Average	1.5	3.4	11.0	27.7

Table G-1 (continued)

Category	Urban Residential Density Class			
	Suburban	Urban Low	Urban Medium	Urban High
Persons/Net Residential Acre				
Milwaukee County[c]				
Range	0.5-1.7	1.8-5.9	6.0-18.1	18.2-46.8
Average	1.3	3.1	11.4	31.2
Kenosha and Walworth Counties[d]				
Range	0.6-2.0	2.1-6.8	6.9-20.9	21.0-54.0
Average	1.5	3.6	13.2	36.0
Racine County[e]				
Range	0.6-2.1	2.2-7.0	7.1-21.6	21.7-55.8
Average	1.6	3.7	13.6	37.2
Washington County[f]				
Range	0.7-2.2	2.3-7.5	7.6-23.0	23.1-59.4
Average	1.7	4.0	14.5	39.6
Ozaukee and Waukesha Counties[g]				
Range	0.7-2.4	2.5-8.0	8.1-24.4	24.5-63.0
Average	1.8	4.2	15.4	42.0
Net Residential Acres/1,000 Population				
Milwaukee County[c]	770	321	87	32
Kenosha and Walworth Counties[d]	660	277	76	28
Racine County[e]	646	269	73	27
Washington County[f]	606	252	69	25
Ozaukee and Waukesha Counties[g]	572	238	65	24
Dwelling Units/Gross Residential Acre				
Range	0.20-0.55	0.56-1.72	1.73-4.79	4.80-11.87
Average	0.3	0.96	3.13	7.92
Dwelling Units/Net Residential Acre				
Range	0.20-0.69	0.70-2.29	2.30-6.99	7.00-17.99
Average	0.5	1.2	4.4	12.0
Net Square Feet/Dwelling Unit				
Range (adjusted)	217,800-62,681	62,680-18,981	18,980-6,231	6,230-2,439
Average	86,120	36,300	9,900	3,630

[a] *Defined as the net area devoted to residential use plus the proportionate area devoted to all supporting land uses including streets in the suburban class and streets, neighborhood parks and playgrounds, elementary schools, and neighborhood institutional and commercial uses in the urban low, medium, and high classes.*

[b] *Defined as the actual site area devoted to the residential use and consists of the ground floor site area occupied by any building plus the required yards and open spaces.*

[c] *Occupied by an average of 2.6 persons in the year 2000.*

[d] *Occupied by an average of 3.0 persons in the year 2000.*

[e] *Occupied by an average of 3.1 persons in the year 2000.*

[f] *Occupied by an average of 3.3 persons in the year 2000.*

[g] *Occupied by an average of 3.5 persons in the year 2000.*

[h] *A population density of 25,000 persons per gross square mile was considered to be the maximum desirable population density level within the Region.*

Source: SEWRPC.

Table G-2

RESIDENTIAL PLANNING UNIT DEVELOPMENT STANDARDS FOR THE URBAN LOW, URBAN MEDIUM, AND URBAN HIGH RESIDENTIAL DENSITY CLASSES UTILIZED IN REGIONAL LAND USE PLAN PREPARATION

Residential Density Class	Number	Acres	Percent	Acres	Percent
Urban Low Density					
Gross Residential Area				2,560.0	100.0
Public Elementary School (K-6) Area		12.8	0.5		
Number of Classrooms	25.0				
Number of Pupils	688.0[a]				
Public Park and Parkway Area		38.4	1.5		
Neighborhood Commercial Area		12.8	0.5		
Street Area		422.4	16.5		
Other Public and Quasi-Public Area		25.6	1.0		
Net Residential Area				2,048.0	80.0
Single-Family Area		2,048.0	80.0		
Population	8,200.0				
Residential Acres/1,000 Population	250.0				
Persons/Residential Acre	4.0				
Number of Dwelling Units	2,485.0				
Dwelling Units/Not Residential Acre	1.2				
Multifamily Area		None			
Urban Medium Density					
Gross Residential Area				640.0	100.0
Public Elementary School (K-6) Area		9.6	1.5		
Number of Classrooms	20.0				
Number of Pupils	546.0				
Public Park and Parkway Area		16.0	2.5		
Neighborhood Commercial Area		6.4	1.0		
Street Area		147.2	23.0		
Other Public and Quasi-Public Area		6.4	1.0		
Net Residential Area				454.4	71.0
Single-Family Area		416.0	65.0		
Population	5,330.0				
Residential Acres/1,000 Population	76.0				
Persons/Residential Acre	12.8				
Number of Dwelling Units	1,615.0				
Dwelling Units/Not Residential Acre	3.9				
Multifamily Area		38.4	6.0		
Population	1,170.0				
Residential Acres/1,000 Population	32.0				
Persons/Residential Acre	30.2				
Number of Dwelling Units	355.0				
Dwelling Units/Net Residential Acre	9.2				
Urban High Density					
Gross Residential Area				160.0	100.0
Public Elementary School (K-6) Area		4.0	2.5		
Number of Classrooms	13.0				
Number of Pupils	350.0				
Public Park and Parkway Area		5.6	3.5		
Neighborhood Commercial Area		2.4	1.5		
Street Area		40.0	25.0		
Other Public and Quasi-Public Area		2.4	1.5		
Net Residential Area				105.6	66.0
Single-Family Area		94.4	59.0		
Population	1,869.0				
Residential Acres/1,000 Population	49.7				
Persons/Residential Acre	19.8				
Number of Dwelling Units	566.0				
Dwelling Units/Not Residential Acre	5.9				
Multifamily Area		11.2	7.0		
Population	2,305.0				
Residential Acres/1,000 Population	4.9				
Persons/Residential Acre	205.8				
Number of Dwelling Units	698.0				
Dwelling Units/Net Residential Acre	62.3				

[a] *Represents 8.4 percent of total population.*

Source: SEWRPC.

Table G-3

EXISTING AND PROPOSED LAND USE IN KENOSHA COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	1,375.70	5.0	237.00	17.2	1,612.70	4.8
Urban Medium Density	3,499.02	12.7	5,140.29	146.9	8,639.31	25.7
Urban Low Density	7,099.74	25.6	- 1,486.48	- 20.9	5,613.26	16.7
Suburban	1,502.97	5.4	- 993.31	- 66.1	509.66	1.5
Subtotal	13,477.43	48.7	2,897.50	21.5	16,374.93	48.7
Commercial	504.08	1.8	92.91	18.4	596.99	1.8
Industrial	811.02	2.9	345.48	42.6	1,156.50	3.4
Governmental[a]	1,323.90	4.8	240.48	18.2	1,564.38	4.7
Transportation[b]	8,927.35	32.2	1,649.17	18.5	10,576.52	31.4
Recreation	2,671.91[c]	9.6	703.46[d]	26.3	3,375.37	10.0
Urban Land Use Subtotal	27,715.69	100.0	5,929.00	21.4	33,644.69	100.0
Rural Land Use						
Residential	--[e]	--	--	--	--	--
Agriculture	113,929.89	75.8	- 4,386.82	- 3.9	109.543.07	75.8
Other Open Lands[f]	36,454.39	24.2	- 1,542.18	- 4.2	34,912.21	24.2
Rural Land Use Subtotal	150,384.28	100.0	- 5,929.00	- 3.9	144,455.28	100.0
Total	178,099.97	--	--	--	178,099.97	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-4

EXISTING AND PROPOSED LAND USE IN MILWAUKEE COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	20,177.88	19.0	562.83	2.8	20,740.71	17.3
Urban Medium Density	13,663.23	12.9	8,626.88	63.1	22,290.11	18.6
Urban Low Density	9,290.54	8.7	- 2,104.93	- 22.7	7,185.61	6.0
Suburban	2,500.65	2.4	- 375.87	- 15.0	2,124.78	1.8
Subtotal	45,632.30	43.0	6,708.91	14.7	52,341.21	43.7
Commercial	2,874.71	2.7	289.41	10.1	3,164.12	2.7
Industrial	4,898.68	4.6	1,382.34	28.2	6,281.02	5.3
Governmental[a]	7,489.97	7.0	567.76	7.6	8,057.73	6.7
Transportation[b]	35,430.62	33.4	3,952.96	11.2	39,383.58	32.9
Recreation	9,924.02[c]	9.3	421.32[d]	4.2	10,345.34	8.7
Urban Land Use Subtotal	106,250.30	100.0	13,322.70	12.5	119,573.00	100.0
Rural Land Use						
Residential	--[e]	--	--	--	--	--
Agriculture	28,607.65	58.6	- 9,210.09	- 32.2	19,397.56	54.7
Other Open Lands[f]	20,206.65	41.4	- 4,112.61	- 20.4	16,094.04	45.3
Rural Land Use Subtotal	48,814.30	100.0	- 13,322.70	- 27.3	35,491.60	100.0
Total	155,064.60	--	--	--	155,064.60	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-5

EXISTING AND PROPOSED LAND USE IN OZAUKEE COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	53.39	0.2	44.26	- 82.9	9.13	--[a]
Urban Medium Density	2,297.41	9.7	3,314.62	144.3	5,612.03	18.2
Urban Low Density	6,237.32	26.3	2,957.46	47.4	9,194.78	29.7
Suburban	3,732.72	15.7	- 2,053.97	- 55.0	1,678.75	5.4
Subtotal	12,320.84	51.9	4,173.85	33.9	16,494.69	53.3
Commercial	330.50	1.4	73.56	22.3	404.06	1.3
Industrial	444.42	1.9	102.88	23.1	547.30	1.8
Governmental[b]	939.18	3.9	269.16	28.7	1,208.34	3.9
Transportation[c]	8,053.84	33.9	1,894.69	23.5	9,948.53	32.1
Recreation	1,657.44[d]	7.0	704.24[e]	42.5	2,361.68	7.6
Urban Land Use Subtotal	23,746.22	100.0	7,218.38	30.4	30,964.60	100.0
Rural Land Use						
Residential	--[f]	--	--	--	--	--
Agriculture	100,491.37	79.6	- 6,432.69	- 6.4	94,058.68	79.0
Other Open Lands[g]	25,775.67	20.4	- 785.69	- 3.0	24,989.98	21.0
Rural Land Use Subtotal	126,267.04	100.0	- 7,218.38	- 5.7	119,048.66	100.0
Total	150,013.26	--	--	--	150,013.26	--

[a] *Less than 0.1 percent.*

[b] *Includes institutional uses.*

[c] *Includes communications, utilities, and off-street parking uses.*

[d] *Includes net site area of public and nonpublic recreation sites.*

[e] *Includes only that net site area recommended for public recreation use.*

[f] *Included in land use inventory as part of urban residential land use.*

[g] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-8

EXISTING AND PROPOSED LAND USE IN WASHINGTON COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	98.77	0.4	84.23	85.3	183.00	0.5
Urban Medium Density	2,999.42	11.5	5,063.94	168.8	8,063.36	22.9
Urban Low Density	6,983.67	26.7	83.11	1.2	7,066.78	20.1
Suburban	1,443.64	5.5	- 759.57	- 52.6	684.07	1.9
Subtotal	11,525.50	44.1	4,471.71	38.8	15,997.21	45.4
Commercial	299.00	1.1	141.86	47.4	440.86	1.2
Industrial	433.70	1.7	450.41	103.9	884.11	2.5
Governmental[a]	919.03	3.5	375.19	40.8	1,294.22	3.7
Transportation[b]	11,286.02	43.2	2,544.74	22.5	13,830.76	39.3
Recreation	1,663.71[c]	6.4	1,108.87[d]	66.7	2,772.58	7.9
Urban Land Use Subtotal	26,126.96	100.0	9,092.78	34.8	35,219.74	100.0
Rural Land Use						
Residential	--[e]	--	--	--	--	--
Agriculture	186,465.75	73.8	- 7,864.34	- 4.2	178,601.41	73.3
Other Open Lands[f]	66,140.69	26.2	- 1,228.44	- 1.9	64,912.25	26.7
Rural Land Use Subtotal	252,606.44	100.0	- 9,092.78	- 3.6	243,513.66	100.0
Total	278,733.40	--	--	--	278,733.40	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-9

EXISTING AND PROPOSED LAND USE IN WAUKESHA COUNTY
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	623.09	0.8	81.03	13.0	704.12	0.7
Urban Medium Density	7,295.83	9.5	13,364.14	183.2	20,659.97	21.7
Urban Low Density	26,896.02	35.1	- 746.47	- 2.8	26,149.55	27.5
Suburban	8,462.61	11.1	- 2,399.58	- 28.4	6,063.03	6.4
Subtotal	43,277.55	56.5	10,299.12	23.8	53,576.67	56.3
Commercial	1,340.74	1.8	270.02	20.1	1,610.76	1.7
Industrial	1,525.09	2.0	804.90	52.8	2,329.99	2.5
Governmental[a]	3,008.97	3.9	827.59	27.5	3,836.56	4.0
Transportation[b]	21,246.56	27.7	5,402.15	25.4	26,648.71	28.0
Recreation	6,218.79[c]	8.1	957.76[d]	15.4	7,176.55	7.5
Urban Land Use Subtotal	76,617.70	100.0	18,561.54	24.2	95,179.24	100.0
Rural Land Use						
Residential	--[e]	--	--	--	--	--
Agriculture	201,676.09	68.4	- 15,185.65	- 7.5	186,490.49	67.5
Other Open Lands[f]	93,351.47	31.6	- 3,375.89	- 3.6	89,975.58	32.5
Rural Land Use Subtotal	295,027.56	100.0	- 18,561.54	- 6.3	276,466.02	100.0
Total	371,645.26	--	--	--	371,645.26	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-10

URBAN LAND AREA AND POPULATION IN THE REGION BY PLANNING ANALYSIS AREA
1970 AND 2000 CONTROLLED CENTRALIZATION LAND USE PLAN

Planning Analysis Area[a]	Urban Land Area (acres)				Population			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha County								
50	3,222.79	444.76	3,667.55	13.8	29,524	6,686	36,210	22.6
51	5,344.26	882.27	6,226.53	16.5	54,116	11,445	65,561	21.1
52	3,991.74	1,864.04	5,855.78	46.7	6,981	15,832	22,813	226.8
53	3,547.14	1,254.40	4,801.54	35.4	7,473	10,174	17,647	136.1
54	3,023.03	347.11	3,370.14	11.5	4,484	3,193	7,677	71.2
55	8,586.73	1,136.42	9,723.15	13.2	15,339	9,553	24,892	62.3
County Subtotal	27,715.69	5,929.00	33,644.69	21.4	117,917	56,883	174,800	48.2
Milwaukee County								
13	5,209.08	--	5,209.08	--	14,154	1,060	15,214	7.5
14	5,323.35	677.69	6,001.04	12.7	24,312	7,422	31,734	30.5
15	2,616.58	--	2,616.58	--	34,758	- 3,955	30,803	- 11.4
16	2,258.58	--	2,258.58	--	45,979	- 10,481	35,498	- 22.8
17	7,253.23	4,206.84	11,460.07	58.0	38,029	31,760	69,789	83.5
18	9,081.70	--	9,081.70	--	127,286	- 8,386	118,900	- 6.6
19	5,374.04	--	5,374.04	--	89,031	- 11,228	77,803	- 12.6
20	6,173.35	--	6,173.35	--	165,520	- 37,223	128,297	- 22.5
21	4,837.99	--	4,837.99	--	74,278	- 15,678	58,600	- 21.1
22	2,489.95	--	2,489.95	--	22,134	- 2,634	19,500	- 11.9
23	3,213.67	--	3,213.67	--	42,063	951	43,014	2.3
24	4,362.36	--	4,362.36	--	64,772	- 8,769	56,003	- 13.5
25	5,283.25	81.76	5,365.01	1.5	35,369	2,562	37,931	7.2
26	6,416.49	--	6,416.49	--	56,530	2,180	58,710	3.9
27	5,106.89	4,347.54	9,454.43	85.1	13,821	25,356	39,177	183.5
28	5,824.39	2,588.82	8,413.21	44.4	12,989	20,568	33,557	158.3
29	9,765.18	1,405.76	11,170.94	14.4	48,894	14,376	63,270	29.4
30	7,638.75	--	7,638.75	--	83,794	- 8,694	75,100	- 10.4
31	8,021.47	14.29	8,035.76	0.2	60,536	- 3,836	56,700	- 6.3
County Subtotal	106,250.30	13,322.70	119,573.00	12.5	1,054,249	- 4,649	1,049,600	- 0.4
Ozaukee County								
1	2,987.24	574.37	3,561.61	19.2	5,225	1,684	6,909	32.2
2	2,465.83	312.87	2,778.70	12.7	10,280	4,376	14,656	42.6
3	2,181.74	645.14	2,826.88	29.6	2,905	5,608	8,513	193.0
4	6,953.20	1,971.73	8,924.93	28.4	20,201	22,765	42,966	112.7
5	9,158.21	3,714.27	12,872.48	40.6	15,850	25,106	40,956	158.4
County Subtotal	23,746.22	7,218.38	30,964.60	30.4	54,461	59,539	114,000	109.3
Racine County								
43	6,111.75	309.73	6,421.48	5.1	46,517	4,645	51,162	10.0
44	6,973.02	75.00	7,048.02	1.1	68,521	2,982	71,503	4.4
45	3,678.45	493.32	4,171.77	13.4	7,608	6,057	13,665	79.6
46	3,628.72	1,780.71	5,409.43	49.1	10,978	13,904	24,882	126.7
47	4,597.61	477.57	5,075.18	10.4	9,512	4,535	14,047	47.7
48	6,252.01	1,003.37	7,255.38	16.0	15,565	7,857	23,422	50.5
49	3,828.68	896.33	4,725.01	23.4	12,137	6,882	19,019	56.7
County Subtotal	35,070.24	5,036.03	40,106.27	14.4	170,838	46,862	217,700	27.4

Table G-10 (continued)

Planning Analysis Area[a]	Urban Land Area (acres)				Population			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Walworth County								
56	4,218.72	908.31	5,127.03	21.5	6,916	7,669	14,585	110.9
57	5,099.77	835.73	5,935.50	16.4	13,872	3,894	17,766	28.1
58	3,512.46	1,386.57	4,899.03	39.5	7,594	5,693	13,287	75.0
59	14,175.51	1,184.27	15,359.78	8.4	21,847	13,493	35,340	61.8
60	5,308.77	541.65	5,850.42	10.2	13,215	5,407	18,622	40.9
County Subtotal	32,315.23	4,856.53	37,171.76	15.0	63,444	36,156	99,600	57.0
Washington County								
6	2,826.30	225.66	3,051.96	8.0	4,826	2,674	7,500	55.4
7	6,999.99	3,024.33	10,024.32	43.2	24,136	27,612	51,748	114.4
8	2,231.72	133.63	2,365.35	6.0	3,589	1,332	4,921	37.1
9	2,631.30	1,091.18	3,722.48	41.5	4,645	10,425	15,070	224.4
10	4,112.82	1,934.86	6,047.68	47.0	11,689	12,449	24,138	106.5
11	2,983.66	2,683.12	5,666.78	89.9	7,390	22,125	29,515	299.4
12	4,341.17	--	4,341.17	--	7,564	2,544	10,108	33.6
County Subtotal	26,126.96	9,092.78	35,219.74	34.8	63,839	79,161	143,000	124.0
Waukesha County								
32	8,094.83	3,230.01	11,324.84	39.9	35,021	30,617	65,638	87.4
33	12,726.42	1,460.09	14,186.51	11.5	43,124	13,901	57,025	32.2
34	8,048.09	2,879.49	10,927.58	35.8	27,038	29,415	56,453	108.8
35	4,493.16	1,573.60	6,066.76	35.0	11,566	16,497	28,063	142.6
36	7,087.45	2,302.12	9,389.57	32.5	17,229	23,375	40,604	135.7
37	3,585.91	843.16	4,429.07	23.5	5,449	4,609	10,058	84.6
38	3,686.66	1,040.36	4,727.02	28.2	8,051	10,803	18,854	134.2
39	7,422.03	914.86	8,336.89	12.3	19,430	11,063	30,493	56.9
40	9,706.91	3,378.74	13,085.65	34.8	47,557	35,969	83,526	75.6
41	6,945.34	--	6,945.34	--	8,632	2,882	11,514	33.4
42	4,820.90	939.11	5,760.01	19.5	8,241	10,131	18,372	122.9
County Subtotal	76,617.70	18,561.54	95,179.24	24.2	231,338	189,262	420,600	81.8
Region Total	327,842.34	64,016.96	391,859.30	19.5	1,756,086	463,214	2,219,300	26.4

[a] *See Map 2.*

Source: SEWRPC.

Table G-11

EXISTING AND PROPOSED LAND USE IN KENOSHA COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	1,375.70	5.0	237.00	17.2	1,612.70	4.0
Urban Medium Density	3,499.02	12.6	7,262.90	207.6	10,761.92	27.1
Urban Low Density	7,099.74	25.6	- 1,668.20	- 23.5	5,431.54	13.7
Suburban	1,502.97	5.5	1,264.03	84.1	2,767.00	7.0
Subtotal	13,477.43	48.7	7,095.73	52.6	20,573.16	51.8
Commercial	504.08	1.8	146.74	29.1	650.82	1.6
Industrial	811.02	2.9	429.20	52.9	1,240.22	3.1
Governmental[a]	1,323.90	4.8	407.55	30.8	1,731.45	4.4
Transportation[b]	8,927.35	32.2	3,153.74	35.3	12,081.09	30.4
Recreation	2,671.91[c]	9.6	771.72[d]	28.9	3,443.63	8.7
Urban Land Use Subtotal	27,715.69	100.0	12,004.68	43.3	39,720.37	100.0
Rural Land Use						
Residential	--[e]	--	54.30	--	54.30	--[f]
Agriculture	113,929.89	75.8	10,298.94	- 9.0	103,630.95	74.9
Other Open Lands[g]	36,454.39	24.2	- 1,760.04	- 4.8	34,694.35	25.1
Rural Land Use Subtotal	150,384.28	100.0	- 12,004.68	- 8.0	138,379.60	100.0
Total	178,099.97	--	--	--	178,099.97	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Less than 0.1 percent.*

[g] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-12

EXISTING AND PROPOSED LAND USE IN MILWAUKEE COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	20,177.88	19.0	- 2,992.03	- 14.8	17,185.85	15.6
Urban Medium Density	13,663.23	12.9	6,977.96	51.1	20,641.19	18.7
Urban Low Density	9,290.54	8.7	- 1,311.68	- 14.1	7,978.86	7.2
Suburban	2,500.65	2.4	- 757.10	- 30.3	1,743.55	1.6
Subtotal	45,632.30	43.0	1,917.15	4.2	47,549.45	43.1
Commercial	2,874.71	2.7	- 569.73	- 19.8	2,304.98	2.1
Industrial	4,898.68	4.6	960.67	19.6	5,859.35	5.3
Governmental[a]	7,489.97	7.0	204.53	2.7	7,694.50	7.0
Transportation[b]	35,430.62	33.4	1,332.96	3.8	36,763.58	33.3
Recreation	9,924.02[c]	9.3	255.34[d]	2.6	10,179.36	9.2
Urban Land Use Subtotal	106,250.30	100.0	4,100.92	3.9	110,351.22	100.0
Rural Land Use						
Residential	--[e]	--	446.29	--	446.29	1.0
Agriculture	28,607.65	58.6	- 3,225.08	- 11.3	25,382.57	56.8
Other Open Lands[f]	20,206.65	41.4	- 1,322.13	- 6.5	18,884.52	42.2
Rural Land Use Subtotal	48,814.30	100.0	- 4,100.92	- 8.4	44,713.38	100.0
Total	155,064.60	--	--	--	155,064.60	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-13

EXISTING AND PROPOSED LAND USE IN OZAUKEE COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	53.39	0.2	- 44.49	- 83.3	8.90	--[a]
Urban Medium Density	2,297.41	9.7	3,845.07	167.4	6,142.48	12.0
Urban Low Density	6,237.32	26.3	2,430.32	39.0	8,667.64	16.9
Suburban	3,732.72	15.7	14,070.80	377.0	17,803.52	34.7
Subtotal	12,320.84	51.9	20,301.70	164.8	32,622.54	63.6
Commercial	330.50	1.4	130.78	39.6	461.28	0.9
Industrial	444.42	1.9	336.61	75.7	781.03	1.5
Governmental[b]	939.18	3.9	374.45	39.9	1,313.63	2.6
Transportation[c]	8,053.84	33.9	5,757.71	71.5	13,811.55	26.9
Recreation	1,657.44[d]	7.0	726.50[e]	43.8	2,383.94	4.6
Urban Land Use Subtotal	23,746.22	100.0	27,627.75	116.3	51,373.97	100.1
Rural Land Use						
Residential	--[f]	--	319.49	--	319.49	0.3
Agriculture	100,491.37	79.6	- 26,266.57	- 26.1	74,224.80	75.3
Other Open Lands[g]	25,775.67	20.4	- 1,680.67	- 6.5	24,095.00	24.4
Rural Land Use Subtotal	126,267.04	100.0	- 27,627.75	- 21.9	98,639.29	100.0
Total	150,013.26	--	--	--	150,013.26	--

[a] *Less than 0.1 percent.*

[b] *Includes institutional uses.*

[c] *Includes communications, utilities, and off-street parking uses.*

[d] *Includes net site area of public and nonpublic recreation sites.*

[e] *Includes only that net site area recommended for public recreation use.*

[f] *Included in land use inventory as part of urban residential land use.*

[g] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-14

EXISTING AND PROPOSED LAND USE IN RACINE COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	2,031.03	5.8	59.41	2.9	2,090.44	4.4
Urban Medium Density	4,254.75	12.2	3,954.85	93.0	8,209.60	17.2
Urban Low Density	8,970.09	25.6	- 1,245.78	- 13.9	7,724.31	16.2
Suburban	1,368.75	3.9	5,756.01	420.5	7,124.76	14.9
Subtotal	16,624.62	47.5	8,524.49	51.3	25,149.11	52.7
Commercial	574.80	1.6	99.79	17.4	674.59	1.4
Industrial	1,098.50	3.1	542.12	49.4	1,640.62	3.4
Governmental[a]	1,744.39	5.0	203.04	11.6	1,947.43	4.1
Transportation[b]	12,442.46	35.4	2,746.74	22.1	15,189.20	31.8
Recreation	2,585.47[c]	7.4	588.95[d]	22.8	3,174.42	6.6
Urban Land Use Subtotal	35,070.24	100.0	12,705.13	36.2	47,775.37	100.0
Rural Land Use						
Residential	--[e]	--	48.62	--	48.62	--[f]
Agriculture	147,206.95	80.7	- 11,510.68	- 7.8	135,696.27	79.9
Other Open Lands[g]	35,284.69	19.3	- 1,243.07	- 3.5	34,041.62	20.1
Rural Land Use Subtotal	182,491.64	100.0	- 12,705.13	- 7.0	169,786.51	100.0
Total	217,561.88	--	--	--	217,561.88	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Less than 0.1 percent.*

[g] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-15

EXISTING AND PROPOSED LAND USE IN WALWORTH COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	29.03	0.1	19.91	68.6	48.94	0.1
Urban Medium Density	3,082.85	9.5	3,794.82	123.1	6,877.67	15.5
Urban Low Density	7,223.40	22.4	199.91	2.8	7,423.31	16.7
Suburban	3,072.87	9.5	3,770.88	122.7	6,843.75	15.4
Subtotal	13,408.15	41.5	7,785.52	58.1	21,193.67	47.7
Commercial	593.02	1.8	84.48	14.2	677.50	1.5
Industrial	827.20	2.6	142.84	17.3	970.04	2.2
Governmental[a]	1,192.13	3.7	210.14	17.6	1,402.27	3.2
Transportation[b]	12,019.97	37.2	2,516.03	20.9	14,536.00	32.8
Recreation	4,274.76[c]	13.2	1,325.91[d]	31.0	5,600.67	12.6
Urban Land Use Subtotal	32,315.23	100.0	12,064.92	37.3	44,380.15	100.0
Rural Land Use						
Residential	--[e]	--	33.27	--	33.27	--[f]
Agriculture	261,743.76	77.5	- 10,452.42	- 4.0	251,291.34	77.2
Other Open Lands[g]	75,922.47	22.5	- 1,645.77	- 2.2	74,276.70	22.8
Rural Land Use Subtotal	337,666.23	100.0	- 12,064.92	- 3.6	325,601.31	100.0
Total	369,981.46	--	--	--	369,981.46	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Less than 0.1 percent.*

[g] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-16

EXISTING AND PROPOSED LAND USE IN WASHINGTON COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	98.77	0.4	91.17	92.3	189.94	0.3
Urban Medium Density	2,999.42	11.5	4,283.75	142.8	7,283.17	11.8
Urban Low Density	6,983.67	26.8	782.86	11.2	7,766.53	12.5
Suburban	1,443.64	5.5	21,154.33	1,465.3	22,597.97	36.5
Subtotal	11,525.50	44.2	26,312.11	228.3	37,837.61	61.1
Commercial	299.00	1.1	149.06	49.9	448.06	0.7
Industrial	433.70	1.6	469.95	108.4	903.65	1.5
Governmental[a]	919.03	3.5	398.63	43.4	1,317.66	2.1
Transportation[b]	11,286.02	43.2	7,335.39	65.0	18,621.41	30.1
Recreation	1,663.71[c]	6.4	1,101.68[d]	66.2	2,765.39	4.5
Urban Land Use Subtotal	26,126.96	100.0	35,766.82	136.9	61,893.78	100.0
Rural Land Use						
Residential	--[e]	--	168.59	--	168.59	0.1
Agriculture	186,465.75	73.8	- 34,310.81	- 18.4	152,154.94	70.2
Other Open Lands[f]	66,140.69	26.2	- 1,624.60	- 2.5	64,516.09	29.7
Rural Land Use Subtotal	252,606.44	100.0	- 35,766.82	- 14.2	216,839.62	100.0
Total	278,733.40	--	--	--	278,733.40	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-17

EXISTING AND PROPOSED LAND USE IN WAUKESHA COUNTY
1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	623.09	0.8	81.03	13.0	704.12	0.6
Urban Medium Density	7,295.83	9.5	13,768.61	188.7	21,064.44	17.2
Urban Low Density	26,896.02	35.1	- 1,611.06	- 6.0	25,284.96	20.6
Suburban	8,462.61	11.1	19,630.40	232.0	28,093.01	22.9
Subtotal	43,277.55	56.5	31,868.98	73.6	75,146.53	61.3
Commercial	1,340.74	1.8	343.36	25.6	1,684.10	1.4
Industrial	1,525.09	2.0	965.70	63.3	2,490.79	2.0
Governmental[a]	3,008.97	3.9	937.07	31.1	3,946.04	3.2
Transportation[b]	21,246.56	27.7	10,945.59	51.5	32,192.15	26.2
Recreation	6,218.79[c]	8.1	967.97[d]	15.6	7,186.76	5.9
Urban Land Use Subtotal	76,617.70	100.0	46,028.67	60.1	122,646.37	100.0
Rural Land Use						
Residential	--[e]	--	3,711.98	--	3,711.98	1.5
Agriculture	201,676.09	68.4	- 45,006.24	- 22.3	156,669.85	62.9
Other Open Lands[f]	93,351.47	31.6	- 4,734.41	- 5.1	88,617.06	35.6
Rural Land Use Subtotal	295,027.56	100.0	- 46,028.67	- 15.6	248,998.89	100.0
Total	371,645.26	--	--	--	371,645.26	--

[a] *Includes institutional uses.*

[b] *Includes communications, utilities, and off-street parking uses.*

[c] *Includes net site area of public and nonpublic recreation sites.*

[d] *Includes only that net site area recommended for public recreation use.*

[e] *Included in land use inventory as part of urban residential land use.*

[f] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-18

URBAN LAND AREA AND POPULATION IN THE REGION BY PLANNING ANALYSIS AREA 1970 AND 2000 CONTROLLED DECENTRALIZATION LAND USE PLAN

Planning Analysis Area[a]	Urban Land Area (acres)				Population			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha County								
50	3,222.79	181.67	3,404.46	5.6	29,524	4,676	34,200	15.8
51	5,344.26	964.27	6,308.53	18.0	54,116	11,582	65,698	21.4
52	3,991.74	3,775.84	7,767.58	94.6	6,981	30,718	37,699	440.0
53	3,547.14	2,219.99	5,767.13	62.6	7,473	17,701	25,174	236.9
54	3,023.03	479.75	3,502.78	15.9	4,484	3,216	7,700	71.7
55	8,586.73	4,383.16	12,969.89	51.0	15,339	16,991	32,330	110.8
County Subtotal	27,715.69	12,004.68	39,720.37	43.3	117.917	84,884	202,801	72.0
Milwaukee County								
13	5,209.08	- 416.48	4,792.60	- 8.0	14,154	1,065	15,219	7.5
14	5,323.35	401.99	5,725.34	7.6	24,312	5,421	29,733	22.3
15	2,616.58	- 29.74	2,586.84	- 1.1	34,758	- 5,958	28,800	- 17.1
16	2,258.58	- 73.05	2,185.53	- 3.2	45,979	- 14,477	31,502	- 31.5
17	7,253.23	1,658.02	8,911.25	22.9	38,029	16,189	54,218	42.6
18	9,081.70	- 151.73	8,929.97	- 1.7	127,286	- 26,387	100,899	- 20.7
19	5,374.04	- 119.43	5,254.61	- 2.2	89,031	- 23,233	65,798	- 26.1
20	6,173.35	- 355.68	5,817.67	- 5.8	165,520	- 68,220	97,300	- 41.2
21	4,837.99	- 153.83	4,684.16	- 3.2	74,278	- 25,679	48,599	- 34.6
22	2,489.95	- 25.94	2,464.01	- 1.0	22,134	- 4,134	18,000	- 18.7
23	3,213.67	- 7.07	3,206.60	- 0.2	42,063	- 51	42,012	- 0.1
24	4,362.36	- 79.54	4,282.82	- 1.8	64,772	- 12,770	52,002	- 19.7
25	5,283.25	81.76	5,365.01	1.5	35,369	2,562	37,931	7.2
26	6,416.49	- 23.50	6,392.99	- 0.4	56,530	- 1,819	54,711	- 3.2
27	5,106.89	2,249.01	7,355.90	44.0	13,821	10,356	24,177	74.9
28	5,824.39	338.80	6,163.19	5.8	12,989	5,559	18,548	42.8
29	9,765.18	962.01	10,727.19	9.9	48,894	11,376	60,270	23.3
30	7,638.75	- 115.06	7,523.69	- 1.5	83,794	- 16,691	67,103	- 19.9
31	8,021.47	- 39.62	7,981.85	- 0.5	60,536	- 8,837	51,699	- 14.6
County Subtotal	106,250.30	4,100.92	110,351.22	3.9	1,054,249	- 155,728	898,521	- 14.8
Ozaukee County								
1	2,987.24	540.19	3,527.43	18.1	5,225	1,575	6,800	30.1
2	2,465.83	3,937.22	6,403.05	159.7	10,280	12,746	23,026	124.0
3	2,181.74	3,627.03	5,808.77	166.2	2,905	10,847	13,752	373.4
4	6,953.20	16,157.75	23,110.95	232.4	20,201	46,757	66,958	231.5
5	9,158.21	3,365.56	12,523.77	36.7	15,850	22,550	38,400	142.3
County Subtotal	23,746.22	27,627.75	51,373.97	116.3	54,461	94,475	148,936	173.5
Racine County								
43	6,111.75	308.85	6,420.60	5.1	46,517	4,883	51,400	10.5
44	6,973.02	75.00	7,048.02	1.1	68,521	2,979	71,500	4.3
45	3,678.45	916.49	4,594.94	24.9	7,608	9,084	16,692	119.4
46	3,628.72	1,718.19	5,346.91	47.3	10,978	13,403	24,381	122.1
47	4,597.61	954.51	5,552.12	20.8	9,512	4,988	14,500	52.4
48	6,252.01	6,021.92	12,273.93	96.3	15,565	11,758	27,323	75.5
49	3,828.68	2,710.17	6,538.85	70.8	12,137	6,763	18,900	55.7
County Subtotal	35,070.24	12,705.13	47,775.37	36.2	170,838	53,858	224,696	31.5

Table G-18 (continued)

Planning Analysis Area[a]	Urban Land Area (acres)				Population			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Walworth County								
56	4,218.72	6,558.87	10,777.59	155.5	6,916	11,314	18,230	163.6
57	5,099.77	1,832.31	6,932.08	35.9	13,872	7,403	21,275	53.4
58	3,512.46	1,760.87	5,273.33	50.1	7,594	5,706	13,300	75.1
59	14,175.51	1,259.91	15,435.42	8.9	21,847	12,453	34,300	57.0
60	5,308.77	652.96	5,961.73	12.3	13,215	6,285	19,500	47.6
County Subtotal	32,315.23	12,064.92	44,380.15	37.3	63,444	43,161	106,605	68.0
Washington County								
6	2,826.30	413.29	3,239.59	14.6	4,826	3,174	8,000	65.8
7	6,999.99	12,522.17	19,522.16	178.9	24,136	46,169	70,305	191.3
8	2,231.72	1,319.86	3,551.58	59.1	3,589	3,111	6,700	86.7
9	2,631.30	4,333.52	6,964.82	164.7	4,645	11,230	15,875	241.8
10	4,112.82	5,877.91	9,990.73	143.0	11,689	14,826	26,515	126.8
11	2,983.66	2,070.00	5,053.66	69.4	7,390	17,310	24,700	234.2
12	4,341.17	9,230.07	13,571.24	212.6	7,564	14,843	22,407	196.2
County Subtotal	26,126.96	35,766.82	61,893.78	136.9	63,839	110,663	174,502	173.3
Waukesha County								
32	8,094.83	2,969.19	11,064.02	36.7	35,021	28,579	63,600	81.6
33	12,726.42	1,676.72	14,403.14	13.2	43,124	15,176	58,300	35.2
34	8,048.09	3,020.76	11,068.85	37.5	27,038	30,762	57,800	113.8
35	4,493.16	1,620.41	6,113.57	36.1	11,566	17,034	28,600	147.3
36	7,087.45	10,342.85	17,430.30	145.9	17,229	30,746	47,975	178.5
37	3,585.91	2,508.06	6,093.97	69.9	5,449	5,483	10,932	100.6
38	3,686.66	2,950.86	6,637.52	80.0	8,051	15,593	23,644	193.7
39	7,422.03	7,500.58	14,922.61	101.1	19,430	21,174	40,604	109.0
40	9,706.91	6,024.12	15,731.03	62.1	47,557	44,401	91,958	93.4
41	6,945.34	30.99	6,976.33	0.4	8,632	4,711	13,343	54.6
42	4,820.90	7,384.13	12,205.03	153.2	8,241	18,242	26,483	221.4
County Subtotal	76,617.70	46,028.67	122,646.37	60.1	231,338	231,901	463,239	100.2
Region Total	327,842.34	150,298.89	478,141.23	45.8	1,756,086	463,214	2,219,300	26.4

[a] *See Map 2.*

Source: SEWRPC.

Table G-19

EXISTING AND PROPOSED LAND USE IN KENOSHA COUNTY
1970 AND 2000 RECOMMENDED REGIONAL LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	1,375	5.0	123	8.9	1,498	4.4
Urban Medium Density	3,499	12.6	4,652	133.0	8,151	23.7
Urban Low Density	7,100	25.6	- 1,356	- 19.1	5,744	16.7
Suburban Density	1,502	5.4	- 88	- 5.9	1,414	4.1
Subtotal	13,476	48.6	3,331	24.7	16,807	48.9
Commercial	504	1.8	34	6.8	538	1.6
Industrial	811	2.9	350	43.2	1,161	3.4
Governmental and Institutional	1,326	4.8	89	6.8	1,415	4.1
Transportation, Communication, and Utilities[a]	8,932	32.2	2,580	28.9	11,512	33.5
Recreation	2,670[b]	9.7	259[c]	9.7	2,929	8.5
Urban Land Use Subtotal	27,719	100.0	6,643	24.0	34,362	100.0
Rural Land Use						
Residential	--[d]	--	1,484	--	1,484	1.0
Agriculture	113,928	75.8	- 7,016	- 6.2	106,912	74.4
Other Open Lands[e]	36,453	24.2	- 1,111	- 3.1	35,342	24.6
Rural Land Use Subtotal	150,381	100.0	- 6,643	- 4.4	143,738	100.0
Total	178,100	--	--	--	178,100	--

[a] *Includes off-street parking uses.*

[b] *Includes net site area of public and nonpublic recreation sites.*

[c] *Includes only that net site area recommended for public recreation use.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-20

EXISTING AND PROPOSED LAND USE IN MILWAUKEE COUNTY
1970 AND 2000 RECOMMENDED REGIONAL LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	20,178	19.0	357	1.8	20,535	17.0
Urban Medium Density	13,663	12.9	10,447	76.5	24,110	20.0
Urban Low Density	9,291	8.7	- 2,705	- 29.1	6,586	5.5
Suburban Density	2,499	2.3	- 185	- 7.4	2,314	1.9
Subtotal	45,631	42.9	7,914	17.3	53,545	44.4
Commercial	2,875	2.7	196	6.8	3,071	2.5
Industrial	4,899	4.6	1,995	40.7	6,894	5.7
Governmental and Institutional	7,502	7.1	211	2.8	7,713	6.4
Transportation, Communication, and Utilities[a]	35,441	33.4	3,616	10.2	39,057	32.4
Recreation	9,911[b]	9.3	521[c]	5.3	10,432	8.6
Urban Land Use Subtotal	106,259	100.0	14,453	13.6	120,712	100.0
Rural Land Use						
Residential	--[d]	--	--	--	--	--
Agriculture	28,607	58.6	- 8,427	- 29.5	20,180	58.7
Other Open Lands[e]	20,199	41.4	- 6,026	- 29.8	14,173	41.3
Rural Land Use Subtotal	48,806	100.0	- 14,453	- 29.6	34,353	100.0
Total	155,065	--	--	--	155,065	--

[a] *Includes off-street parking uses.*

[b] *Includes net site area of public and nonpublic recreation sites.*

[c] *Includes only that net site area recommended for public recreation use.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-21

EXISTING AND PROPOSED LAND USE IN OZAUKEE COUNTY
1970 AND 2000 RECOMMENDED REGIONAL LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	54	0.2	- 45	- 83.3	9	--
Urban Medium Density	2,297	9.7	3,392	147.7	5,689	18.1
Urban Low Density	6,237	26.3	1,452	23.3	7,689	24.5
Suburban Density	3,733	15.7	- 390	- 10.4	3,343	10.7
Subtotal	12,321	51.9	4,409	35.8	16,730	53.3
Commercial	331	1.4	43	13.0	374	1.2
Industrial	443	1.9	483	109.0	926	3.0
Governmental and Institutional	939	3.9	113	12.0	1,052	3.3
Transportation, Communication, and Utilities[a]	8,055	33.9	1,922	23.9	9,977	31.8
Recreation	1,657[b]	7.0	682[c]	41.1	2,339	7.4
Urban Land Use Subtotal	23,746	100.0	7,652	32.2	31,398	100.0
Rural Land Use						
Residential	--[d]	--	1,243	--	1,243	1.0
Agriculture	100,491	79.6	- 7,989	- 7.9	92,502	78.0
Other Open Lands[e]	25,776	20.4	- 906	- 3.5	24,870	21.0
Rural Land Use Subtotal	126,267	100.0	- 7,652	- 6.1	118,615	100.0
Total	150,013	--	--	--	150,013	--

[a] *Includes off-street parking uses.*

[b] *Includes net site area of public and nonpublic recreation sites.*

[c] *Includes only that net site area recommended for public recreation use.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-22

EXISTING AND PROPOSED LAND USE IN RACINE COUNTY
1970 AND 2000 RECOMMENDED REGIONAL LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	2,031	5.8	2	0.1	2,033	5.0
Urban Medium Density	4,255	12.1	4,197	98.6	8,452	20.7
Urban Low Density	8,970	25.6	- 1,333	- 14.9	7,637	18.7
Suburban Density	1,369	3.9	- 167	- 12.2	1,202	3.0
Subtotal	16,625	47.4	2,699	16.2	19,324	47.4
Commercial	574	1.6	83	14.5	657	1.6
Industrial	1,099	3.1	798	72.6	1,897	4.6
Governmental and Institutional	1,744	5.0	72	4.1	1,816	4.5
Transportation, Communication, and Utilities[a]	12,442	35.5	1,680	13.5	14,122	34.7
Recreation	2,586[b]	7.4	347[c]	13.4	2,933	7.2
Urban Land Use Subtotal	35,070	100.0	5,679	16.2	40,749	100.0
Rural Land Use						
Residential	--[d]	--	1,797	--	1,797	1.0
Agriculture	147,207	80.7	- 6,243	- 4.2	140,964	79.7
Other Open Lands[e]	35,285	19.3	- 1,233	- 3.5	34,052	19.3
Rural Land Use Subtotal	182,492	100.0	- 5,679	- 3.1	176,813	100.0
Total	217,562	--	--	--	217,562	--

[a] *Includes off-street parking uses.*

[b] *Includes net site area of public and nonpublic recreation sites.*

[c] *Includes only that net site area recommended for public recreation use.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-23

EXISTING AND PROPOSED LAND USE IN WALWORTH COUNTY
1970 AND 2000 RECOMMENDED REGIONAL LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	29	0.1	- 20	- 69.0	9	--
Urban Medium Density	3,083	9.5	2,225	72.2	5,308	14.2
Urban Low Density	7,224	22.4	- 557	- 7.7	6,667	17.8
Suburban Density	3,073	9.5	378	12.3	3,451	9.2
Subtotal	13,409	41.5	2,026	15.1	15,435	41.2
Commercial	593	1.8	64	10.8	657	1.7
Industrial	827	2.6	448	54.2	1,275	3.4
Governmental and Institutional	1,192	3.7	48	4.0	1,240	3.3
Transportation, Communication, and Utilities[a]	12,020	37.2	1,821	15.1	13,841	36.9
Recreation	4,275[b]	13.2	779[c]	18.2	5,054	13.5
Urban Land Use Subtotal	32,316	100.0	5,186	16.0	37,502	100.0
Rural Land Use						
Residential	--[d]	--	2,115	--	2,115	0.6
Agriculture	261,744	77.5	- 6,474	- 2.5	255,270	76.8
Other Open Lands[e]	75,922	22.5	- 827	- 1.1	75,095	22.6
Rural Land Use Subtotal	337,666	100.0	- 5,186	- 1.5	332,480	100.0
Total	369,982	--	--	--	369,982	--

[a] *Includes off-street parking uses.*

[b] *Includes net site area of public and nonpublic recreation sites.*

[c] *Includes only that net site area recommended for public recreation use.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-24

EXISTING AND PROPOSED LAND USE IN WASHINGTON COUNTY
1970 AND 2000 RECOMMENDED REGIONAL LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	99	0.4	--	--	99	0.3
Urban Medium Density	2,999	11.5	4,495	149.9	7,494	21.4
Urban Low Density	6,983	26.7	- 1,067	- 15.3	5,916	16.9
Suburban Density	1,443	5.5	1,062	73.6	2,505	7.1
Subtotal	11,524	44.1	4,490	39.0	16,014	45.7
Commercial	299	1.1	41	13.9	340	1.0
Industrial	434	1.7	385	88.7	819	2.3
Governmental and Institutional	916	3.5	122	13.3	1,038	2.9
Transportation, Communication, and Utilities[a]	11,289	43.2	3,240	28.7	14,529	41.4
Recreation	1,664[b]	6.4	696[c]	41.8	2,360	6.7
Urban Land Use Subtotal	26,126	100.0	8,974	34.3	35,100	100.0
Rural Land Use						
Residential	--[d]	--	7,318	--	7,318	3.0
Agriculture	186,466	73.8	- 15,747	- 8.4	170,719	70.1
Other Open Lands[e]	66,141	26.2	- 545	- 0.8	65,596	26.9
Rural Land Use Subtotal	252,607	100.0	- 8,974	- 3.6	243,633	100.0
Total	278,733	--	--	--	278,733	--

[a] *Includes off-street parking uses.*

[b] *Includes net site area of public and nonpublic recreation sites.*

[c] *Includes only that net site area recommended for public recreation use.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-25

EXISTING AND PROPOSED LAND USE IN WAUKESHA COUNTY
1970 AND 2000 RECOMMENDED REGIONAL LAND USE PLAN

Land Use Category	Existing 1970		Planned Increment		Total 2000	
	Acres	Percent of Major Category	Acres	Percent Change	Acres	Percent of Major Category
Urban Land Use						
Residential						
Urban High Density	623	0.8	- 46	- 7.4	577	0.6
Urban Medium Density	7,296	9.5	11,638	159.5	18,934	18.8
Urban Low Density	26,896	35.1	- 2,123	- 7.9	24,773	24.6
Suburban Density	8,460	11.0	4,252	50.3	12,712	12.6
Subtotal	43,275	56.4	13,721	31.7	56,996	56.6
Commercial	1,341	1.8	237	17.7	1,578	1.6
Industrial	1,525	2.0	2,213	145.1	3,738	3.7
Governmental and Institutional	3,009	3.9	296	9.8	3,305	3.3
Transportation, Communication, and Utilities[a]	21,251	27.8	6,582	31.0	27,833	27.7
Recreation	6,219[b]	8.1	882[c]	14.2	7,101	7.1
Urban Land Use Subtotal	76,620	100.0	23,931	31.2	100,551	100.0
Rural Land Use						
Residential	--[d]	--	8,349	--	8,349	3.1
Agriculture	201,676	68.4	- 27,883	- 13.8	173,793	64.1
Other Open Lands[e]	93,349	31.6	- 4,397	- 4.7	88,952	32.8
Rural Land Use Subtotal	295,025	100.0	- 23,931	- 8.1	271,094	100.0
Total	371,645	--	--	--	371,645	--

[a] *Includes off-street parking uses.*

[b] *Includes net site area of public and nonpublic recreation sites.*

[c] *Includes only that net site area recommended for public recreation use.*

[d] *Included in land use inventory as part of urban residential land use.*

[e] *Includes woodlands, water, wetlands, unused lands, and quarries.*

Source: SEWRPC.

Table G-26

URBAN LAND AREA AND POPULATION IN THE REGION BY PLANNING ANALYSIS AREA 1970 AND 2000 RECOMMENDED LAND USE PLAN

Planning Analysis Area[a]	Urban Land Area (acres)				Population			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha County								
50	3,223	284	3,507	8.8	29,500	4,100	33,600	13.9
51	5,344	607	5,951	11.4	54,100	5,100	59,200	9.4
52	3,992	2,394	6,386	60.0	7,000	20,100	27,100	287.1
53	3,550	2,174	5,724	61.2	7,500	15,800	23,300	210.7
54	3,023	211	3,234	7.0	4,500	2,200	6,700	48.9
55	8,587	973	9,560	11.3	15,300	9,600	24,900	62.7
County Subtotal	27,719	6,643	34,362	24.0	117,900	56,900	174,800	48.3
Milwaukee County								
13	5,209	598	5,807	11.5	14,100	800	14,900	5.7
14	5,323	760	6,083	14.3	24,300	7,100	31,400	29.2
15	2,617	0	2,617	0.0	34,800	- 4,300	30,500	- 12.4
16	2,259	72	2,331	3.2	46,000	- 10,800	35,200	- 23.5
17	7,253	3,249	10,502	44.8	38,000	28,800	66,800	75.8
18	9,082	70	9,152	0.8	127,300	- 9,400	117,900	- 7.4
19	5,374	- 57	5,317	- 1.1	89,000	- 13,600	75,400	- 15.3
20	6,173	- 11	6,162	- 0.2	165,500	- 37,700	127,800	- 22.8
21	4,840	- 5	4,835	- 0.1	74,300	- 16,000	58,300	- 21.5
22	2,490	0	2,490	0.0	22,100	- 2,900	19,200	- 13.1
23	3,214	77	3,291	2.4	42,100	400	42,500	1.0
24	4,362	0	4,362	0.0	64,800	- 9,100	55,700	- 14.0
25	5,283	777	6,060	14.7	35,400	2,200	37,600	6.2
26	6,417	909	7,326	14.2	56,500	1,900	58,400	3.4
27	5,108	4,074	9,182	79.8	13,800	31,500	45,300	228.3
28	5,830	2,418	8,248	41.5	13,000	25,600	38,600	196.9
29	9,765	1,497	11,262	15.3	48,900	14,000	62,900	28.6
30	7,639	15	7,654	0.2	83,800	- 9,000	74,800	- 10.7
31	8,021	10	8,031	0.1	60,600	- 4,200	56,400	- 6.9
County Subtotal	106,259	14,453	120,712	13.6	1,054,300	- 4,700	1,049,600	- 0.4
Ozaukee County								
1	2,987	598	3,585	20.0	5,200	1,900	7,100	36.5
2	2,466	656	3,122	26.6	10,300	4,400	14,700	42.7
3	2,182	595	2,777	27.3	2,900	5,600	8,500	193.1
4	6,953	1,893	8,846	27.2	20,200	20,500	40,700	101.5
5	9,158	3,910	13,068	42.7	15,900	27,100	43,000	170.4
County Subtotal	23,746	7,652	31,398	32.2	54,500	59,500	114,000	109.2
Racine County								
43	6,112	637	6,749	10.4	46,500	4,700	51,200	10.1
44	6,973	454	7,427	6.5	68,500	3,000	71,500	4.4
45	3,678	407	4,085	11.1	7,600	6,100	13,700	80.3
46	3,629	1,613	5,242	44.4	11,000	13,900	24,900	126.4
47	4,597	438	5,035	9.5	9,500	3,300	12,800	34.7
48	6,252	1,095	7,347	17.5	15,600	9,000	24,600	57.7
49	3,829	1,035	4,864	27.0	12,100	6,900	19,000	57.0
County Subtotal	35,070	5,679	40,749	16.2	170,800	46,900	217,700	27.5

Table G-26 (continued)

Planning Analysis Area[a]	Urban Land Area (acres)				Population			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Walworth County								
56	4,219	787	5,006	18.7	6,900	3,900	10,800	56.5
57	5,100	615	5,715	12.1	13,900	7,900	21,800	56.8
58	3,512	1,566	5,078	44.6	7,600	4,700	12,300	61.8
59	14,176	1,512	15,688	10.7	21,900	14,100	36,000	64.4
60	5,309	706	6,015	13.3	13,200	5,500	18,700	41.7
County Subtotal	32,316	5,186	37,502	16.0	63,500	36,100	99,600	56.9
Washington County								
6	2,826	296	3,122	10.5	4,800	3,000	7,800	62.5
7	7,000	3,122	10,122	44.6	24,100	26,500	50,600	110.0
8	2,232	191	2,423	8.6	3,600	1,500	5,100	41.7
9	2,631	549	3,180	20.9	4,700	5,900	10,600	125.5
10	4,113	1,862	5,975	45.3	11,700	12,100	23,800	103.4
11	2,983	2,302	5,285	77.2	7,400	23,200	30,600	313.5
12	4,341	652	4,993	15.0	7,500	7,000	14,500	93.3
County Subtotal	26,126	8,974	35,100	34.3	63,800	79,200	143,000	124.1
Waukesha County								
32	8,095	2,965	11,060	36.6	35,000	30,600	65,600	87.4
33	12,726	2,076	14,802	16.3	43,100	14,000	57,100	32.5
34	8,049	3,097	11,146	38.5	27,000	29,400	56,400	108.9
35	4,493	911	5,404	20.3	11,600	9,900	21,500	85.3
36	7,088	2,559	9,647	36.1	17,300	21,200	38,500	122.5
37	3,586	841	4,427	23.5	5,400	4,600	10,000	85.2
38	3,687	1,498	5,185	40.6	8,100	11,100	19,200	137.0
39	7,422	1,425	8,847	19.2	19,400	12,500	31,900	64.4
40	9,707	4,232	13,939	43.6	47,500	33,600	81,100	70.7
41	6,945	2,068	9,013	29.8	8,700	11,200	19,900	128.7
42	4,822	2,259	7,081	46.8	8,200	11,200	19,400	136.6
County Subtotal	76,620	23,931	100,551	31.2	231,300	189,300	420,600	81.8
Region Total	327,856	72,518	400,374	22.1	1,756,100	463,200	2,219,300	26.4

[a] *See Map 2.*

Source: SEWRPC.

Table G-27

OCCUPIED HOUSING UNITS IN THE REGION BY PLANNING ANALYSIS AREA 1970 AND 2000 RECOMMENDED LAND USE PLAN

Planning Analysis Area[a]	Occupied Housing Units			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha County				
50	8,600	2,100	10,700	24.4
51	17,100	3,300	20,400	19.3
52	2,000	6,300	8,300	315.0
53	2,000	4,800	6,800	240.0
54	1,200	800	2,000	66.7
55	4,600	3,600	8,200	78.3
Subtotal	35,500	20,900	56,400	58.9
Milwaukee County				
13	4,000	1,100	5,100	27.5
14	6,600	3,600	10,200	54.5
15	12,000	0	12,000	--
16	21,500	0	21,500	--
17	9,700	12,200	21,900	125.8
18	41,100	200	41,300	0.5
19	30,800	- 600	30,200	- 1.9
20	53,500	- 100	53,400	- 0.2
21	24,600	0	24,600	--
22	7,400	100	7,500	1.4
23	12,600	1,400	14,000	11.1
24	21,800	100	21,900	0.5
25	10,000	3,300	13,300	33.0
26	16,600	3,700	20,300	22.3
27	3,600	11,500	15,100	319.4
28	3,200	9,500	12,700	296.9
29	13,600	7,300	20,900	53.7
30	27,300	500	27,800	1.8
31	18,700	300	19,000	1.6
Subtotal	338,600	54,100	392,700	16.0
Ozaukee County				
1	1,400	600	2,000	42.9
2	2,900	1,300	4,200	44.8
3	800	1,600	2,400	200.0
4	5,500	6,100	11,600	110.9
5	4,200	8,100	12,300	192.9
13	0	0	0	--
Subtotal	14,800	17,700	32,500	119.6
Racine County				
43	13,900	2,600	16,500	18.7
44	21,100	3,000	24,100	14.2
45	2,000	1,800	3,800	90.0
46	2,800	4,200	7,000	150.0
47	2,500	1,100	3,600	44.0
48	3,900	2,900	6,800	74.4
49	3,600	2,400	6,000	66.7
Subtotal	49,800	18,000	67,800	36.1
Walworth County				
56	2,000	1,400	3,400	70.0
57	3,200	2,000	5,200	62.5
58	2,300	1,700	4,000	73.9
59	7,000	4,500	11,500	64.3
60	4,000	1,800	5,800	45.0
Subtotal	18,500	11,400	29,900	61.6
Washington County				
6	1,300	1,000	2,300	76.9
7	6,800	8,700	15,500	127.9
8	900	400	1,300	44.4
9	1,200	1,700	2,900	141.7
10	3,400	4,300	7,700	126.5
11	1,900	6,800	8,700	357.9
12	1,900	1,900	3,800	100.0
Subtotal	17,400	24,800	42,200	142.5
Waukesha County				
32	8,900	9,000	17,900	101.1
33	10,900	4,400	15,300	40.4
34	6,800	8,500	15,300	125.0
35	2,900	3,000	5,900	103.4
36	4,600	5,900	10,500	128.3
37	1,500	1,500	3,000	100.0
38	2,300	3,200	5,500	139.1
39	5,900	4,100	10,000	69.5
40	13,500	9,800	23,300	72.6
41	2,400	3,300	5,700	137.5
42	2,200	3,300	5,500	150.0
Subtotal	61,900	56,000	117,900	90.5
Region	536,500	202,900	739,400	37.8

[a] *See Map 2.*

Source: SEWRPC.

Table G-28

EMPLOYMENT IN THE REGION BY PLANNING ANALYSIS AREA 1972 AND 2000 RECOMMENDED LAND USE PLAN

Planning Analysis Area[a]	Employment			
	Existing 1972	Planned Increment	Total 2000	Percent Change 1972-2000
Kenosha County				
50	5,800	1,400	7,200	24.1
51	27,600	2,600	30,200	9.4
52	3,000	1,700	4,700	56.7
53	1,800	5,500	7,300	305.6
54	500	500	1,000	100.0
55	2,000	1,900	3,900	95.0
Subtotal	40,700	13,600	54,300	33.4
Milwaukee County				
13	3,000	200	3,200	6.7
14	18,000	3,100	21,100	17.2
15	10,200	300	10,500	2.9
16	58,300	1,400	59,700	2.4
17	14,100	21,200	35,300	150.4
18	46,400	3,600	50,000	7.8
19	20,900	1,600	22,500	7.7
20	78,800	5,000	83,800	6.3
21	86,000	3,700	89,700	4.3
22	9,600	500	10,100	5.2
23	4,200	700	4,900	16.7
24	22,400	1,200	23,600	5.4
25	8,700	2,800	11,500	32.2
26	17,100	3,500	20,600	20.5
27	3,500	15,300	18,800	437.1
28	1,800	6,900	8,700	383.3
29	12,000	4,700	16,700	39.2
30	56,200	3,400	59,600	6.0
31	37,200	6,100	43,300	16.4
Subtotal	508,400	85,200	593,600	16.8
Ozaukee County				
1	1,300	1,400	2,700	107.7
2	4,700	3,000	7,700	63.8
3	500	1,700	2,200	340.0
4	7,900	6,500	14,400	82.3
5	4,900	6,100	11,000	124.5
Subtotal	19,300	18,700	38,000	96.9
Racine County				
43	15,800	2,700	18,500	17.1
44	33,800	8,600	42,400	25.4
45	800	1,300	2,100	162.5
46	5,700	7,600	13,300	133.3
47	1,200	1,900	3,100	158.3
48	2,100	2,900	5,000	138.1
49	4,200	6,900	11,100	164.3
Subtotal	63,600	31,900	95,500	50.2
Walworth County				
56	1,100	1,900	3,000	172.7
57	3,800	2,400	6,200	63.2
58	4,100	2,800	6,900	68.3
59	9,900	6,600	16,500	66.7
60	5,300	3,300	8,600	62.3
Subtotal	24,200	17,000	41,200	70.2
Washington County				
6	1,500	800	2,300	53.3
7	11,400	7,000	18,400	61.4
8	400	500	900	125.0
9	1,000	600	1,600	60.0
10	4,800	2,900	7,700	60.4
11	1,200	2,800	4,000	233.3
12	900	200	1,100	22.2
Subtotal	21,200	14,800	36,000	69.8
Waukesha County				
32	11,700	11,400	23,100	97.4
33	14,500	14,600	29,100	100.7
34	8,000	11,900	19,900	148.8
35	1,100	3,300	4,400	300.0
36	2,900	7,000	9,900	241.4
37	500	700	1,200	140.0
38	1,300	4,900	6,200	376.9
39	5,400	6,900	12,300	127.8
40	24,200	18,800	43,000	77.7
41	1,100	3,500	4,600	318.2
42	800	2,900	3,700	362.5
Subtotal	71,500	85,900	157,400	120.1
Total	748,900	267,100	1,016,000	35.7

[a] *See Map 2.*

Source: SEWRPC.

Table G-29

POPULATION IN THE REGION BY SEWER SERVICE AREA 1970 AND 2000 RECOMMENDED LAND USE PLAN

Sewer Service Area[a] Name	Population			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Kenosha County				
Kenosha	86,900	19,500	106,400	22.4
Paddock Lake	1,500	1,800	3,300	120.0
Silver Lake	1,300	1,100	2,400	84.6
Twin Lakes	2,600	2,200	4,800	84.6
Bristol and George Lakes	700	1,300	2,000	185.7
Pleasant Prairie North	900	2,000	2,900	222.2
Hooker and Montgomery Lakes	900	900	1,800	100.0
Somers	900	6,200	7,100	688.9
Bristol	100	200	300	200.0
Pleasant Prairie South	500	400	900	80.0
Parkside	600	4,200	4,800	700.0
Carol Beach	4,100	12,100	16,200	295.1
Wilmot	400	400	800	100.0
Camp and Center Lakes	1,800	900	2,700	50.0
Rock Lake	500	800	1,300	160.0
Cross Lake	1,200	900	2,100	75.0
Subtotal	104,900	54,900	159,800	52.3
Outside Sewer Service Area	13,000	2,000	15,000	15.4
Total	117,900	56,900	174,800	48.3
Milwaukee County				
South Milwaukee	23,300	- 700	22,600	- 3.0
Milwaukee	1,029,400	- 3,900	1,025,500	- 0.4
Subtotal	1,052,700	- 4,600	1,048,100	- 0.4
Outside Sewer Service Area	1,600	- 100	1,500	- 6.3
Total	1,054,300	- 4,700	1,049,600	- 0.4
Ozaukee County				
Cedarburg	9,700	9,100	18,800	93.8
Mequon	10,100	26,000	36,100	257.4
Port Washington	9,200	4,400	13,600	47.8
Belgium	900	600	1,500	66.7
Fredonia	1,100	1,100	2,200	100.0
Grafton	7,600	9,200	16,800	121.1
Saukville	1,600	5,100	6,700	318.8
Thiensville	3,600	1,100	4,700	30.6
Waubeka	500	100	600	20.0
Lake Church	700	0	700	0.0
Subtotal	45,000	56,700	101,700	126.0
Outside Sewer Service Area	9,500	2,800	12,300	29.5
Total	54,500	59,500	114,000	109.2

Table G-29 (continued)

Sewer Service Area[a] Name	Population			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Racine County				
Racine	101,600	9,500	111,100	9.4
Burlington	9,600	6,900	16,500	71.9
Waterford-Rochester	3,800	3,400	7,200	89.5
Sturtevant-Mt. Pleasant	8,100	7,300	15,400	90.1
Union Grove	3,000	3,200	6,200	106.7
Crestview-North Park	10,700	1,700	12,400	15.9
Caddy Vista	1,000	300	1,300	30.0
Caledonia	3,600	6,500	10,100	180.6
Wind Lake	3,500	3,300	6,800	94.3
Eagle Lake	1,000	300	1,300	30.0
Sanders Park	2,600	2,000	4,600	76.9
Southern Colony	1,400	400	1,800	28.6
Racine-Tichigan Lake	1,100	600	1,700	54.5
Subtotal	151,000	45,400	196,400	30.1
Outside Sewer Service Area	19,800	1,500	21,300	7.6
Total	170,800	46,900	217,700	27.5
Walworth County				
Delavan	5,900	2,800	8,700	47.5
Elkhorn	4,800	4,100	8,900	85.4
Lake Geneva	6,500	5,500	12,000	84.6
Whitewater	10,200	6,700	16,900	65.7
Darien	900	1,100	2,000	122.2
East Troy	1,800	3,200	5,000	177.8
Fontana	1,700	2,400	4,100	141.2
Genoa City	1,100	600	1,700	54.5
Sharon	1,200	1,400	2,600	116.7
Walworth	1,800	1,400	3,200	77.8
Williams Bay	2,300	2,400	4,700	104.3
Delavan Lake	2,500	200	2,700	8.0
Lyons	600	100	700	16.7
Potters Lake	900	500	1,400	55.6
Lake Como	1,500	400	1,900	26.7
Subtotal	43,700	32,800	76,500	75.1
Outside Sewer Service Area	19,800	3,300	23,100	16.7
Total	63,500	36,100	99,600	56.9
Washington County				
Hartford	7,100	8,600	15,700	121.1
West Bend	18,300	23,200	41,500	126.8
Germantown	3,800	22,800	26,600	600.0
Jackson	700	5,300	6,000	757.1
Kewaskum	2,100	2,800	4,900	133.3
Newburg	700	1,700	2,400	242.9
Slinger	1,400	3,000	4,400	214.3
Allenton	700	1,200	1,900	171.4
Pike Lake	800	0	800	0.0
Tri Lakes	2,200	200	2,400	9.1
Subtotal	37,800	68,800	106,600	182.0
Outside Sewer Service Area	26,000	10,400	36,400	40.0
Total	63,800	79,200	143,000	124.1

Table G-29 (continued)

Sewer Service Area[a] Name	Population			
	Existing 1970	Planned Increment	Total 2000	Percent Change 1970-2000
Waukesha County				
Brookfield	17,100	4,200	21,300	24.6
Delafield-Nashotah	3,300	6,100	9,400	184.8
Muskego	9,500	9,400	18,900	98.9
New Berlin	23,300	27,500	50,800	118.0
Oconomowoc-Lac La Belle	11,000	9,500	20,500	86.4
Waukesha	46,600	32,300	78,900	69.3
Butler	2,200	0	2,200	0.0
Dousman	800	1,400	2,200	175.0
Elm Grove	6,600	400	7,000	6.1
Hartland	3,300	3,000	6,300	90.9
Menomonee Falls	28,100	28,000	56,100	99.6
Mukwonago	3,300	6,000	9,300	181.8
Pewaukee	8,400	9,200	17,600	109.5
Sussex	3,900	4,700	8,600	120.5
Wales	900	2,100	3,000	233.3
Brookfield-New Berlin	21,700	15,100	36,800	69.6
Nashotah-Nemahbin	1,400	300	1,700	21.4
Oconomowoc Lake	500	200	700	40.0
Wisconsin School for Boys	400	400	800	100.0
Lannon	3,100	2,700	5,800	87.1
Okauchee Lake	4,200	1,800	6,000	42.9
North Lake	800	500	1,300	62.5
Pine Lake	400	800	1,200	200.0
Beaver Lake	800	1,400	2,200	175.0
Silver Lake	500	100	600	20.0
North Prairie	800	900	1,700	112.5
Subtotal	202,900	168,000	370,900	82.8
Outside Sewer Service Area	28,400	21,300	49,700	75.0
Total	231,300	189,300	420,600	81.8
Region	1,756,100	463,200	2,219,300	26.4

[a] *See Map 60.*

Source: SEWRPC.

Appendix H

TRANSPORTATION SYSTEM BENEFIT-COST ANALYSIS

The benefit-cost analysis method of evaluating government investments in public works came into general use after the adoption of the Federal Flood Control Act of 1936. The act stated that waterways should be improved "if the benefits to whomsoever they may accrue are in excess of the estimated costs." Monetary value of benefits has since been defined as the amount of money which an individual would pay for that benefit if he were given the market choice of purchase. Monetary costs are taken as the total value of resources used in the construction of the project.

Benefits must exceed costs in order for a project to be justified, but this criterion alone is not sufficient to justify the investment. Although a project may have a benefit-cost ratio greater than one, it may be less than the benefit-cost ratio of an alternative project which would accomplish the same objectives. In order to assure that public funds are invested most profitably, alternative plans or projects should, therefore, be investigated and analyzed.

Benefit-cost analyses must be based on a specified number of years, usually equal to the physical or economic life of the project. In transportation planning it is generally advisable to amortize the capital costs over the same number of years for which the traffic forecasts have been made, since the risk involved in the use of capital increases as the amortization exceeds the traffic forecast period. Consequently, 25 years is often selected for the period of economic analyses in transportation facility planning. Although this period is shorter than that used to evaluate many other types of public works improvements, it results in less risk based upon traffic predictions. Also, this period results in elimination of the need to include in the analyses pavement and structure reconstruction costs after the original pavements and structures have reached the end of their physical life, and elimination of the need to account for the possible competition of future new means of transportation. Finally, this shorter period recognizes the inability to anticipate other social, economic, and technological changes which may occur in the more distant future and which may influence project benefits and costs.

In considering a single highway or urban mass transit facility improvement project, the selection of a period of economic analysis can be relatively simple and direct. In considering an entire transportation system, however, which entails the staged construction of varying components of the system in a series of public works projects over a long period of time, there is no single period of physical and economic life which can be readily assigned to the total system. Consequently, the period of economic analysis selected must be long enough to permit a reasonable amortization of the costs incurred in, and reasonable accrual of the benefits derived from, construction and operation of the total system. This period is estimated to be 40 to 50 years, considerably longer than the 20- to 25-year analysis period for single facilities. During the longer period, all of the staged facilities comprising the total recommended system will have reached the end of their physical life and will presumably require replacement. Moreover, the total system will not accommodate the forecast traffic demands in an optimal manner until shortly after the completion of the last facilities staged for construction under the recommended plan implementation program, and, therefore, will not return maximum benefits until beyond the end of the planning period. Since the travel demand is unknown beyond the plan design period, however, it is necessary to assume that benefits would accrue at the year 2000 level to the year 2005 and diminish gradually over a 20-year period thereafter as facilities constructed become obsolete and as traffic congestion again increases. Salvage values can thus be assumed to be zero for all proposed facilities comprising the proposed system.

The benefits and costs from a project can be classified as direct (primary), measurable in monetary terms, and as indirect (secondary). Indirect benefits and costs either are of such a nature that no monetary value can be assigned to them or are so obscure that calculation of the monetary value is impractical. In the regional transportation planning studies, direct costs were considered to include relocation assistance, right-of-way acquisition, and construction and transportation system operation and maintenance costs. Direct benefits were considered to include reductions in motor vehicle operating, accident, and time costs. Indirect costs include disruption of community patterns, businesses, and industries; division of neighborhood and community service areas; and deterioration or destruction of the natural resources base and of scenic, historic, or cultural features. Indirect benefits include increased land values, increased economic activity, and increased efficiencies in community services.

Only direct benefits and costs were included in the analysis because of the generally nonquantifiable nature of the indirect benefits and costs associated with the recommended transportation system plan. A monetary value for the benefits expected to be received from the proposed highway system was calculated as follows:

1. Assignments of traffic demand, derived from the 1972 origin/destination survey or from the recommended land use plan as appropos, were made to the transportation system in order to obtain a measure of the total vehicle miles, vehicle hours, passenger miles, and passenger hours of travel by automobiles, mass transit passengers, and trucks which might be expected to occur on that system on an average weekday.

2. Estimates of average weekday vehicle miles and vehicle hours of travel, based on travel demand, were made for the collector and land access street and highway system.

3. In order to provide a more accurate measure of operating, time, and accident costs, the transportation system was divided into 18 segments consisting of:

   * standard surface arterial streets and highways in each of the seven counties of the Region;

   * freeways in each of the seven counties in the Region;

   * collector and land access streets and highways in the Region; and

   * each of the urban mass transit systems operating in the three urbanized areas of the Region.

4. The vehicle miles of travel on each of the segments of the street and highway system were then multiplied by derived cost factors, which were prepared to reflect motor vehicle operating costs on each segment. These cost factors were derived for three vehicle types:

   a. Automobiles and light trucks, $0.0713 per vehicle mile, which excludes the cost of fuel, insurance, and parking fees.

   b. Medium and heavy gasoline-fueled trucks ranging from $0.0845 to $0.1148 per vehicle mile based on average speed of operation, which excludes the cost of fuel and insurance.

   c. Heavy diesel-fueled trucks ranging from $0.1219 to $0.1546 per vehicle mile based on average speed of operation.

5. The gasoline consumed by automobiles and trucks operating on the total street and highway system was multiplied by the per gallon cost of gasoline, $0.39 after adjustment for federal and state motor fuel taxes.

6. The cost of parking was calculated by multiplying the average cost of parking on a traffic analysis zone basis by the number of auto driver trips destined to the traffic analysis zone.

7. The total annual operating costs were obtained by summing the average weekday costs of vehicle operation, motor fuel, and parking and multiplying by 310.

8. The average weekday vehicle hours of travel were multiplied by the appropriate cost factor to obtain the total cost of trip maker travel time. These cost factors were $4.00 per hour for passenger travel, $5.45 per hour for automobile and light truck travel, and $6.00 per hour for heavy truck travel.

9. The annual transportation system user travel time costs were derived by multiplying the average weekday travel time costs by 310 and 290 for street and highway and transit travel, respectively.

10. The cost of accidents was derived by multiplying the annual number of accidents by the cost of each accident. (See Appendix E for accident rates and costs.)

11. The total annual transportation system user costs were obtained by summing the annual operating, travel time, and accident costs.

12. Steps 1 through 11 were carried out for the existing (1972) transportation system and each future (2000) alternative transportation system under consideration.[1]

13. The present worth on January 1, 1975 of the total transportation system user costs was then calculated for each future transportation system over the 50-year time period using a 6 percent rate of return for three time periods:

   a. 1975 through 2000, wherein an equal staging of system improvements and travel demand was assumed to yield an equal annual increase in user costs.

   b. 2001 through 2005, wherein user costs were assumed to accrue annually at the level reached in 2000.

   c. 2006 through 2025, wherein user costs were assumed to diminish annually in equal amounts to reflect a diminishing of benefits, as the staged facilities became obsolete.

14. The transportation system user benefits, defined as the savings in operating, travel time, and accident costs accrued through the provision of the proposed transportation system improvements, were obtained by subtracting the present worth of the user costs under the transportation system alternative being analyzed from the present worth of the user costs anticipated to occur under the "no build" transportation system alternative.

A monetary value for the costs incurred under the proposed alternative transportation systems were calculated as follows:

1. Construction costs, which included relocation assistance, right-of-way acquisition, and engineering costs were obtained by summing such costs as estimated for all facilities proposed under the transportation system plan under evaluation.[2]

2. Capital costs involved in the operation of the urban mass transit systems, which included vehicles needed for both replacement of obsolete vehicles as well as improvement and expansion of the system and the associated support facilities, were obtained in a manner similar to the construction costs.[3]

3. Capital costs involved in the purchase of mass transit vehicles to maintain operation of the system over the 50-year period were used for the benefit-cost analysis.

4. Operation and maintenance costs incurred under the proposed alternative transportation systems were calculated for both existing and proposed facilities.[4]

5. The present worth, on January 1, 1975, of the total transportation system capital costs was obtained by assuming that construction costs and the transit system capital costs were incurred in equal annual increments over the 25-year plan implementation period, 1975 to 2000, using a 6 percent rate of return. The exception to this procedure was the added capital costs incurred to maintain operation of the mass transit system to the year 2025, which involved vehicle replacement costs during the period 2001 to 2010.

6. The present worth, on January 1, 1975, of the system operation and maintenance costs was derived using a 6 percent rate of return for the following three time periods:

   a. 1975 through 2000, wherein equal staging of the plan implementation costs was assumed to yield equal annual increases in operation and maintenance costs from the 1975 annual estimated level to the 2000 annual level.

   b. 2001 to 2005, wherein such costs were assumed to accrue at the 2000 level.

   c. 2006 to 2025, wherein costs were assumed to diminish annually in equal annual amounts to the 1975 level as staged facilities become obsolete.

7. The total present worth of the plan alternative costs was obtained by summing the present worth of the capital, operating, and maintenance costs.

8. The costs associated with a specific alternative transportation plan under analysis were obtained by subtracting the cost of the "no build" transportation system from the cost of the alternative in question as derived in step 7.

9. The benefit-cost ratio was then calculated by dividing the benefits or difference in user costs between the alternative transportation plan and the "no build" plan by the increment of cost involved in implementing the alternative plan as opposed to the "no build" plan.[5]

It should be noted that the selection of the 6 percent rate of return in the calculation of the present worth of both plan benefits and costs was made on the basis of a reasonable rate of return for long-term public investments. An analysis of alternative rates of return conducted for the recommended transportation system plan indicates that the benefit-cost ratio would be 1.56 using a 4 percent rate of return and 1.24 using an 8 percent rate of return.

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[1] *For detailed tabulations of transportation system user costs, see Chapters VI and VIII of this volume.*

[2] *For detailed transportation system costs, see Chapters VI and VIII of this volume.*

[3] *Ibid., footnote 2.*

[4] *Ibid., footnote 2.*

[5] *Ibid., footnote 2.*

Appendix I

DETAILED MATERIALS PERTAINING TO THE APPLICATION OF THE RANK BASED EXPECTED VALUE METHOD OF PLAN EVALUATION TO THE ALTERNATIVE PLANS

Table I-1

MATRIX TABLES FOR EVALUATION OF THE SATISFACTION OF THE LAND USE DEVELOPMENT OBJECTIVES FOR THE CONTROLLED CENTRALIZATION AND CONTROLLED DECENTRALIZATION ALTERNATIVE LAND USE PLANS

Objective No. 1

BALANCED ALLOCATION OF LAND USE

Standard	Rank Order Value of Standard(n)	Rank Order Value of Land Use Plans(m)	
		Controlled Centralization	Controlled Decentralization
1. Residential Land Allocation	5	3	3
a. Urban High Density		3	3
b. Urban Medium Density		3	3
c. Urban Low Density		3	3
d. Suburban Density		3	3
e. Rural Density		3	3
2. Park and Recreation Land Allocation	4	3	3
a. Major		3	3
b. Other		3	3
3. Industrial Land Allocation	3	2	2
a. Major and Other		2	2
4. Commercial Land Allocation	2	2	2
a. Major		3	3
b. Other		2	2
5. Governmental and Institutional Land Allocation	1	3	3
a. Major and Other		3	3
Plan Value(v)		40	40
Rank Order Value		1	1

Objective No. 2

COMPATIBLE ARRANGEMENT OF LAND USE

Standard	Rank Order Value of Standard(n)	Rank Order Value of Land Use Plans(m)	
		Controlled Centralization	Controlled Decentralization
1. Neighborhood Units for Urban High-, Medium-, and Low-Density Residential Development	4	1	1
2. Suburban and Rural Residential Land Location	3	3	3
3. Industrial Land Location	2	3	3
4. Regional Commercial Land Location	1	3	3
Plan Value(v)		22	22
Rank Order Value		1	1

Table I-1 (continued)

Objective No. 3

PROTECTION, WISE USE, AND DEVELOPMENT OF NATURAL RESOURCE BASE

Standard	Rank Order Value of Standard(n)	Rank Order Value of Land Use Plans(m)	
		Controlled Centralization	Controlled Decentralization
1. Soils	5	3	3
a. Sewered Urban Development		3	3
b. Unsewered Suburban Development		3	3
c. Rural Development		3	3
2. Inland Lakes and Streams	4	2	2
a. Major Inland Lakes—50 acres or more		2	2
(1) 25 percent of shoreline in natural state		2	2
(2) 50 percent of shoreline in nonurban use		2	2
(3) 10 percent of shoreline in public use		2	2
b. Minor Inland Lakes—under 50 acres		2	2
(1) 25 percent of shoreline in natural state or low-intensity public use		2	2
c. Perennial Streams		2	2
(1) 25 percent of shoreline in natural state		2	2
(2) 50 percent of shoreline in nonurban use		2	2
d. Floodlands Free From New Incompatible Urban Development		3	3
e. Restrict Encroachments in Channels and Floodways		3	3
3. Wetlands	3	3	3
a. Protect Wetlands Over 50 Acres and Those With High Resource Value		3	3
4. Woodlands	2	2	2
a. Protect 10 Percent of Watershed		2	2
b. Preserve 40 Acres Each Per County of Four Forest Types		1	1
c. Maintain Five Acres per 1,000 Persons for Recreation Use		3	3
5. Wildlife	1	3	3
a. Ensure Preservation of Suitable Habitat		3	3
Plan Value(v)		39	39
Rank Order Value		1	1

Table I-1 (continued)

Objective No. 4

PROPERLY RELATED DEVELOPMENT TO TRANSPORTATION AND UTILITY SYSTEMS

Standard	Rank Order Value of Standard(n)	Rank Order Value of Land Use Plans(m)	
		Controlled Centralization	Controlled Decentralization
1. Locate Urban Development so as to Maximize Use of Existing Transportation and Utility Systems	7	3	1
2. Locate Urban Development Where Transportation System Can Provide Ready Access	6	3	3
3. Locate Urban High-, Medium-, and Low-Density Residential Development Where Readily Serviceable by Public Sanitary Sewerage Facilities	5	2	1
4. Locate Urban High-, Medium-, and Low-Density Where Readily Serviceable by Public Water Supply Facilities	4	2	1
5. Locate Urban High-, Medium-, and Low-Density Residential Development Where Readily Serviceable by Mass Transit	3	2	1
6. Minimize Penetration by Major Transportation Routes of Residential Neighborhood Units	2	1	1
7. Locate Transportation Terminal Facilities Near Principal Land Uses Served	1	1	1
Plan Value(v)		66	40
Rank Order Value		2	1

Objective No. 5

CONSERVE AND DEVELOP HEALTHY, SAFE, CONVENIENT, AND ATTRACTIVE RESIDENTIAL AREAS

Standard	Rank Order Value of Standard(n)	Rank Order Value of Land Use Plans(m)	
		Controlled Centralization	Controlled Decentralization
1. Locate Urban High-, Medium-, and Low-Density Residential Development in Physically Self-Contained Neighborhood Units	3	1	1
2. Appropriate Land Uses Within Neighborhood Units	2	1	1
3. Locate Suburban and Rural Residential Development Properly to Environment	1	3	3
Plan Value(v)		8	8
Rank Order Value		1	1

Table I-1 (continued)

Objective No. 6

PRESERVE, DEVELOP, AND REDEVELOP VARIETY OF INDUSTRIAL AND COMMERCIAL SITES

Standard	Rank Order Value of Standard(n)	Rank Order Value of Land Use Plans(m)	
		Controlled Centralization	Controlled Decentralization
1. Regional Industrial Site Requirements	4	3	3
2. Regional Commercial Site Requirements	3	3	3
3. Local Industrial Site Requirements	2	1	1
4. Local Commercial Site Requirements	1	1	1
Plan Value(v)		24	24
Rank Order Value		1	1

Objective No. 7

PRESERVE AND PROVIDE OPEN SPACE

Standard	Rank Order Value of Standard(n)	Rank Order Value of Land Use Plans(m)	
		Controlled Centralization	Controlled Decentralization
1. Regional Park Spatial Location	3	3	3
2. Local Park Spatial Location	2	1	1
3. Preserve Unique Scientific, Cultural, Scenic, or Educational Sites	1	2	2
Plan Value(v)		13	13
Rank Order Value		1	1

Objective No. 8

PRESERVE LAND AREAS FOR AGRICULTURAL USE

Standard	Rank Order Value of Standard(n)	Rank Order Value of Land Use Plans(m)	
		Controlled Centralization	Controlled Decentralization
1. Preserve Prime Agricultural Lands	2	2	1
2. All Agricultural Lands Within a One-Half Mile Radius of High-Value Scientific, Educational, or Recreational Sites Should be Preserved	1	2	1
Plan Value (v)		6	3
Rank Order Value		2	1

Source: SEWRPC.

Table I-2

MATRIX TABLES FOR EVALUATION OF THE SATISFACTION OF THE TRANSPORTATION SYSTEM DEVELOPMENT OBJECTIVES FOR ALTERNATIVE TRANSPORTATION SYSTEM PLANS UNDER CONTROLLED CENTRALIZATION LAND USE PLAN

Objective No. 1

EFFECTIVELY SERVE REGIONAL LAND USE PATTERN

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Serve urbanized area land uses	2	1	2	2
2. Adequate accessibility	1	1	2	3
Plan Value(v)		3	6	7
Rank Order Value		1	2	3

Objective No. 2

MINIMIZE COSTS AND ENERGY UTILIZATION

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Minimize total transportation system costs	4	3	1	2
2. Direct benefits exceed direct costs	3	3	1	2
3. Maximize use of existing transportation system	2	3	2	1
4. Minimize petroleum-based fuel use	2	1	3	2
Plan Value(v)		29	17	20
Rank Order Value		3	1	2

Table I-2 (continued)

Objective No. 3

PROVIDE FLEXIBLE, BALANCED TRANSPORTATION SYSTEM

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Arterial Street and Highway System	4	1	3	3
a. Arterial spacing		3	3	3
b. Freeway warrants		1	3	3
2. Transit System	3	1	3	2
a. Total system transit warrants		3	1	2
b. Minimize subsidy per ride		3	2	1
c. Primary rapid transit warrants		1	3	3
d. Primary/secondary transit to reduce peak hour congestion		1	3	3
e. Primary/secondary collection-distribution		1	3	3
f. Transit service area per percent population served		1	3	3
g. Transit transfers		3	3	3
h. Median headways		1	3	2
i. Transit stop spacing		3	3	3
j. Transit user walking distance in CBD		3	3	3
k. Percent transit trips to Milwaukee CBD		1	3	2
l. Elderly-handicapped transit service		1	1	1
3. Parking	2	1	3	3
a. Transit station parking		1	3	3
b. CBD parking supply		3	3	3
c. CBD walking distance for short-term parkers		1	1	1
4. System Adaptability	1	1	1	1
Plan Value(v)		10	28	25
Rank Order Value		1	3	2

Table I-2 (continued)

Objective No. 4

MINIMIZE DISRUPTION

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Encourage advance reservation of right-of-way	3	1	1	1
2. Minimize penetration of neighborhoods	3	3	1	1
3. Minimize dislocation	2	3	2	1
4. Minimize penetration of environmental corridors	2	3	2	1
5. Minimize land-taking	2	3	2	1
6. Minimize tax base reduction	2	3	2	1
7. Minimize noise exposure	1	1	2	3
8. Minimize destruction of cultural sites	1	1	1	1
Plan Value(v)		38	25	18
Rank Order Value		3	2	1

Objective No. 5

FACILITATE TRAFFIC FLOW

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Minimize passenger hours of travel	2	1	2	3
2. Minimize vehicle hours of travel	2	1	3	2
3. Minimize vehicle miles of travel	2	1	3	2
4. Adequate street and highway capacity (volume-to-capacity ratio equal to or less than 1.10	1	1	2	3
5. Adequate transit capacity (load factor less than 1.0)	1	3	3	3
6. Overall travel speeds	1	3	3	3
Plan Value(v)		13	24	23
Rank Order Value		1	3	2

Table I-2 (continued)

Objective No. 6

REDUCE ACCIDENT EXPOSURE

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Maximize travel on facilities with lowest accident exposure	3	1	2	3
2. Maintain traffic operations at desirable service level (volume-to-capacity ratio equal to or less than 0.9)	2	1	2	3
3. Improve railroad grade crossing protection	1	1	1	1
Plan Value(v)		6	11	16
Rank Order Value		1	2	3

Objective No. 7

AESTHETIC QUALITY

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Aesthetic quality design standards	2	1	1	1
2. Minimize destruction of visually pleasing objects and vistas	1	1	1	1
Plan Value(v)		3	3	3
Rank Order Value		1	1	1

Source: SEWRPC.

Table I-3

MATRIX TABLES FOR EVALUATION OF THE SATISFACTION OF THE TRANSPORTATION SYSTEM DEVELOPMENT OBJECTIVES FOR ALTERNATIVE TRANSPORTATION SYSTEM PLANS UNDER CONTROLLED DECENTRALIZATION LAND USE PLAN

Objective No. 1

EFFECTIVELY SERVE REGIONAL LAND USE PATTERN

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Serve urbanized area land uses	2	1	2	2
2. Adequate accessibility	1	2	1	3
Plan Value(v)		4	5	7
Rank Order Value		1	2	3

Objective No. 2

MINIMIZE COSTS AND ENERGY UTILIZATION

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Minimize total transportation system costs	4	3	2	1
2. Direct benefits exceed direct costs	3	3	1	2
3. Maximize use of existing transportation system	2	3	2	1
4. Minimize petroleum-based fuel use	2	1	3	2
Plan Value(v)		29	21	16
Rank Order Value		3	2	1

Table I-3 (continued)

Objective No. 3

PROVIDE FLEXIBLE, BALANCED TRANSPORTATION SYSTEM

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Arterial Street and Highway System	4	1	3	3
a. Arterial spacing		3	3	3
b. Freeway warrants		1	3	3
2. Transit System	3	1	3	2
a. Total system transit warrants		3	1	2
b. Minimize subsidy per ride		3	2	1
c. Primary rapid transit warrants		1	3	3
d. Primary/secondary transit to reduce peak hour congestion		1	3	3
e. Primary/secondary collection-distribution		1	3	3
f. Transit service area/percent population served		1	3	3
g. Transit transfers		3	3	3
h. Median headways		1	3	2
i. Transit stop spacing		3	3	3
j. Transit user walking distance in CBD		3	3	3
k. Percent transit trips to Milwaukee CBD		1	3	2
l. Elderly-handicapped transit service		1	1	1
3. Parking	2	1	3	3
a. Transit station parking		1	3	3
b. CBD parking supply		3	3	3
c. CBD walking distance for short-term parkers		1	1	1
4. System Adaptability	1	1	1	1
Plan Value(v)		10	28	25
Rank Order Value		1	3	2

Table I-3 (continued)

Objective No 4

MINIMIZE DISRUPTION

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Encourage advance reservation of right-of-way	3	1	1	1
2. Minimize penetration of neighborhoods	3	3	1	1
3. Minimize dislocation	2	3	2	1
4. Minimize penetration of environmental corridors	2	3	2	1
5. Minimize land-taking	2	3	2	1
6. Minimize tax base reduction	2	3	2	1
7. Minimize noise exposure	1	1	2	3
8. Minimize destruction of cultural sites	1	1	1	1
Plan Value(v)		38	25	18
Rank Order Value		3	2	1

Table I-3 (continued)

Objective No. 5

FACILITATE TRAFFIC FLOW

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Minimize passenger hours of travel	2	1	2	3
2. Minimize vehicle hours of travel	2	1	3	2
3. Minimize vehicle miles of travel	2	1	3	2
4. Adequate street and highway capacity (volume-to-capacity ratio equal to or less than 1.10)	1	1	2	3
5. Adequate transit capacity (load factor less than 1.0)	1	3	3	3
6. Overall travel speeds	1	3	3	3
Plan Value(v)		13	24	23
Rank Order Value		1	3	2

Objective No. 6

REDUCE ACCIDENT EXPOSURE

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Maximize travel on facilities with lowest accident exposure	3	1	2	3
2. Maintain traffic operations at desirable service level (volume-to-capacity ratio equal to or less than 0.9)	2	1	2	3
3. Improve railroad grade crossing protection	1	1	1	1
Plan Value(v)		6	11	16
Rank Order Value		1	2	3

Table I-3 (continued)

Objective No. 7

AESTHETIC QUALITY

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)		
		No Build	Highway Supported Transit	Transit Supported Highway
1. Aesthetic quality design standards	2	1	1	1
2. Minimize destruction of visually pleasing objects and vistas	1	1	1	1
Plan Value(v)		3	3	3
Rank Order Value		1	1	1

Source: SEWRPC.

Table I-4

MATRIX TABLES FOR EVALUATION OF THE SATISFACTION OF THE TRANSPORTATION SYSTEM DEVELOPMENT OBJECTIVES FOR ALTERNATIVE TRANSPORTATION SYSTEM PLANS UNDER THE RECOMMENDED LAND USE PLAN

Objective No. 1

EFFECTIVELY SERVE REGIONAL LAND USE PATTERN

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)				
		No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
1. Serve urbanized area land uses	2	1	2	2	2	2
2. Adequate accessibility	1	1	3	3	3	2
Plan Value(v)		3	7	7	7	6
Rank Order Value		1	3	3	3	2

Objective No. 2

MINIMIZE COSTS AND ENERGY UTILIZATION

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)				
		No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
1. Minimize transportation system operating and capital investment costs	4	4	2	5	3	1
2. Direct benefits exceed direct costs	3	5	3	4	2	1
3. Maximize use of existing transportation system	2	5	1	2	3	4
4. Minimize petroleum-based fuel use	2	1	4	5	4	4
Plan Value(v)		43	27	46	32	23
Rank Order Value		4	2	5	3	1

Table I-4 (continued)

Objective No. 3

PROVIDE FLEXIBLE, BALANCED TRANSPORTATION SYSTEM

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)				
		No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
1. Arterial Street and Highway System	4	1	5	5	5	5
a. Arterial spacing	--	5	5	5	5	5
b. Freeway warrants	--	1	5	5	5	5
2. Transit System	3	1	3	3	4	5
a. Total system transit warrants	--	5	3	1	4	2
b. Minimize subsidy per ride	--	5	2	1	4	4
c. Primary rapid transit warrants	--	1	5	5	5	5
d. Primary/secondary transit to reduce peak hour congestion	--	1	5	5	5	5
e. Primary/secondary collection-distribution	--	1	5	5	5	5
f. Transit service area/percent population served	--	1	5	5	5	5
g. Transit transfers	--	5	5	5	5	5
h. Median headways	--	1	2	3	2	3
i. Transit stop spacing	--	5	5	5	5	5
j. Transit user walking distance in CBD	--	1	5	5	5	5
k. Percent transit trips to Milwaukee CBD	--	1	2	4	3	5
l. Elderly-handicapped transit service	--	1	1	1	1	1
3. Parking	2	5	5	5	5	5
a. Transit station parking	--	5	5	5	5	5
b. CBD parking supply	--	5	5	5	5	5
c. CBD walking distance for short-term parkers	--	1	1	1	1	1
4. System Adaptability	1	1	1	1	1	1
Plan Value(v)		18	40	40	43	46
Rank Order Value		1	3	3	4	5

Table I-4 (continued)

Objective No. 4

MINIMIZE DISRUPTION

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)				
		No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
1. Encourage advance reservation of right-of-way	3	1	1	1	1	1
2. Minimize penetration of neighborhoods	3	4	1	1	1	1
3. Minimize dislocation	2	4	1	2	2	3
4. Minimize penetration of environmental corridors	2	4	1	2	2	3
5. Minimize land-taking	2	4	1	2	2	3
6. Minimize tax base reduction	2	4	1	2	2	3
7. Minimize noise exposure	1	3	1	1	1	2
8. Minimize destruction of cultural sites	1	1	1	1	1	1
Plan Value(v)		51	16	24	24	33
Rank Order Value		4	1	2	2	3

Objective No. 5

FACILITATE TRAFFIC FLOW

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)				
		No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
1. Minimize passenger hours of travel	2	2	4	3	4	1
2. Minimize vehicle hours of travel	2	1	2	4	3	2
3. Minimize vehicle miles of travel	2	1	2	4	3	5
4. Adequate street and highway capacity (volume-to-capacity ratio equal to or less than 1.10)	1	1	5	4	3	2
5. Adequate transit capacity (load factor less than 1.0)	1	5	5	5	5	5
6. Overall travel speeds	1	5	5	5	5	5
Plan Value(v)		19	31	36	33	28
Rank Order Value		1	3	5	4	2

Table I-4 (continued)

Objective No. 6

REDUCE ACCIDENT EXPOSURE

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)				
		No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
1. Maximize travel on facilities with lowest accident exposure	3	1	4	5	3	2
2. Maintain traffic operations at desirable service level (volume-to-capacity ratio equal to or less than 0.9)	2	1	4	5	3	2
3. Improve railroad grade crossing protection	1	1	1	1	1	1
Plan Value(v)	--	6	21	26	16	11
Rank Order Value	--	1	4	5	3	2

Objective No. 7

AESTHETIC QUALITY

Standard	Rank Order Value of Standard(n)	Rank Order Value of Transportation System Plans(m)				
		No Build	Plan A	Plan A'(25)	Plan A'(50)	Plan R
1. Aesthetic quality design standards	2	1	1	1	1	1
2. Minimize destruction of visually pleasing objects and vistas	1	1	1	1	1	1
Plan Value(v)		3	3	3	3	3
Rank Order Value		1	1	1	1	1

Source: SEWRPC.

Appendix J

AN ALTERNATIVE FORECAST OF FUTURE PUBLIC TRANSPORTATION REVENUES

BACKGROUND

A basic forecast of revenues for transportation purposes is set forth in Chapter III of this volume. This forecast is based upon the trend in public highway and transportation expenditures observed over the period 1960 to 1972. At the request of the Wisconsin Department of Transportation, an alternative forecast was prepared and used in a cost-revenue analysis set forth in Chapter VIII of this volume. This alternative forecast assumes that inflation will continue to occur and will adversely affect transportation-related revenues for such inflation-resistant sources as fixed transit fares and fixed, per-gallon, taxes on motor fuels. Many of the assumptions used in the alternative forecast were modeled after assumptions used by the Wisconsin Department of Transportation, Office of Policy and Program Analysis, in preparing a statewide analysis of future state motor vehicle revenues and federal highway aids available to the state through the year 1987. For the purpose of preparing this alternative forecast of public financial resources available for transportation purposes, three transportation revenue sources were analyzed: state motor vehicle revenues, the federal aid highway program, and local (county, city, village, and town) revenues. The following discussion sets forth the revenue sources and the procedures and assumptions used to generate this alternative transportation revenue forecast by source of revenue for southeastern Wisconsin.

REVENUES AVAILABLE FOR TRANSPORTATION PURPOSES

An important source of funding for transportation purposes is derived from motor vehicle revenues collected by the State. These revenues come from four sources: a 7-cents-per-gallon tax on motor fuels; motor vehicle registration fees; driver's license fees; and motor carrier fees. Of the collected revenues, only about one-third is actually spent by the State for construction and maintenance purposes. About two-fifths of the collected revenues are returned to local units of government, with the remainder of the collected revenues being used for debt service, administration, planning, park roads, collection and enforcement expenses, and first charges of other state agencies as required by state statutes. Motor vehicle revenues thus provide funds for both state and local expenditures for transportation purposes.

A second source of funding for transportation purposes is the federal aid highway program, which is funded through the following sources: a 4-cents-per-gallon tax on motor fuels; a 6-cents-per-gallon tax on lubricating oil; excise taxes on tires, inner tubes, and tread rubber; excise taxes on the purchase price of trucks and buses, and on the purchase price of parts and accessories for trucks and buses (more than 10,000 pounds); and a tax on highway use of heavy vehicles (more than 26,000 pounds). These collected revenues fund the various federal aid highway programs as authorized by Congressional legislation. These programs set the upper limits on expenditures for federal aid highways. For each of the various federal aid programs, deductions from the authorized levels are made for program administration and planning and research activities. These normally amount to about 4 or 5 percent of the authorizations. The remaining amounts are then apportioned or allocated among the states where they can then be obligated to various transportation projects.

A third source of funding for transportation purposes are the revenues provided by local units of government. Unlike the federal and state sources, however, local units of government generally do not have special funds set up for transportation purposes. Rather, transportation projects and services usually compete with other local government-funded projects and services for "general fund" revenues.

ALTERNATIVE FORECAST OF FUTURE PUBLIC TRANSPORTATION REVENUES

State Component

The following assumptions were used in the alternative forecast of state motor vehicle revenues which may be expected to become available for use by the State within the Region:

1. All sources of state motor vehicle revenues (motor fuel tax, motor vehicle registration fees, driver's license fees, and motor carrier fees) will remain at their 1975 rates and will therefore not keep pace with price inflation.

2. The total state motor vehicle revenues will continue to increase through the year 2000; however, the expected annual rate of increase will decrease to reflect user efficiencies in motor fuel consumption. (The Wisconsin Department of Transportation is forecasting that the annual rate of increase in motor fuel tax revenues will decline to 1 percent by 1982.) The annual rate of increase for all motor vehicle revenues (including revenues from motor fuel taxes), as forecast by the Wisconsin Department of Transportation, will decrease from 5 percent in 1975 to

2.3 percent in 1982, and then continue to increase at 2.3 percent annually through 1987. For the purpose of forecasting total state motor vehicle revenues to the year 2000, the 2.3 percent annual rate of growth is further assumed for the period 1988 to 2000.

3. The portion of state motor vehicle revenues directly expended by the State for maintenance and construction within the Region will remain at the 1972 level of 6 percent of the total state motor vehicle revenues. This was the lowest level over the 12-year period of record, 1960 to 1972. (Note: In 1977, 6.5 percent of the total motor vehicle revenues were expended by the State for maintenance and construction within the Region.) It should be noted that this amount does not represent the total of state motor vehicle revenues expended in the Region, since only about one-third of the total motor vehicle revenues are directly expended by the State for maintenance and construction. Additional state motor vehicle revenues are channeled through local units of government. These are discussed later in this appendix.

Using the above-noted assumptions, total state motor vehicle revenues were projected to the year 2000. The assumed proportion (6 percent) of the total state motor vehicle revenues expected to be expended by the state within the Region was calculated. This amount was reduced to constant 1975 dollars using an assumed average inflation rate of 5 percent per year throughout the forecast period.

Local Component

As previously noted, local funding for transportation purposes is provided from two sources. One of these sources is state motor vehicle revenues, approximately two-fifths of which are returned to local units of government under a variety of aid formulas as stipulated by state statutes. The majority of these returned funds are earmarked for various transportation purposes. The largest share of total funds spent by local units of government for transportation purposes, however, is derived from the second source—"general fund" revenues (taxes and fees assessed and collected by the local units of government). In the preparation of the alternative forecast of future public transportation revenues, these two funding sources were considered separately.

The following assumptions were used in the alternative forecast of local revenues which may be expected to become available for use for transportation purposes within the Region:

1. The amount of total local government expenditures for transportation purposes provided from "general fund" revenues will be the same as originally forecast.

2. The portion of total local government expenditures for transportation purposes provided from state motor vehicle revenues will decline as a relative share of total local government expenditues for transportation purposes due to the low forecast rates of annual growth in those revenues as noted above. This revenue source will grow at the rate discussed above under the state component section of the alternative forecast.

Using the above-noted assumptions, total local government revenues expected to be available for transportation purposes were projected to the year 2000 for all counties, cities, villages, and towns in the Region. These amounts were reduced to constant 1975 dollars using an assumed average inflation rate of 5 percent per year throughout the forecast period.

Federal Component

The following assumptions were used in the alternative forecast of federal highway aids which may be expected to become available for use within the Region:

1. All sources of federal highway aid revenues (motor fuel and lubricating oil taxes, federal excise taxes, and highway use taxes) will remain at their 1975 rates. Historically, about one-third of these revenues have come from excise taxes assessed against dollar sales amounts. These revenues can be assumed to keep pace with price inflation. The two-thirds of these revenues that are derived from fixed-rate taxes will not keep pace with price inflation.

2. Federal highway aid revenues derived from fixed-rate taxes will grow at a rate of only 1 percent per year through the year 2000, partially as a reflection of user efficiencies in motor fuel consumption. Federal highway aid revenues derived from excise taxes (assessed against dollar sales amounts) will grow at a rate of 5 percent per year through the year 2000 as the prices of goods and services increase due to price inflation. A weighted average of the assumed annual rates of growth on these two revenue categories produces an assumed annual rate of growth of 2.3 percent per year for total federal highway aid revenues. This rate is conservative in view of the rates of growth recorded in these revenues over the past decade (the equivalent of 8.8 percent per year) and is consistent with the Wisconsin Department of Transportation forecast of decreased rates of growth in these revenues (decreasing from the present rate to 2.5 percent by 1982 and continuing at 2.5 percent rate of increase through 1987).

3. Total federal highway aid program apportionments and allocations to the State of Wisconsin will—over the forecast period—increase at the same rate as federal highway aid revenues, approximately 2.3 percent per year.

4. The proportion of federal highway aid program apportionments and allocations made available through the State for use in the Region in the year 2000 will be equal to the average proportion of total federal highway aid program apportionments and allocations made to the State that were obligated within the Region over the period 1968 to 1972[1]—33 percent. (Note: In 1977, 30.3 percent of total federal highway aid program apportionments and allocations made to the State were obligated within the Region.)

Using the above-noted assumptions, total federal highway aid program apportionments and allocations for the State were projected to the year 2000. The assumed proportion (33 percent) of the State's total federal highway aid program apportionments and allocations expected to be obligated within the Region was calculated. This amount was reduced to constant 1975 dollars, using an assumed average inflation rate of 5 percent per year throughout the forecast period.

SUMMARY

The alternative forecast of future public transportation revenues produced using the procedures outlined above indicates that about $163 million (expressed in constant 1975 dollars) could be expected to be available for use in the Region in the year 2000. As shown in Table J-1, this is 20 percent less than the $204 million forecast presented in Chapter III of this volume. Major differences between the original forecast and the alternate forecast occur in the categories of state revenues available, where the alternate forecast is only one-third of the original forecast, and in the federal revenues available, where the alternate forecast is two-thirds of the original forecast. For all categories of local revenue sources, the alternate forecast is about 8 percent less than the original forecast. It is important to note that local units of government (counties, cities, villages, and towns) will bear a greater fiscal responsibility for the construction and maintenance of transportation facilities under the alternate forecast—approximately 82 percent of total expenditures—than under the original forecast—approximately 71 percent of total expenditures.

Table J-1

FORECAST REVENUES AVAILABLE IN THE YEAR 2000 FOR TRANSPORTATION AND RELATED USES BY SOURCE: ORIGINAL AND ALTERNATE FORECASTS

Unit of Government	Forecast Method (Millions of 1975 Dollars)		Difference	
	Original	Alternate	Absolute	Percent
Federal	32.5	20.4	- 12.1	- 37.2
State	26.1	8.8	- 17.3	- 66.3
County	25.7	23.7	- 2.0	- 7.9
City	86.4	79.6	- 6.8	- 7.8
Village	16.6	15.4	- 1.2	- 7.5
Town	16.5	15.2	- 1.3	- 7.6
Total	203.8	163.1	- 40.7	- 20.0

Source: SEWRPC.

[1] *The proportion of total federal highway aid program apportionments and allocations made to the State that are obligated within the Region is highly variable from year to year. The time period 1968 to 1972 was chosen because the year-to-year variability was relatively less than during other time periods and was deemed to represent a more "typical" situation.*

APPENDIX K

ENVIRONMENTAL ASSESSMENT OF RECOMMENDED PLANS

INTRODUCTION

Federal planning guidelines issued jointly by the Federal Highway Administration and the Urban Mass Transportation Administration of the U. S. Department of Transportation and by the U. S. Department of Housing and Urban Development call for the preparation of environmental assessments in connection with the development of areawide plans, including land use and transportation plans.[1] These guidelines envision that the environmental assessments provide the basis in part for the preparation of federally required environmental impact statements by state and federal implementing agencies. The Commission believes that the inventory data, analyses, alternative plans, and recommended plans presented in the two volumes of this planning report constitute, in effect, a comprehensive environmental assessment statement. However, in light of the explicit federal planning guidelines to identify a separate section of the planning document termed "environmental assessment," the Commission has attempted in this appendix to bring together all of the data and analyses concerning the regional land use and transportation plans for convenient reference purposes.

Accordingly, this appendix sets forth environmental assessments of the recommended land use and the recommended transportation plans. Following this introduction, the appendix is divided into four parts. The first part sets forth the regional land use plan assessment. The second part sets forth the regional transportation plan assessment. The third part sets forth the air quality assessment based upon both the recommended regional land use plans and the recommended transportation plans. Finally, the fourth part concludes the appendix with a summary of the environmental assessment of the two regional plan elements.

In considering the material included in this appendix which, as noted above, has largely been drawn from data previously presented in this report, it should be kept in mind that the regional land use and transportation plans are by their very nature system plans. As such, the environmental assessments can only be done at a systems level and, consequently, in a relatively generalized manner. More detailed project level planning designed to implement the regional land use and transportation plans will result in project proposals that will require more specific environmental assessments.

LAND USE PLAN ASSESSMENT

Anticipated growth in, and redistribution of, the regional population through the year 2000 requires a concomitant increase in urban development to support that growth. Urban growth could occur in many planned and unplanned forms which would have different impacts on the regional environment. The recommended regional land use plan represents a development framework for southeastern Wisconsin which would minimize the impact of potentially serious and costly environmental problems and contribute to the creation of a more healthy, attractive, and efficient settlement pattern. From an environmental protection point of view, the recommended land use plan—termed the controlled centralization alternative—is more sound than the alternative land use plan—termed the controlled decentralization alternative—which was prepared and evaluated in the land use plan revision and reevaluation process. This section presents a description of the potential environmental impacts of the major elements of the recommended plan including comparisons to the environmental impacts which could be expected with implementation of the controlled decentralization alternative.

Alternative Land Use Plans

Prior to the adoption of the initial 1990 regional land use plan by the Commission in 1966, the Commission explored three alternative land use plans for the future development of the Region: a controlled existing trend plan, a satellite cities plan, and a corridor plan. A fourth plan—an "unplanned alternative"—was also considered. The controlled existing trend alternative was found to best meet the regional development objectives and standards and was selected for refinement and adoption as the 1990 regional land use plan. During the reevaluation of the adopted 1990 regional land use plan, it was concluded that consideration should be given to refinements and work efforts should be centered on revisions to the basic controlled existing trend plan that was selected for adoption as the initial regional land use plan. In the refinement and revision of the controlled existing trend plan as initially prepared and adopted, two somewhat different development concepts were proposed: one, a refinement of the adopted initial year 1990 regional land use plan adopted by the Commission in 1966; the other, a much more decentralized plan. Accordingly, two alternatives were explored, requiring the preparation of two different alternative controlled existing trend land use plans for the Region for the year 2000. The two variations of the original controlled existing trend plan have been termed "controlled centralization plan" and "controlled decentralization plan." The controlled centralization plan was ultimately selected for adoption as the regional land use plan for the year 2000.

In the recommended plan—the controlled centralization plan—the development concept emphasized is, as the name implies, one of centralization, with virtually all new urban development being encouraged to occur within areas readily served by such important urban utilities and facilities as centralized public sanitary sewer, public water supply, and mass transit. Under this development concept, new urban development would occur in planned neighborhood units, primarily at medium population density levels. This development concept is identical to that utilized in the preparation of the initial 1990 regional land use plan. In its design, however, the recommended year 2000 regional land use plan reflects changes in population distribution and land use development which have occurred within the Region between 1963 and 1970, the new regional and county population forecasts prepared to the year 2000, and certain recommendations of other regional and subregional plan elements prepared and adopted by the Commission since 1966, including, most importantly, the regional sanitary sewerage system plan.

In contrast, the controlled decentralization plan places less emphasis on the centralization of urban development, on the concentration of residential development in planned neighborhood units, on the provision of public sanitary sewer and water supply, and on the attainment of medium population density levels, and more emphasis on the use of onsite soil absorption sewage disposal systems (septic tanks) and private water supply wells. This alternative plan was prepared because the Commission's behavioral and attitudinal studies both indicated that a need existed—even within the broad concept of a controlled existing trend land use plan—to accommodate more low-density, unsewered urban development. In comparison to the recommended plan, implementation of the controlled decentralization alternative would result in the conversion of more open land, including prime agricultural land, to urban use; would result in more serious pollution of surface water and contamination of groundwater because of the greater reliance on septic systems; and, would contribute more to an urban sprawl development pattern which would act to break up economical farm units, reduce wildlife habitat, and create urban areas which cannot be readily provided with urban services. The controlled decentralization plan also reflects changes which have occurred within the Region from 1963 to 1970 but it does not reflect the new county population forecasts for the year 2000 prepared by the Commission. Instead, this alternative plan is based upon an alternative regional population distribution. That is, it is based upon extrapolation of short-term trends in county population growth and, in the case of Milwaukee County, decline over the period 1970 to 1975.

Included as major elements of both alternative plans are recommendations concerning the density and spatial distribution of urban development; major commercial, industrial, and recreation centers; and primary environmental corridor and prime agricultural lands. Recommendations of the alternative plans for major commercial, industrial, and recreation centers as well as for primary environmental corridor and prime agricultural land preservation are similar, and, therefore, there is little difference between the alternative plans in terms of the environmental impacts of these aspects of both plans. The alternative plans do, however, differ significantly with respect to the proposed amount, density, and spatial distribution of urban development and would accordingly generate significantly different environmental impacts.

Environmental Impacts

Urban Development: Urban development consists of all the residential, commercial, industrial, and institutional buildings and grounds; all bridges and viaducts, streets and highways; all the sewer, water, gas, power, and communication lines; and all the public facilities, such as schools and parks, libraries, fire and police stations, and hospitals, needed to provide a sound basis for a healthy, productive urban life. The expansion of urban development will have certain unavoidable impacts on the regional environment. The most important potential adverse environmental impacts associated with the expansion of urban development relate to the following: loss of open land including the potential loss of wetlands, woodlands, and wildlife habitat areas; the potential loss of prime agricultural lands; increased storm water runoff and flood flows in streams and watercourses; soil erosion and attendant sedimentation and stream and lake pollution during the land development process; increased pollutant loadings on surface waters and groundwaters; and increased air pollution associated with the operation of commercial and industrial enterprises and residential uses and attendant transportation movements.

The alternative land use plans differ significantly in terms of the environmental impacts that would result from the urban development patterns which they propose. The recommended plan attempts to meet the urban land development needs of the regional population and, at the same time, seeks to avoid the unnecessary loss of open space and prime agricultural lands to urban use. The recommended land use plan proposes an amount of urban development which would accommodate population growth primarily at medium density, with new residential development averaging about three dwelling units per gross residential acre. The plan proposes to limit the conversion of land to urban use to a total of 113 square miles—or an additional 4 percent of the total area of the Region—over the design period of the plan. None of this new urban land would be developed within the primary environmental corridors of the Region, and urban encroachment into prime agricultural areas would be minimized.

In comparison to the recommended plan, the controlled decentralization alternative proposes the conversion of a large amount of open land to urban use—235 square miles, or more than twice the amount envisioned under the recommended plan. Much of the new urban development would be in the form of new suburban density residential land, with a gross density of 192 dwelling units per square mile. Like the recommended plan, the controlled decentralization alternative proposes no additional urban development in the regional primary environmental corridors. The controlled decentralization alternative would, however, result in the conversion of more prime agricultural land—35 square miles—compared to about 13 square miles under the recommended plan.

The alternative land use plans differ not only with respect to the overall amount of new urban development but also with respect to distribution of development within the Region. Under the recommended plan, urban development would be centralized to the maximum extent practicable, with urban development proposed to occur largely in concentric rings along the full periphery of, and outward from, existing urban centers. The degree of centralization is indicated by the fact that if the plan were implemented, more than 60 percent of all new urban residential development in the Region would be located within 20 miles of the Milwaukee central business district. In contrast to this proposed compact form of urban growth, the controlled decentralization alternative envisions a continued proliferation of very low-density suburban development in outlying areas of the Region removed from existing urban development. This "urban sprawl" type of development tends to break up economical farm units, reduce the quality and productivity of wildlife habitat, and create urban areas which cannot be efficiently provided with basic urban services. Under the alternative land use plan, 27 percent of all new urban residential development in the Region would be located within 20 miles of the Milwaukee central business district.

The recommended land use plan envisions that all new urban development within the Region would be served with public sanitary sewerage facilities and would be located only in areas covered by soils which are well-drained and otherwise suitable for such development. In addition, the plan recommends the provision of sewerage facilities to certain existing urban areas which are not presently served. The plan envisions that by the year 2000 about 92 percent of all urban land and about 93 percent of all of the resident population of the Region would be provided with public sanitary sewer and water supply services. In general, the plan seeks to curb urban residential development which relies on septic tanks and private wells because of the potential adverse environmental impacts resulting from malfunctioning systems and development on unsuitable soils. The latter is particularly important since about one-half of the Region is covered by soils unsuitable for septic tank use at any development density. It should be noted that the plan does seek to accommodate some of the continued demand for rural residential development in outlying areas of the Region through the development of land at densities at or lower than one dwelling unit per five acres. With proper attention to soil and other natural resource base limitations, such large lot development can be sustained without public sanitary sewer, water supply, or urban storm drainage facilities; high value woodland and wetland areas can be preserved; and wildlife can continue to sustain itself in the area.

Unlike the recommended plan, the controlled decentralization alternative proposes the development of a substantial amount of suburban density residential land which would not be provided with public sanitary sewer and water supply service. Under the controlled decentralization alternative, only 63 percent of all urban land in the Region would be served with public sanitary sewer and water supply services by the year 2000. While new suburban-density residential development proposed under this alternative would be allocated to areas covered by soils suitable for development with septic systems, poorly maintained, malfunctioning systems may still contribute to the pollution of surface water and contaminate groundwater underlying the Region.

In addition to new urban development, the recommended land use plan envisions the restoration of deteriorated urban areas and the conservation of stable urban areas. Such rehabilitation and conservation activities should have a generally positive impact on the regional environment. Such activities should restore the beauty of deteriorated urban neighborhoods and contribute to the health, safety, and efficiency—including energy efficiency—of the restored structures and the surrounding areas. Rehabilitation activities conserve resources by maximizing the use of the sound structural components of deteriorated buildings. Similarly, rehabilitation activities maximize use of existing urban improvements including existing streets; sidewalks; sewer and water mains and laterals; gas, electric, and telephone lines; and street lighting. By maximizing the utilization of resources already committed to urban uses, rehabilitation activities lessen the need for new residential and related urban development and attendant conversion of open lands to urban use. It should be recognized that because it is based upon a continued high rate of outmigration from the older central cities of the Region, the controlled decentralization alternative could be expected to result in much less emphasis on urban rehabilitation and conservation efforts. This is readily apparent in the plan assumption that two square miles of land currently in urban use in Milwaukee County would revert to unused land. The continued outmigration of population and rapid urban growth in outlying areas of the Region envisioned under the controlled decentralization alternative would generate less impetus for preserving and revitalizing older urban areas.

[1] *Code of Federal Regulations, Title 23, Part 450, Subpart A, 450.120, as reported in Federal Register, Vol. 40, No. 181, "Transportation Improvement Program," pages 42976-42984, September 17, 1975, and Code of Federal Regulations, Title 24, Part 600, Subpart B, 600.65.*

Finally, because of the centralized, compact form of urban development under the recommended land use plan, the plan would result in a relationship between land use and transportation which is more efficient, more economical, and more environmentally sound than that which could be expected under the controlled decentralization alternative. As indicated in Chapter V of this volume, three alternative transportation system plans—a "no build" alternative, a highway-supported transit plan, and a transit-supported highway plan—were initially prepared in conjunction with each alternative land use plan. Analysis of the corresponding transportation plans for each land use alternative indicated consistently that the level of fuel consumption, the number of vehicle miles of travel, and the number of automobiles in use would be higher under the controlled decentralization plan than under the controlled centralization alternative. Moreover, the additional local and collector street mileage which would be required under the controlled decentralization alternative is about twice that required under the recommended plan. The higher local and collector street requirement of the controlled decentralization plan is necessary to serve the substantial amount of very low-density suburban development in outlying areas of the Region proposed in this alternative.

Major Retail and Service Centers: There were 12 major retail and service centers in the Region in 1970. The recommended land use plan envisions retaining 11 of these existing major retail and service centers and adding five new centers by the year 2000. One of the major centers—Northridge in Milwaukee—has already been developed. Two totally new major centers are proposed, one to be located in the City of Oak Creek and one to be located in the City of Racine. The remaining additional retail and service centers called for in the plan presently function as the central business districts of West Bend and Waukesha. These would be strengthened and improved through expanded retail and service floor area by the year 2000.

Among the plan recommendations concerning additional major retail and service centers, the most significant environmental impacts would be associated with the development of the totally new centers proposed in the Cities of Oak Creek and Racine. These new centers would represent areas of intensive urban development with a net site area of at least 20 acres and a gross site area, including parking, of approximately 70 acres. Owing to the extensive parking areas as well as the large areas devoted to retail and service structures, the major retail and service centers represent a type of development high in the proportion of impervious areas which could be expected to generate considerable runoff. In addition, the major commercial centers would be expected to attract at least 3,000 shopping trips per day, resulting in heavy traffic on the surrounding arterial street and highway systems. The primary environmental impacts associated with the proposed expansion of the West Bend and Waukesha central business districts would be those resulting from increased traffic flows.

While the provision of new major and retail service centers would generate certain negative environmental impacts, the provision of major commercial centers properly integrated with respect to the existing and proposed transportation system and residential areas is environmentally more sound than the alternative of meeting the same retail and service needs through strip and spot commercial development along major streets and highways. Moreover, the regional land use plan seeks to minimize the potential adverse environmental impact associated with major retail and service center development. The new major commercial centers would be located in areas which have soils suitable for such development and can be readily provided with public water supply, sanitary sewer service, and storm water drainage. The new centers would contain adequate parking and would be properly located with respect to the regional transportation system. Through the provision of adequate parking and the proper control of traffic flows, the impacts of the new major commercial centers on surrounding land uses can be minimized.

It should be noted that the controlled decentralization alternative proposes more additional major retail and service centers than the recommended land use plan. Implementation of the controlled decentralization alternative would, therefore, generate more of the adverse environmental impacts associated with such large-scale commercial development. This alternative recommends the development of three totally new major retail and service centers in addition to Northridge and further recommends the expansion of four commercial areas currently functioning as central business districts in outlying cities of the Region. The additional major retail and service centers proposed under the controlled decentralization alternative are required because of the continued movement of the regional population to outlying areas envisioned by this plan alternative.

Major Industrial Centers: There were 17 major industrial centers in the Region in 1970. All 17 of these areas are proposed in the recommended land use plan to be retained, and five new major industrial centers would be added. All five of these centers were proposed in the 1990 land use plan, and in 1970 were under initial stages of development. These five centers are located on the western edge of the City of Kenosha, in the Granville portion of the City of Milwaukee, and in the Cities of Oak Creek, Burlington, and Waukesha.

Like the proposed major retail and service centers, major industrial sites represent large areas of very intensive development. The planned major centers would eventually have 250 acres or more of net industrial land and a gross area of 320 acres, including parking, devoted to industrial use. Because of the extensive area devoted to industrial buildings and large areas developed for parking and storage purposes, the major industrial sites also represent a form of development with a relatively high proportion of impervious area which could be expected to generate substantial runoff. Moreover, owing to the large number of job opportunities provided, the major industrial centers could be expected to increase traffic on the surrounding transportation system and, therefore, have an impact on any adjacent land uses.

The land use plan seeks to minimize any potential adverse environmental impacts associated with industrial development within the Region. One positive effect of major industrial site development is that industrial land uses are centralized in one area and may be more readily buffered from any surrounding residential development. Major industrial sites being developed in conformance with the plan are located in areas which have soils suitable for such development, which are provided with sanitary sewer and water supply service and storm water drainage, and which have reasonable access to major highway, airport, and railway facilities and reasonable access from residential areas.

The environmental impacts of the major industrial site recommendations of the controlled decentralization alternative could be expected to be very similar to those of the recommended land use plan. The recommended plan and the controlled decentralization alternative both envision a total of 22 industrial sites in the Region by the year 2000, with 21 of these sites being common to both plans. The controlled decentralization alternative, however, proposes the development of a totally new industrial site in the Cedarburg-Grafton area, instead of expanding the Milwaukee-Granville site as proposed under the recommended plan. By expanding the Milwaukee-Granville site, the recommended land use plan avoids the need to develop a totally new major industrial site and thereby avoids the adverse environmental impacts which arise in committing a large tract of open land to industrial use.

Major Parks: Major parks are defined as parks of at least 250 acres which have a multicounty service area. The recommended land use plan calls for the acquisition and development of only two new major parks—one on Sugar Creek in the Town of Lafayette, Walworth County, and the other in Paradise Valley in the Town of West Bend, Washington County[2] The plan also proposes additional land acquisition at one existing park—Monches Park in the Town of Merton, Waukesha County. The major park proposals of the controlled decentralization alternative are essentially the same as those of the recommended plan.

[2] *It should be noted that the preliminary recommended plan called for the development of a 650-acre state park at the Sugar Creek site adjacent to a proposed reservoir. The final recommended plan calls for the development of a 250-acre county park at the Sugar Creek site without the reservoir.*

Because the Sugar Creek, Paradise Valley, and Monches Park sites are located within the primary environmental corridors of the Region, implementation of the major park proposals of the land use plan would contribute to the preservation and enhancement of valuable natural resource amenities in the Region. Specifically, the plan calls for the public acquisition of 1,000 acres of primary environmental corridor land for development as new major parks, thereby ensuring the permanent preservation of these areas.

While the provision of large parks serves to permanently preserve high-value resource areas, in essentially open uses, the development of recreation facilities requires some alteration of natural conditions of the proposed recreation sites. Good park site design techniques must attempt to minimize problems related to park development such as the displacement of wildlife, loss of wetlands, and erosion. It should be noted that park site design is a local rather than a regional planning function. The regional park and open space plan, which has refined the major park proposals of the regional land use plan, proposes that major parks be developed only to accommodate facilities for those activities which rely heavily on natural resource amenities to enhance the quality of the recreational experience. Specifically, the plan proposes the provision of golf, picnic, nature study, and skiing facilities at the Sugar Creek site; the provision of camping, swimming, picnic, and nature study facilities at the Paradise Valley site; and the provision of picnic facilities at the Monches site. Under the plan, facilities for such activities as baseball and tennis, which do not rely on natural resource amenities for the quality of the recreational experience, would not be provided in major parks. Rather, such nonresource-oriented facilities would be provided in smaller parks in urban areas of the Region. Nonresource-oriented facilities are not consistent with the nature of major parks as conceived by the Commission, and the provision of such facilities within major parks will result in unnecessary alteration of high-value resource areas.

Primary Environmental Corridors: The most important elements of the natural resource base of the Region—including the best remaining woodlands; wetlands; wildlife habitat areas; surface waters and associated undeveloped shorelands and floodlands; areas covered by organic soils; areas containing rough topography and significant geological formations; scenic, historic, and scientific sites; groundwater recharge and discharge areas; existing park sites; and the best remaining potential park and related open space sites—have been found to occur largely together in linear patterns in the natural landscape. These linear patterns have been termed primary environmental corridors. Together these corridors encompass about 542 square miles, or about 20 percent of the area of the Region. Of this total, about 437 square miles, or 16 percent of the Region, is considered "net" corridor area—that is, not in urban use or covered by surface water. The recommended land use plan as well as the controlled decentralization alternative proposes that these environmental corridors be protected and preserved in essentially natural, open use. Such protection and preservation is considered essential to the maintenance of a wholesome environment in the Region, to the preservation of the Region's cultural and natural heritage and natural beauty, and to the prevention of new and the intensification of existing environmental problems such as flooding and water pollution. The topography, soils, and flood hazards existing in the majority of these corridors, moreover, make them poorly suited to intensive urban development of any kind, but well-suited to recreational and conservancy uses.

Implementation of the corridor preservation recommendations would result in the preservation of a total of 142 square miles of wetlands in the Region. Such wetlands contribute to flood control, serving to temporarily store excess runoff and reduce peak flood flows. Wetlands with standing water are suitable habitat for waterfowl and marsh furbearers, while dryer types of wetlands support upland game because of the protection afforded by vegetation growth. Wetlands serve as important recharge areas for the groundwater aquifers underlying the Region. Wetlands also contribute to the maintenance of good water quality, and wetlands act as "traps" retaining nutrients and sediments, thereby preventing such nutrients from reaching streams and lakes.

Implementation of the corridor preservation recommendations of the plan would preserve a total of 101 square miles of woodlands. Woodlands contribute to clean air and water and to the maintenance of a diversity of plant and animal life. Woodlands reduce soil erosion and siltation of streams and contribute to flood control by reducing runoff.

Implementation of the corridor preservation recommendations would also preserve many of the best remaining potential park sites in southeastern Wisconsin. Of the 211 remaining high-value potential park sites identified in the Commission's potential park sites inventory, 87 percent are located in whole or part within the regional primary environmental corridors. The preservation of these high-value potential park sites is necessary to ensure the availability of suitable outdoor recreation sites to provide recreational opportunities for the regional population for all time.

Implementation of the corridor preservation recommendations of the plan would also preserve all of the remaining undeveloped floodlands of the Region in essentially natural, open uses and, thus, avoid aggravation of existing flood problems along developed reaches of the perennial rivers and streams in the Region as well as avoid the creation of new flood problems. Commission studies have clearly indicated the major impact on flood flows, flood stages, and flood damages of not preserving the primary environmental corridors in their natural state, but instead permitting the filling and development of the remaining natural floodlands for urban purposes. The results of these analyses indicate that 100-year recurrence interval flood flows may be increased by up to 85 percent under land use conditions involving complete development of floodlands, while corresponding flood stages may be expected to be increased by up to four feet. The increases in flood flows and flood stages would also result in significant—up to 75 percent—increases in flood damages. By preserving the primary environmental corridors in their natural state many of the remaining natural floodlands in the Region and their attendant flood water storage capacity would also be preserved, thereby significantly reducing potential flood flows, flood stages, and flood damages associated with permitting the filling and development of remaining natural floodlands.

Prime Agricultural Lands: The recommended land use plan proposes to preserve to the greatest extent practicable those areas identified as prime agricultural lands. Such lands are covered by the most productive soils; are in large enough tracts—both in terms of the individual farm sizes and in terms of the collective blocks of land—to make farming a viable enterprise and to sustain supporting agribusiness; have had large amounts of capital invested in good soil and water conservation practices as well as in such agricultural facilities as irrigation and drainage systems; and have consistently displayed higher than average crop yields. In 1970 these lands totaled about 633 square miles, or 24 percent of the area of the Region. The recommended plan proposes to convert to urban use only those prime agricultural lands which have already been committed to urban development due to the proximity to existing and expanding concentrations of urban uses and the prior commitment of heavy capital investment in utility extensions. The recommended plan envisions the conversion to urban use of about 13 square miles of prime agricultural land by the year 2000. The controlled decentralization alternative, it should be noted, calls for the conversion of about 35 square miles of prime agricultural land by the plan design year.

Implementation of the plan recommendations to preserve most of the remaining prime agricultural lands in the Region will have a positive impact on the environment of southeastern Wisconsin. In addition to providing food and fiber, agricultural areas contribute significantly to the maintenance of an ecological balance between plants and animals. The preservation of prime agricultural lands will serve to maintain the rural character and natural beauty of outlying areas in the Region, and at the same time give form and structure to urban development.

Preservation of prime agricultural lands through the establishment of agricultural zoning districts will also assist in the implementation of sound soil and water conservation practices and diffused-source water pollution abatement measures, such as conservation tillage, crop rotation, contouring, cover crops, terracing, diversion structures and dikes, water and grade control structures, and grassed waterways, and will facilitate implementation of appropriate wind erosion, streambank erosion, and pesticide, fertilizer, and animal waste controls. The implementation of such conservation practices and other pollution control measures on agricultural land will help preserve and maintain streams and lakes with existing high water quality and help improve the substandard water quality conditions of

polluted lakes and streams in order to provide for recreational use and the maintenance of fish and aquatic life. The water quality benefits from good soil and water conservation practices include reduced sediment, organic matter, and nutrient and pesticide contributions to surface waters. The Commission's areawide water quality management program has shown that well-managed agricultural land contributes less pollutants to surface waters than urban and suburban land uses, which include construction and transportation activities and a higher proportion of impervious land surface. The program has also shown, however, that landowners are willing to invest in soil and water conservation practices only on lands located in "permanent" agricultural areas and not on lands located in areas likely to be subject to conversion to other uses.

TRANSPORTATION PLAN ASSESSMENT

One of the necessary considerations in the land use-transportation plan reevaluation process is the environmental impact of the recommended regional transportation plan. The importance of environmental considerations in the development of the recommended transportation plan is reflected by one of the five basic principles guiding the plan reevaluation process, as stated in Chapter II of Volume I of this report.

> Both transportation and land use planning must recognize the existence of a limited natural resource base to which urban and rural development must be properly adjusted to ensure a pleasant and habitable environment. Land, water, and air resources are limited and subject to misuse through improper land use and transportation facility development.

The importance of the consideration of environmental impacts in the planning of transportation facilities and services, and other public actions is further reflected by the National Environmental Policy Act and the Wisconsin Environmental Policy Act which require the assessment of public projects which may significantly affect the quality of the human environment and involve federal and state agencies of government, respectively. Because past public actions at the project level have in many cases been drawn from long-range systemwide plans and future public actions can be expected to be precipitated by future systemwide long-range planning efforts, there is a need, also, to include an environmental assessment of the recommended transportation plan in the land use-transportation plan reevaluation process.

Taken together, both volumes of this report have provided nearly all the information necessary for a regional environmental assessment of the recommended transportation system plan. In the first volume, the regional framework within which the transportation plan was developed was presented through extensive discussion of the existing characteristics of the Region, including the previously adopted regional land use and transportation plans; the regional demographic, economic, and public financial resource base; the regional natural resource and public utility base; the land use of the Region; community plans and land use regulatory ordinances of the Region; and the transportation facilities and travel habits and patterns of the Region. In the second volume of this report, this regional framework was expanded upon through analyses and presentation of the anticipated growth and change in the Region to the year 2000. A regional land use plan which the recommended transportation plan was designed to serve was developed and also reported in the second volume of this report. Also presented were a number of alternative regional transportation plans, one of which was the recommended transportation plan and another of which was a "no build" option. As documented in Chapter VIII of this second volume of the report, the plan alternatives were compared and evaluated against a comprehensive set of transportation system planning objectives, and their supporting principles and standards. The objectives, principles, and standards against which the plans were measured included a wide range of environmental considerations sufficient to the development of a regional transportation plan environmental assessment, as well as aspects of accessibility, cost, mobility, safety, and system flexibility.

A summary environmental assessment of the recommended regional transportation plan is provided in the following sections of this appendix. The environmental assessment includes a description of the recommended plan and the "no build" plan, and a summary of their principal environmental impacts. The environmental implications of the recommended and "no build" transportation plans to be summarized include land use impacts, noise impacts, energy impacts, and community and local government impacts. The air quality impacts of the transportation plans will receive separate considerations in a later section of this appendix. Particular attention is given to adverse environmental effects, and the resource commitments of the recommended and "no build" plans. The regional framework within which the recommended plan was developed and the characteristics and impacts of transportation plan alternatives other than the "no build" plan will not be discussed, as they have been described in some detail earlier in this report. It should be noted that the following environmental assessment of the long-range regional transportation system plan must necessarily be general in nature. This is because specific characteristics of actions outlined in the plan which can have a significant effect on the actions' environmental impacts are not established until later, when detailed, project-level plans and designs are formulated. Specific characteristics can be substantially changed by project-level planning and design.

The Recommended and "No Build" Transportation Plans

The recommended regional transportation plan comprises an integrated transportation system of four components: freeways, standard arterial streets and highways, mass transit facilities and services, and system management recommendations, which together best meet the transportation system planning objectives. The "no build" transportation plan represents the alternative of taking no action, that is, maintaining and preserving the existing transportation system with little or no improvement or expansion.

Freeways: The freeway systems for the recommended and "no build" transportation plans for the year 2000 are shown on Maps K-1 and K-2 and are quantified in Table K-1. The "no build" plan consists of the 230 miles of existing freeway facilities open to traffic as of January 1, 1978, and an additional eight miles of freeways considered to be fully committed.

The recommended plan includes the existing and committed freeways included under the "no build" plan, and an additional 97 miles of proposed freeways. The additional proposed freeways are divided into two sets of long-range plan recommendations, an upper tier and a lower tier. Both are included in the long-range plan, but no further work is recommended to be undertaken for the design or construction of freeways included in the upper tier plan recommendations for an indeterminate time period of at least a decade, at which time the need for the upper tier freeway facilities would be reviewed in light of the success of recommended system management efforts. Approximately 37 miles of the additional freeways are recommended in the upper tier of the plan, the remaining 60 miles of proposed freeways being recommended in the lower tier of the plan.

Standard Arterial Streets and Highways: Summary data on the standard arterial street and highway systems under the recommended and "no build" regional transportation plans are given by county and arterial facility type in Tables K-2 and K-3, respectively. The arterial street improvements have been categorized as system preservation, system improvement, and system expansion efforts. System preservation includes all arterial improvement projects of resurfacing and reconstruction which are required to maintain structural adequacy and serviceability and do not significantly increase existing capacity. System improvement includes all projects which would significantly increase capacity through street widening or relocation. System expansion includes all projects involving construction of new facilities.

Under the recommended plan for the year 2000, the standard arterial system increases from 2,847 miles of streets and highways in 1972 to approximately 3,190 miles. This additional mileage is primarily a result of the addition of existing nonarterial facilities to the standard arterial system, as the construction of new surface arterial facilities would total only about 150 miles under the recommended plan. Under the recommended plan about 2,400 miles, or 75 percent, of the standard arterial system is categorized as system preservation; 684 miles, or 21 percent, falls into the system improvement category; and the remaining 106 miles, or 3 percent, falls into the system expansion category.

Table K-1

EXISTING, COMMITTED, AND PROPOSED FREEWAYS IN THE REGION FOR THE "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

Freeway Facility	Number of Miles							
	No Build			Recommended				
						Planned		
	Existing January 1, 1978	Committed	Total	Existing January 1, 1978	Committed	Lower Tier	Upper Tier	Total
Airport	5.1	--	5.1	5.1	--	--	--	5.1
Airport Spur	--	1.4	1.4	--	1.4	--		1.4
East-West	33.5	--	33.5	33.5	--	--	--	33.5
Fond du Lac	4.5	--	4.5	4.5	--	--	--	4.5
Lake	2.6	--	2.6	2.6	--	3.1	33.3	39.0
North-South	78.0	--	78.0	78.0	--	--	--	78.0
Park	1.2	--	1.2	1.2	--	--	0.5	1.7
Rock	48.7	--	48.7	48.7	--	--	--	48.7
Stadium	2.7	--	2.7	2.7	--	0.8	3.3	6.8
USH 12	19.1	--	19.1	19.1	--	17.0	--	36.1
USH 16	8.3	7.0	15.3	8.3	7.0	5.4	--	20.7
USH 41	11.3	--	11.3	11.3	--	21.0	--	32.3
West Bend	1.0	--	1.0	1.0	--	12.7	--	13.7
Zoo	14.5	--	14.5	14.5	--	--	--	14.5
Total	230.5	8.4	238.9	230.5	8.4	60.0	37.1	336.0

Source: SEWRPC.

Under the "no build" plan for the year 2000, the standard arterial street and highway system increases from 2,847 miles of streets and highways in 1972 to 3,072 miles in the year 2000. This additional mileage is almost exclusively a result of the addition of existing nonarterial facilities to the standard arterial system, as the construction of new facilities totals less than 1 percent, or about 4 miles, under the "no build" plan. More than 99 percent of the standard arterial system, or about 3,057 miles, is categorized as system preservation, while only 13 miles fall into the system improvement category, and two miles fall into the system expansion category.

Mass Transit Facilities and Services: Transit system development proposals for the year 2000 were prepared for the Kenosha, Milwaukee, and Racine urbanized areas of the Region under the recommended and "no build" transportation plans.

Milwaukee Urbanized Area: Transit facilities and services in the Milwaukee urbanized area were recommended under both plans to be provided at the primary, secondary, and tertiary levels of service, as defined earlier in Chapter VIII of the first volume of this report. Under the "no build" plan, the present primary transit service of modified rapid transit, or Freeway Flyers, operating over 41 miles of freeways and seven miles of standard arterials is continued to the year 2000. The 15 existing and committed transit stations serving the present 10-route Freeway Flyer system are also continued under the "no build" plan. Under the recommended plan, primary transit service is provided with motorbuses over a total of 80 miles of freeways and 27 miles of surface arterials. Thirty-eight transit stations are proposed to be established along the 29 route primary transit system; of which five stations are already in existence.

Secondary, or express, transit service is limited under the "no build" plan to the two express motorbus routes currently provided. Under the recommended plan, secondary service is provided over 14 motorbus routes. Nearly 10 miles of the 156 miles which comprise the 14 express routes consist of exclusive transit lanes, that is, traffic lanes where only buses would be allowed during specified hours of the day.

Tertiary, or local, transit service under the "no build" plan consists of preserving the local bus service currently provided in the Milwaukee urbanized area. Under the recommended plan, tertiary transit service is extended to nearly all of the Milwaukee urbanized area, including low-density urban residential areas in southern Ozaukee and Washington Counties, eastern Waukesha County, and southern Milwaukee County. The recommended plan tertiary transit service would serve 94 percent of the Milwaukee urbanized area population in the year 2000, compared to 71 percent under the "no build" plan.

Kenosha and Racine Urbanized Areas: In the Kenosha and Racine urbanized areas only a tertiary or local level of mass transit service is envisioned in both plans. Because significant improvements in mass transit service in these two urbanized areas have taken place in recent years in accordance with transit development programs previously prepared by the Commission in cooperation with the Cities of Kenosha and Racine, the recommended regional transportation plan envisions only relatively minor route extensions and changes to the existing system, or "no build" option. The changes proposed reflect the anticipated expansion of the urbanized areas.

Transportation System Management Recommendations: The recommended regional transportation plan for the year 2000 also includes two major transportation system management recommendations. One recommendation is the expansion of a freeway operational control system which would constrain access to the freeway system during peak hours, while granting preferential access to high-occupancy vehicles, in an attempt to ensure high rates of traffic flow at reasonable speeds. The second recommendation imposes curb parking prohibitions during peak hours on certain arterial streets and highways. Together these actions seek to modify travel demand through the reduction of vehicular traffic during the peak period and ensure that maximum use is made of existing transportation facilities. Other transportation systems management actions have been recommended under the Commission's transportation systems management planning program and have been fully coordinated with the recommended transportation plan.

Land Use Impacts

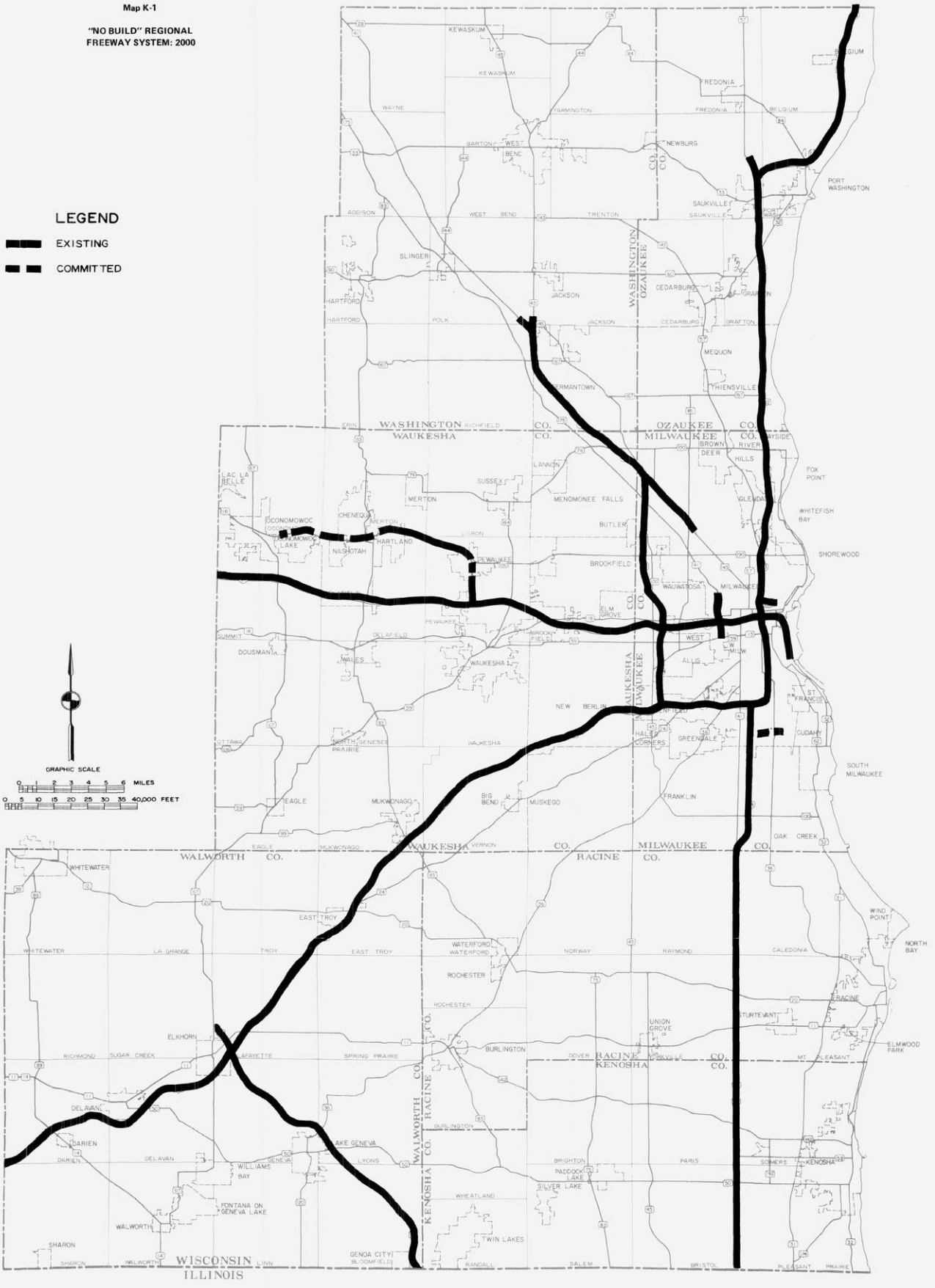
Direct impacts on land use of the recommended regional transportation plan and the "no build" alternative plan include the acquisition of land for proposed transportation system development, the dislocation of residential and nonresidential structures by proposed transportation system development, and the penetration of primary environmental corridors by proposed transportation system development.

The recommended long-range regional transportation plan would require significantly more land for system development than would the "no build" plan. As shown in Table K-4, the construction of new transportation facilities and terminals under the recommended plan would cost $111,495,200 for necessary land acquisition, demolition, and relocation. The "no build" plan would only require $3,239,000.

The recommended long-range plan would also require substantially more dislocation of households, businesses, and industries than would the "no build" plan, as shown in Table K-4. The reconstruction of existing, and the construction of new, transportation facilities will displace 777 residential units and 84 nonresidential structures under the recommended plan as compared with the displacement of nine residential units and four nonresidential structures under the "no build" plan.

Map K-1

"NO BUILD" REGIONAL
FREEWAY SYSTEM: 2000



Map K-2

RECOMMENDED REGIONAL FREEWAY SYSTEM: 2000

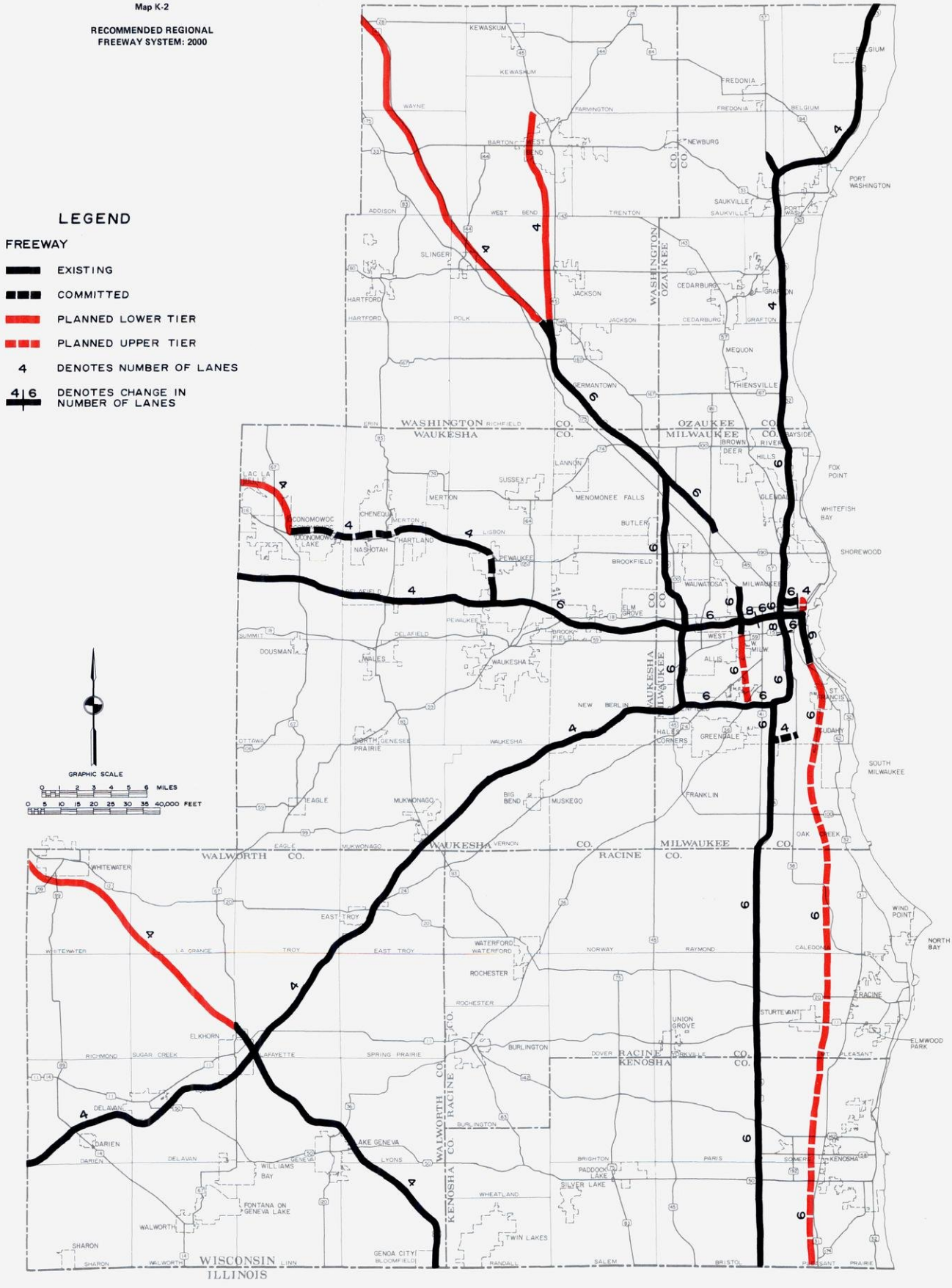


Table K-2

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2000 "NO BUILD" REGIONAL TRANSPORTATION PLAN

Arterial Facility Type	System Preservation				System Improvement			System Expansion		Total (miles)
	No Work Required (miles)	Resurface (miles)	Reconstruct for Same Capacity (miles)	Percent of Total	Reconstruct for Additional Capacity (miles)	New Construction–Replacement Facility (miles)	Percent of Total	New Construction–New Facility	Percent of Total	
Kenosha County										
Freeway	--	12.1	--	100.0	--	--	--	--	--	12.10
Standard Arterial	0.9	203.3	113.6	99.5	0.5	--	0.1	1.30	0.4	319.60
Subtotal	0.9	215.4	113.6	99.5	0.5	--	0.1	1.30	0.4	331.70
Milwaukee County										
Freeway	9.8	57.6	--	97.4	--	--	--	1.8	2.6	69.2
Standard Arterial	60.1	537.0	66.6	99.4	3.7	--	0.6	--	--	667.4
Subtotal	69.9	594.6	66.6	99.3	3.7	--	0.5	1.8	0.2	736.6
Ozaukee County										
Freeway	16.8	10.8	--	100.0	--	--	--	--	--	27.6
Standard Arterial	2.8	186.5	85.3	99.5	1.5	--	0.5	--	--	276.1
Subtotal	19.6	197.3	85.3	99.5	1.5	--	0.5	--	--	303.7
Racine County										
Freeway	--	12.0	--	100.0	--	--	--	--	--	12.0
Standard Arterial	5.7	180.5	189.1	99.4	0.1	1.3	0.4	0.9	0.2	377.6
Subtotal	5.7	192.5	189.1	99.4	0.1	1.3	0.4	0.9	0.2	389.6
Walworth County										
Freeway	50.3	--	--	100.0	--	--	--	--	--	50.3
Standard Arterial	7.3	253.8	139.0	100.0	0.1	--	--	--	--	400.2
Subtotal	57.6	253.8	139.0	100.0	0.1	--	--	--	--	450.5
Washington County										
Freeway	2.2	6.4	--	100.0	--	--	--	--	--	8.6
Standard Arterial	1.8	291.2	117.4	99.6	1.2	--	0.4	--	--	401.6
Subtotal	4.0	297.6	117.4	99.6	1.2	--	0.4	--	--	410.2
Waukesha County										
Freeway	14.5	38.9	--	92.1	4.6	--	7.9	--	--	58.0
Standard Arterial	15.5	443.5	165.9	99.3	4.3	0.4	0.7	--	--	629.6
Subtotal	30.0	482.4	165.9	98.7	8.9	0.4	1.3	--	--	687.6
Southeastern Wisconsin Region										
Freeway	93.6	137.8	--	97.5	4.6	--	1.9	1.8	0.6	237.8
Standard Arterial	94.1	2,085.8	876.9	99.5	11.4	1.7	0.4	2.2	0.1	3,072.1
Total	187.7	2,223.6	876.9	99.4	16.0	1.7	0.5	4.0	0.1	3,309.9

Source: SEWRPC.

The recommended transportation plan also has an impact on land use of the Region in that it requires the location of nearly 62 miles of transportation facilities in or through primary environmental corridors. About 31 of these miles are the result of the construction of proposed new facilities, and 31 miles are a result of the reconstruction of additional capacity of existing facilities. The "no build" plan does not propose the location of any new or improved transportation facilities in environmental corridors. The reason for avoiding the location of transportation facilities in the primary environmental corridors of the Region is that the corridors contain the best remaining park lands, open space, woodlands, wetlands, and surface water resources of the Region. However, total preservation of environmental corridors from transportation system development is difficult, if not impossible, because both transportation facilities and environmental corridors are systems comprised of linear components which within a Region must inevitably cross at some locations. It should be noted that this estimation of environmental corridor penetration has been made at the regional system planning level and is necessarily general in nature. More detailed examination during project planning and design phases may indicate that the new or improved transportation facilities proposed in the recommended plan could be placed outside the environmental corridor lands. This is particularly true, of course, where transportation facilities are proposed to be constructed approximately parallel to the primary environmental corridors.

An indirect land use impact of the recommended and "no build" transportation plans is the relative accessibility provided by each plan to subareas of the Region. Accessibility provides an overall measure of the relative ease with which work, shopping, social, and recreational activities within the Region can be reached from the various subareas of the Region. The accessibility provided under each plan thus influences the relative attractiveness of subareas within the Region with respect to supporting existing development and inducing new land use development. The recommended and "no build" plans provide nearly the same accessibility to all parts of the Region, and as a consequence, can be expected to support the recommended land use plan to the same degree.

Noise Impacts

The recommended regional transportation plan and the "no build" plan also have an impact on the Region through the generation of traffic-related noise. However, the determination of the traffic-related noise impacts of alternative regional transportation system plans is difficult at the systems planning level, because the characteristics of each street and highway which can influence the amount of noise generated by traffic are not established until detailed project planning and design has been completed. These noise influencing characteristics include the vertical alignment of the facility (street or highway) at grade, depressed, or elevated, the gradient of the facility, the pavement type of the

Table K-3

ARTERIAL STREET AND HIGHWAY SYSTEM PRESERVATION, IMPROVEMENT, AND EXPANSION BY ARTERIAL FACILITY TYPE BY COUNTY: 2000 RECOMMENDED REGIONAL TRANSPORTATION PLAN

Arterial Facility Type	System Preservation				System Improvement			System Expansion		
	No Work Required (miles)	Resurface (miles)	Reconstruct for Same Capacity (miles)	Percent of Total	Reconstruct for Additional Capacity (miles)	New Construction—Replacement Facility (miles)	Percent of Total	New Construction—New Facility	Percent of Total	Total (miles)
Kenosha County										
Freeway	--	12.1	--	49.8	--	--	--	12.2	50.2	24.3
Standard Arterial	0.9	128.2	114.2	72.6	70.0	9.7	23.8	12.3	3.7	335.3
Subtotal	0.9	140.3	114.2	71.0	70.0	9.7	22.2	24.5	6.8	359.6
Milwaukee County										
Freeway	9.8	53.0	--	73.5	5.4	--	6.3	17.6	20.6	85.8
Standard Arterial	62.5	319.0	72.5	65.9	219.7	3.7	32.4	11.9	1.7	689.3
Subtotal	72.3	372.0	72.5	66.7	225.1	3.7	29.5	29.5	3.8	775.1
Ozaukee County										
Freeway	16.8	8.8	--	92.8	2.0	--	7.2	--	--	27.6
Standard Arterial	4.0	145.3	89.8	84.4	38.6	2.0	14.3	3.6	1.3	283.3
Subtotal	20.8	154.1	89.8	85.1	40.6	2.0	13.7	3.6	1.2	310.9
Racine County										
Freeway	--	12.0	--	49.8	--	--	--	12.1	50.2	24.1
Standard Arterial	5.7	119.7	182.3	73.6	81.7	5.9	20.9	22.9	5.5	418.2
Subtotal	5.7	131.7	182.3	72.3	81.7	5.9	19.8	35.0	7.9	442.3
Walworth County										
Freeway	50.3	--	--	74.9	--	--	--	16.9	25.1	67.2
Standard Arterial	9.3	226.8	133.9	88.9	22.0	10.2	7.8	13.8	3.3	416.0
Subtotal	59.6	226.8	133.9	87.0	22.0	10.2	6.6	30.7	6.4	483.2
Washington County										
Freeway	2.2	6.4	--	80.3	21.1	--	49.8	12.7	29.9	42.4
Standard Arterial	1.8	218.7	112.8	84.3	40.2	6.8	11.9	14.9	3.8	395.2
Subtotal	4.0	225.1	112.8	78.7	61.3	6.8	15.6	27.6	6.3	437.6
Waukesha County										
Freeway	14.1	35.6	--	76.9	8.8	--	13.6	6.1	9.5	64.6
Standard Arterial	18.5	259.7	174.9	69.4	167.0	6.0	26.5	26.7	4.1	652.8
Subtotal	32.6	295.3	174.9	70.1	175.8	6.0	25.3	32.8	4.6	717.4
Southeastern Wisconsin Region										
Freeway	93.2	127.9	--	65.8	37.3	--	11.1	77.6	23.5	336.0
Standard Arterial	102.7	1,417.4	880.4	75.3	639.2	44.3	21.4	106.1	3.3	3,190.1
Total	195.9	1,545.3	880.4	74.3	676.5	44.3	20.4	183.7	5.3	3,526.1

Source: SEWRPC.

facility, the shielding of the facility, the setback distance of structures along the facility, and the characteristics of the traffic on the facility including mix of vehicles, peaking characteristics, and level of services.

An estimate, however, has been made of the relative noise impact in rural and urban areas of the recommended and "no build" plans. The noise impact estimate for each plan, as shown in Table K-5, indicates the number of miles of arterial streets and highways in the Region along which traffic-related noise at the face of structures along those streets and highways would exceed 70 dba, the maximum desirable outside noise level for residences, public buildings, and parks. The noise impact estimate for each plan assumes that all arterial facilities of the plan are located at grade, and that all structures located along the arterial facilities are setback at specified distances related to street width and number of lanes. Thus, the noise impacts shown in Table K-5 which show the recommended plan to have greater impact in both rural and urban areas of the Region should be viewed as relative measures which have substantial potential for reduction through project planning and design which changes alignments, increases building setbacks, adds shielding, or modifies gradients.

Moreover, it should be noted that the noise impacts of the plans have been estimated only in terms of the number of miles of arterial streets and highways which would exceed 70 dba. The estimate does not indicate differences, which could be substantial, between plans when both noise levels are above 70 dba, or when both levels are below 70 dba. Furthermore, it should be noted that the estimated noise levels reflect peak noise levels which would occur only during the peak hours of the day, and not throughout the day.

Energy Impacts

Another environmental impact of the recommended and "no build" regional transportation plans is the motor fuel consumption by motor vehicles under each plan. As shown in Table K-6, the recommended plan would provide a slight decrease in motor vehicle energy requirements over the "no build" plan. Under the assumption that automobiles used in the Region in the year 2000 would have an average fuel efficiency of 19 miles per gallon as federally mandated for new automobiles for the year 1980, this fuel savings would approximate 3 percent, or 24 million gallons. Assuming an average fuel efficiency of 27 miles per gallon as federally mandated for the year 1985, the fuel savings would approximate 2 percent, or 11 million gallons of motor fuel under the recommended plan.

Table K-4

COMPARISON OF LAND TAKING REQUIREMENTS FOR TRANSPORTATION SYSTEM IMPROVEMENTS IN THE REGION BY COUNTY: 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

County and Taking	No Build Plan	Recommended Plan
Kenosha County		
Number of Residential Units	--	41
Number of Nonresidential Structures	--	2
Acquisition, Demolition, and Relocation Cost	--	$ 14,030,600
Property Tax Base Reduction	--	$ 13,672,400
Milwaukee County		
Number of Residential Units	9	593
Number of Nonresidential Structures	4	41
Acquisition, Demolition, and Relocation Cost	$3,139,000	$ 50,990,200
Property Tax Base Reduction	$3,064,000	$ 47,880,800
Ozaukee County		
Number of Residential Units	--	16
Number of Nonresidential Structures	--	5
Acquisition, Demolition, and Relocation Cost	--	$ 4,904,100
Property Tax Base Reduction	--	$ 4,654,500
Racine County		
Number of Residential Units	--	84
Number of Nonresidential Structures	--	18
Acquisition, Demolition, and Relocation Cost	--	$ 14,201,700
Property Tax Base Reduction	--	$ 13,062,100
Walworth County		
Number of Residential Units	--	3
Number of Nonresidential Structures	--	2
Acquisition, Demolition, and Relocation Cost	--	$ 5,697,000
Property Tax Base Reduction	--	$ 5,589,800
Washington County		
Number of Residential Units	--	12
Number of Nonresidential Structures	--	7
Acquisition, Demolition, and Relocation Cost	--	$ 7,636,900
Property Tax Base Reduction	--	$ 7,433,100
Waukesha County		
Number of Residential Units	--	28
Number of Nonresidential Structures	--	9
Acquisition, Demolition, and Relocation Cost	$ 100,000	$ 14,034,700
Property Tax Base Reduction	--	$ 13,844,700
Southeastern Wisconsin Region		
Number of Residential Units	9	777
Number of Nonresidential Structures	4	84
Acquisition, Demolition, and Relocation Cost	$3,239,000	$111,495,200
Property Tax Base Reduction	$3,164,000	$106,137,400

Source: SEWRPC.

Table K-5

COMPARISON OF MILES OF ARTERIAL STREETS AND HIGHWAYS WITH TRAFFIC RELATED NOISE EXCEEDING 70 DBA BY COUNTY: 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

	Arterial Miles Exceeding 70 dba[a]			
	No Build Plan		Recommended Plan	
County	Rural	Urban	Rural	Urban
Kenosha County				
Freeway	12	0	12	--
Standard Arterial	31	47	47	47
Subtotal	43	47	59	47
Milwaukee County				
Freeway	1	58	1	80
Standard Arterial	4	401	2	433
Subtotal	5	459	3	513
Ozaukee County				
Freeway	22	5	22	6
Standard Arterial	2	14	2	17
Subtotal	24	19	24	23
Racine County				
Freeway	12	--	18	6
Standard Arterial	10	57	20	85
Subtotal	22	57	38	91
Walworth County				
Freeway	1	--	34	2
Standard Arterial	50	24	33	25
Subtotal	51	24	67	27
Washington County				
Freeway	5	1	18	1
Standard Arterial	19	22	35	35
Subtotal	24	23	53	36
Waukesha County				
Freeway	10	17	11	19
Standard Arterial	37	147	65	191
Subtotal	47	164	76	210
Southeastern Wisconsin Region				
Freeway	63	81	116	114
Standard Arterial	155	712	204	835
Total	218	793	320	949

[a] *The noise impact estimates for each plan shown in this table assume that all arterial facilities of the plan are located at grade, and all structures located along the arterial facilities are setback at specified distances related to street width and number of lanes. Thus, the noise impact estimates should be viewed as relative measures which have substantial potential for reduction through later project planning and design which changes alignments, increases building setbacks, adds shielding, or modifies gradients.*

Source: SEWRPC.

As shown in Table K-7, part of the reason for decreased motor fuel consumption under the recommended plan is an expected lower automobile availability in the Region primarily as a result of improved mass transit services under the recommended plan, a small reduction in the total number of trips made by residents of the Region, and an increase in tripmaking on more energy-efficient transportation modes and facilities.

Community and Local Government Impacts

The recommended and "no build" regional transportation plans also have significant social, economic, and environmental impacts on communities and local governments within the Region. Community-level impacts include the penetration of neighborhoods by new or improved transportation facilities and the provision of greater accessibility to areas outside the community. Impacts on local government include the reduction of the property tax base, and the increase of the local share of transportation system costs as envisioned under the plans.

Neighborhood Penetration: The penetration of neighborhood units and neighborhood facility service areas by arterial streets and highways and primary transit routes is a major community impact of both the recommended and "no build" transportation plans. However, the determination of the extent of this impact is dependent to a large part upon later project planning which establishes the precise alignment of new transportation facilities. The determination of the amount of impact is also dependent upon the delineation of neighborhood unit boundaries by local units of government. However, not all communities within the Region, particularly the City of Milwaukee, have delineated neighborhood boundaries. Accordingly, it is not possible to quantify totally the extent to which the recommended and "no build" regional transportation plan alternatives have an impact on neighborhoods. With the information that is available, it can be concluded that the only major new freeway proposed under the recommended plan, the Lake Freeway, has been located in a fully coordinated manner with delineated neighborhood units in the City of Oak Creek and the Kenosha and Racine planning districts. Moreover, in regard to the importance of the penetration of neighborhoods by the construction of transportation facilities, it is believed that existing urban development will adjust, as the disruption can be viewed as being partially offset by the resultant improvement in traffic conditions in the existing neighborhoods.

Property Tax Base Impacts: The reconstruction of existing transportation facilities and the construction of new transportation facilities under the recommended and "no build" regional transportation plans is expected to have a direct impact on the property tax base within the Region. Shown in Table K-4 is an estimate of the property tax base reduction under both plans, obtained by determining the total value of land consumed and buildings acquired for proposed new and improved transportation facilities. It can be observed that the impact of the recommended plan, $106,137,400, is substantially greater than that of the "no build" plan, $3,164,000. It should be noted, however, that the relocation of property owners displaced by new or improved transportation facilities to communities within the Region, possibly even within the same local unit of government, will correspondingly lessen the estimated regional tax base loss.

Table K-6

COMPARISON OF MOTOR FUEL CONSUMPTION BY VEHICLES TRAVELING IN THE REGION BY FUEL TYPE: 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

Vehicle Type	Annual Motor Fuel Consumption (million gallons)	
	No Build Plan	Recommended Plan
Assuming 1980 Vehicle Efficiency Standards (19 MPG)		
Street and Highway		
Gasoline	721	688
Diesel	33	35
Subtotal	754	723
Transit (Diesel)	4	11
Total	758	734
Assuming 1985 Vehicle Efficiency Standards (27 MPG)		
Street and Highway		
Gasoline	500	480
Diesel	33	35
Subtotal	533	515
Transit (Diesel)	4	11
Total	537	526

Source: SEWRPC.

Table K-7

CHARACTERISTICS OF THE "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS WHICH RELATE TO ENERGY CONSUMPTION

Year 2000 Characteristic	No Build Plan	Recommended Plan
Automobile Availability	1,096,100	1,002,500
Internal Person Trip Production (Average Weekday)		
Automobile	5,434,700	5,127,300
Transit	160,900	335,000
Total	5,595,600	5,462,300
Vehicle Miles of Travel		
Freeway	11,340,000	12,609,000
Standard Arterial	20,060,000	17,523,000

Source: SEWRPC.

Transportation System Costs: The recommended and "no build" regional transportation plans also have an impact on the Region in terms of the necessary construction, maintenance, and operation costs of their proposed facilities and services. As shown in Table K-8, the recommended regional plan has a total system cost of $4,675,017,800, more than 50 percent greater than the total cost of the "no build" alternative. The difference in total cost is primarily a result of greater arterial street construction costs, and mass transit construction and operation costs under the recommended plan. As shown in Table K-9, the increase in mass transit capital and operation costs of the recommended plan over the "no build" plan would occur primarily in the Milwaukee urbanized area, but also in the Kenosha and Racine urbanized areas. The difference in arterial street construction costs between the recommended and "no build" plans occurs regionwide, with Milwaukee County accounting for the greatest difference, as shown in Table K-10.

Accessibility Impacts: Another important impact of the recommended and "no build" transportation plans is the accessibility which they propose to provide. Regionwide, the recommended plan provides a higher level of accessibility than the "no build" transportation plan. Total passenger-hours each day under the recommended plan in the year 2000 are 1.23 million, as compared to 1.20 million under the "no build" plan. Another indicator of the greater regionwide accessibility under the recommended plan is the greater percentage of congested transportation facilities under the "no build" plan, where 24.5 percent of the arterial system is at or above design capacity, as compared to 11 percent under the recommended plan.

Further social, economic, and environmental implications of the regional transportation plans are indicated by the impact of accessibility under each plan on subareas of the Region. Accessibility by mass transit is measured by the availability of transit service. As shown on Map K-3 and in Table K-11, the transit service area for the Milwaukee urbanized area under the recommended plan is substantially larger than the service area under the "no build" plan. More than 94 percent of the urbanized population is served by mass transit under the recommended plan, as compared to 71 percent under the "no build" plan. In the Kenosha and Racine urbanized areas, as shown on Map K-4 and in Table K-11, the area and population served by transit under each plan is nearly identical. Also shown on Maps K-3 and K-4 is the location of subareas of the urbanized areas of the Region, with above-average minority populations identified in terms of minorities and/or low family income. These areas are largely served by mass transit under either plan in all three urbanized areas. Another measure of the accessibility of the subareas of the Region is the degree to which transportation facilities operating at or above design capacity are located within these areas. As shown on Maps K-5 and K-6, street and highway congestion is more prevalent under the "no build" plan throughout the Region and in minority areas of the Region.

The subareas of the Region can also be measured for accessibility to the Region's employment opportunities, major retail land service centers, medical centers, major outdoor recreation centers, higher education facilities, and scheduled air transport airports. Table K-12 indicates the percentage of the population of the three urbanized areas of the Region that is within what is considered to be a reasonable travel time by automobile and mass transit of a minimum acceptable number of the various regional opportunities listed above. As shown in Table K-12, the recommended and "no build" plans are very similar with respect to meeting accessibility standards within the urbanized areas of the Region by both the automobile and mass transit. In the Milwaukee urbanized area, however, transit accessibility under the recommended plan is substantially improved over the "no build" plan. The improved transit accessibility under the recommended plan has a substantial impact on the level of transit service provided to minority population areas of the Milwaukee urbanized area. Specifically, the recommended plan provides substantially greater transit accessibility to employment and major retail and service centers to the low-income and racial minority populations residing within the Milwaukee urbanized area. As shown on Map K-7, nearly all of the identified low-income and racial minority population areas in the Milwaukee urbanized area are within 30 minutes by transit of 40 percent of the Milwaukee urbanized area's employment under the recommended plan. Only a small portion of these minority areas receive the same level of accessibility to Milwaukee urbanized area employment under the "no build" plan, as also shown on Map K-7. With respect to accessibility to major retail and service centers, nearly all of the identified minority areas in the Milwaukee urbanized area are within 35 minutes by transit to at least three major retail and service centers under the recommended plan, as shown on Map K-8. Only a small number of these areas receive the same level of accessibility under the "no build" plan, also shown on Map K-8. Similarly with respect to transit accessibility to scheduled air transport airports, nearly all of the Milwaukee urbanized area's minority population areas are within 60 minutes by transit of such an airport under the recommended plan; and, very few of these areas are within 60 minutes of an airport by transit under the "no build" plan, as shown on Map K-9. Both the recommended and "no build" plans, however, provide minority population areas of the Milwaukee urbanized area with similar levels of transit accessibility to medical centers and hospitals, major public outdoor recreation centers, and higher education facilities. Under both plans, almost all of the minority areas are within 40 minutes by transit of a regional medical center (or 30 minutes of a hospital or medical clinic), as shown on Map K-10; within 40 minutes by transit of a major public outdoor recreation center as shown on Map K-11; and within 40 minutes by transit of a vocational school, college, or university as shown on Map K-12.

AIR QUALITY ASSESSMENT

As described in Chapter VI of this volume, an inventory of air pollutant emissions from point, area, and line sources for the base year 1973 was prepared in order to calibrate and validate the Wisconsin Atmospheric Diffusion Model (WIS*ATMDIF) and to serve as the basis for forecasting future trends in air quality. The use of the WIS*ATMDIF model enabled forecasts of pollutant emissions for the year 2000 to be converted to ambient air pollutant concentrations and thereby assessed relative to the National Ambient Air Quality Standards (NAAQS). In this manner, two alternative land use plans and six alternative transportation plans, including the "no build" and recommended transportation plans, were evaluated as to their impact on ambient air quality within the Region in the year 2000. The results of these analyses indicated that the projected pollutant concentrations under each of the alternative plan combinations would be of such similar magnitude and spatial extent as to preclude air quality considerations from serving as a basis for preferentially selecting one plan over another. Moreover, under each of the alternative plans considered, violations of the air quality standards for particulate matter, hydrocarbons, and photochemical oxidants were forecast to occur in certain subareas within the Region, particularly in Milwaukee County.

In the following sections, the impact of the recommended land use plan and the recommended and "no build" transportation plans on regional ambient air quality in the year 2000 is examined and evaluated in terms of the NAAQS, and by comparison of the change in pollutant emissions between 1973 and 2000. Alternative and recommended strategies for the abatement of forecast violations of the NAAQS within the Region are not presented herein, but rather are documented in SEWRPC Planning Report No. 28, A Regional Air Quality Maintenance Plan for Southeastern Wisconsin.

Regional Air Pollutant Emissions: 1973-2000

Point Sources: In 1973, there were 159 facilities in the Region which emitted more than 10 tons of air pollutants annually. As shown in Table K-13, these facilities released approximately 18,000 tons of particulate matter; 192,000 tons of sulfur oxides; 21,000 tons of carbon monoxide; 48,500 tons of nitrogen oxides; and 26,000 tons of hydrocarbons into the atmosphere over the Region during 1973. By the year 2000, it is forecast that there will be 186 facilities throughout the Region emitting annually approximately 13,000 tons of particulate matter; 206,000 tons of sulfur oxides; 29,000 tons of carbon monoxide; 66,500 tons of nitrogen oxides; and 27,000 tons of hydrocarbons.

Of the five pollutant species, only particulate matter emissions from point sources were forecast to decrease between 1973 and 2000. This forecasted decrease was due primarily to the assumption that all major point sources not in compliance with federal and state emission standards in 1973 would be in compliance by January 1, 1979 as required by law. Growth in pollutant emissions from point sources between 1973 and 2000, most notably in carbon monoxide and nitrogen oxide emissions, is attributable to increased fuel use to meet the energy requirements of industrial expansion within the Region.

Table K-8

TRANSPORTATION SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION OVER THE PERIOD 1976-2000: "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

Cost Element	No Build Plan	Recommended Plan
Arterial Streets and Highways		
Construction	$ 780,197,900	$1,845,891,000
Operation and Maintenance	442,068,800	504,848,600
Subtotal	$1,222,266,700	$2,350,739,600
Nonarterial Streets		
Construction	$ 473,929,300	$ 471,756,600
Operation and Maintenance	580,209,600	579,736,600
Subtotal	$1,054,138,900	$1,051,493,200
Mass Transit		
Construction	$ 91,300,000	$ 175,533,000
Operation and Maintenance	577,101,000	1,097,252,000
Subtotal	$ 688,401,000	$1,272,785,000
Total	$2,944,806,000	$4,675,017,800

Source: SEWRPC.

Table K-9

TRANSIT SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION BY URBANIZED AREA OVER THE PERIOD 1976-2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

Urbanized Area and Transit System Cost Item	No Build Plan	Recommended Plan
Kenosha Urbanized Area		
Capital Cost	$ 2,850,000	$ 3,128,000
Operation and Maintenance Cost	23,490,000	33,096,000
Average Annual Cost	1,054,000	1,449,000
Milwaukee Urbanized Area		
Capital Cost	86,275,000	168,760,000
Operation and Maintenance Cost	532,513,000	1,029,138,000
Average Annual Cost	24,752,000	47,916,000
Racine Urbanized Area		
Capital Cost	2,175,000	3,645,000
Operation and Maintenance Cost	21,098,000	35,018,000
Average Annual Cost	931,000	1,547,000
Southeastern Wisconsin Region		
Capital Cost	91,300,000	175,533,000
Operation and Maintenance Cost	577,101,000	1,097,252,000
Average Annual Cost	$ 26,736,000	$ 50,911,000

Source: SEWRPC.

Table K-10

ARTERIAL STREET AND HIGHWAY SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION BY COUNTY OVER THE PERIOD 1976-2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

County and Cost Item	No Build Plan	Recommended Plan
Kenosha County		
Capital Cost		
Arterial	$ 49,107,500	$ 179,571,800
Nonarterial	5,897,900	5,879,900
Operation and Maintenance Cost		
Arterial	26,283,800	32,565,000
Nonarterial	42,993,400	42,993,400
Resurfacing Cost		
Arterial	19,768,100	13,949,700
Nonarterial	39,830,900	39,830,900
Total	$ 183,863,600	$ 314,790,700
Average Annual Cost	$ 7,354,500	$ 12,591,600
Milwaukee County		
Capital Cost		
Arterial	$ 104,547,300	$ 637,596,700
Nonarterial	92,938,600	92,938,600
Operation and Maintenance Cost		
Arterial	241,396,300	266,016,300
Nonarterial	290,528,800	290,528,800
Resurfacing Cost		
Arterial	123,722,300	92,142,700
Nonarterial	115,068,600	115,068,600
Total	$ 968,201,900	$1,494,291,700
Average Annual Cost	$ 38,728,100	$ 59,771,700
Ozaukee County		
Capital Cost		
Arterial	$ 26,949,600	$ 67,694,300
Nonarterial	11,265,500	11,265,500
Operation and Maintenance Cost		
Arterial	20,300,000	22,525,000
Nonarterial	28,251,200	28,251,200
Resurfacing Cost		
Arterial	18,012,900	14,837,600
Nonarterial	26,095,500	26,095,500
Total	$ 130,874,700	$ 170,669,100
Average Annual Cost	$ 5,235,000	$ 6,826,800
Racine County		
Capital Cost		
Arterial	$ 75,360,300	$ 216,507,900
Nonarterial	23,706,100	21,772,800
Operation and Maintenance Cost		
Arterial	32,978,800	42,807,000
Nonarterial	48,013,100	47,540,100
Resurfacing Cost		
Arterial	20,881,000	14,294,800
Nonarterial	25,133,200	24,893,800
Total	$ 226,072,500	$ 367,816,400
Average Annual Cost	$ 9,042,900	$ 14,712,600
Walworth County		
Capital Cost		
Arterial	$ 48,716,300	$ 96,952,300
Nonarterial	10,054,000	10,054,000
Operation and Maintenance Cost		
Arterial	29,707,500	32,455,000
Nonarterial	36,023,100	36,023,100
Resurfacing Cost		
Arterial	27,110,100	21,327,300
Nonarterial	19,161,500	19,161,500
Total	$ 170,772,500	$ 215,974,300
Average Annual Cost	$ 6,830,900	$ 8,639,000
Washington County		
Capital Cost		
Arterial	$ 57,966,100	$ 135,119,300
Nonarterial	9,534,600	9,534,600
Operation and Maintenance Cost		
Arterial	27,318,700	32,482,600
Nonarterial	34,379,600	34,379,600
Resurfacing Cost		
Arterial	22,877,500	17,214,300
Nonarterial	15,864,900	15,864,900
Total	$ 167,941,400	$ 244,596,600
Average Annual Cost	$ 6,717,600	$ 9,783,900
Waukesha County		
Capital Cost		
Arterial	$ 138,696,200	$ 310,053,900
Nonarterial	23,095,800	23,095,800
Operation and Maintenance Cost		
Arterial	64,083,700	75,997,500
Nonarterial	100,020,400	100,020,400
Resurfacing Cost		
Arterial	46,482,700	28,626,200
Nonarterial	56,300,200	56,300,200
Total	$ 428,679,000	$ 594,094,000
Average Annual Cost	$ 17,147,200	$ 23,763,700
Southeastern Wisconsin Region		
Capital Cost		
Arterial	$ 501,343,300	$1,643,497,300
Nonarterial	176,474,500	174,541,200
Operation and Maintenance Cost		
Arterial	442,068,800	504,848,600
Nonarterial	580,209,600	579,736,600
Resurfacing Cost		
Arterial	278,854,600	202,393,700
Nonarterial	297,454,800	297,215,400
Total	$2,276,405,600	$3,402,232,800
Average Annual Cost	$ 91,056,200	$ 136,089,300

Source: SEWRPC.

Table K-11

TRANSIT SERVICE CHARACTERISTICS IN THE KENOSHA, MILWAUKEE, AND RACINE URBANIZED AREAS 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

Characteristic	No Build Plan	Recommended Plan
Kenosha Urbanized Area		
Square Miles	27.9	38.7
Population	113,200	121,000
Percent of Urbanized Area Population	84.9	90.8
Milwaukee Urbanized Area		
Square Miles	221.7	436.4
Population	1,045,800	1,380,600
Percent of Urbanized Area Population	71.0	93.8
Racine Urbanized Area		
Square Miles	31.5	42.6
Population	124,800	140,500
Percent of Urbanized Area Population	82.7	93.1

Source: SEWRPC.

Line Sources: Air pollutant emissions from line sources include those emissions produced by the movement of light-duty gasoline vehicles, light-duty gasoline trucks, heavy-duty gasoline trucks, and heavy-duty diesel trucks along the regional highway, arterial, local collector, and feeder street network. Table K-14 summarizes the total estimated line source emissions for 1973 and for the year 2000 by county. Moreover, since carbon monoxide, nitrogen oxides, and hydrocarbon concentrations are determined in part by temporarily varying meteorological conditions, the pollutant emissions in Table K-14 are also presented by season.

The significant reduction in carbon monoxide, nitrogen oxides, and hydrocarbon emissions from line sources between 1973 and 2000 is directly attributable to the Federal Motor Vehicle Control Program, which places strict limitations on the quantity of emissions a mobile source may emit per mile of travel. It should be noted, however, that the line source emission forecast for the year 2000 presented herein is based on mobile source emission standards which predate the Clean Air Act Amendments of 1977. The effect of the latest revision to the Clean Air Act on ambient air quality in the year 2000 is examined in SEWRPC Planning Report No. 28.

Particulate matter and sulfur oxide emission forecasts will not be affected by any changes contained in the Clean Air Act Amendments of 1977. The reduction in particulate matter emissions between 1973 and 2000 is principally due to a federal requirement that all lead compounds be removed from gasoline by 1980. The increase in sulfur oxide emissions evident in Table K-14 is a direct result of the anticipated increase in total vehicle miles of travel. At present there are no controls on emissions of sulfur oxides from motor vehicles.

Area Sources: The area source emissions inventory is comprised of 22 separate emission categories. Sources within each category produce only small quantities of pollutant emissions individually, but when considered collectively they may contribute significantly to the regional air pollution problem. The 22 area source emission categories are listed in Table K-15 along with their estimated regional total emissions by pollutant species for 1973. As may be seen by comparing Table K-15 with Tables K-13 and K-14, area sources account for more particulate matter and sulfur oxide emissions than line sources, and more carbon monoxide emissions than point sources, when viewed on a regional basis.

Table K-12

COMPARISON OF URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO SELECTED SUBAREAS THROUGH TRAVEL ON TRANSIT AND ARTERIAL STREETS AND HIGHWAYS: 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

Urbanized Area	Anticipated 2000 Urbanized Area Population (in hundreds)	Urbanized Area Population Meeting Travel Time Standards (in hundreds)							
		By Arterial Streets No Build Plan		By Arterial Streets Recommended Plan		By Transit[g] No Build Plan		By Transit[g] Recommended Plan	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Kenosha	1,333	--	--	--	--	--	--	--	--
Employment Related[a]	--	1,333	100.0	1,333	100.0	965	72.4	1,021	76.1
Major Retail Service[b]	--	1,191	89.3	1,299	97.5	--	--	--	--
Medical Facility[c]	--	1,333	100.0	1,333	100.0	838	62.9	863	64.7
Major Park[d]	--	1,333	100.0	1,333	100.0	253	19.0	253	19.0
Higher Education Facility[e]	--	1,333	100.0	1,333	100.0	734	55.1	745	55.9
Scheduled Air Transport Airport[f]	--	1,333	100.0	1,333	100.0	--	--	--	--
Milwaukee	14,721	--	--	--	--	--	--	--	--
Employment Related	--	13,760	93.5	13,934	94.7	562	3.8	6,598	44.8
Major Retail Service	--	14,721	100.0	14,494	98.5	884	6.0	8,172	55.5
Medical Facility	--	14,721	100.0	14,721	100.0	5,885	40.0	11,390	77.4
Major Park	--	14,721	100.0	14,721	100.0	4,301	29.2	11,847	80.5
Higher Education Facility	--	14,721	100.0	14,721	100.0	6,812	46.3	11,952	81.2
Scheduled Air Transport Airport	--	14,721	100.0	14,721	100.0	1,886	12.8	8,179	55.6
Racine	1,509	--	--	--	--	--	--	--	--
Employment Related	--	1,509	100.0	1,509	100.0	941	62.4	1,061	70.3
Major Retail Service	--	1,509	100.0	1,509	100.0	--	--	--	--
Medical Facility	--	1,509	100.0	1,509	100.0	559	37.0	559	37.0
Major Park	--	1,509	100.0	1,509	100.0	248	16.4	482	31.9
Higher Education Facility	--	1,509	100.0	1,509	100.0	1,176	77.9	1,290	85.5
Scheduled Air Transport Airport	--	1,509	100.0	1,509	100.0	--	--	--	--

[a] *Standard: 30 minutes overall travel time of 40 percent of organized area employment opportunities.*

[b] *Standard: 35 minutes overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes overall travel time of a major regional medical center and/or 30 minutes overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes overall travel time of a scheduled air transport airport.*

[g] *Standard: Transit service, as defined for this measurement of accessibility, does not include park and ride transit service.*

Source: SEWRPC.

Table K-16 presents the area source emissions inventory for 1973 and forecast for 2000 for each county by season. The increase in emissions of all five pollutant species between 1973 and 2000, as evident in this table, is a result of continuing urban growth in the Region, and the fact that area sources are generally not subject to emission controls at present.

Regional Ambient Air Quality: 2000

Particulate Matter: The anticipated concentrations of particulate matter over the Region in 2000, as calculated by the Wisconsin Atmospheric Diffusion Model for the emissions forecast under the recommended land use and transportation plan, are shown on Map K-13. The results of this analysis indicate that an area of approximately 20 square miles in Milwaukee County may be expected to exceed the primary annual ambient air quality standard of 75 $\mu g/m^3$, and that an additional 77 square miles may be expected to exceed the secondary annual standard of 60 $\mu g/m^3$ in the year 2000.

The relative contribution from point, area, and line sources of particulate matter emissions to the forecast annual average concentration are shown individually on Maps K-14, K-15, and K-16, respectively. The largest particulate matter concentrations may be seen to be produced by area sources, as evidenced by Map K-15. The maximum isopleth value on this map is 60 $\mu g/m^3$ and is located in the City of Milwaukee. Area sources alone, therefore, are anticipated to cause a violation of the secondary annual standard for this pollutant species.

The maximum particulate matter concentrations due to point source emissions, 25 $\mu g/m^3$ shown on Map K-14, also occur in the City of Milwaukee. Although point sources emit a greater quantity of particulate matter emissions than area sources, point sources discharge the particulates at a much higher elevation. Being emitted from tall stacks, particulate matter emissions from point sources are dispersed over a much greater distance and through a larger volume of air before influencing the air quality at ground level.

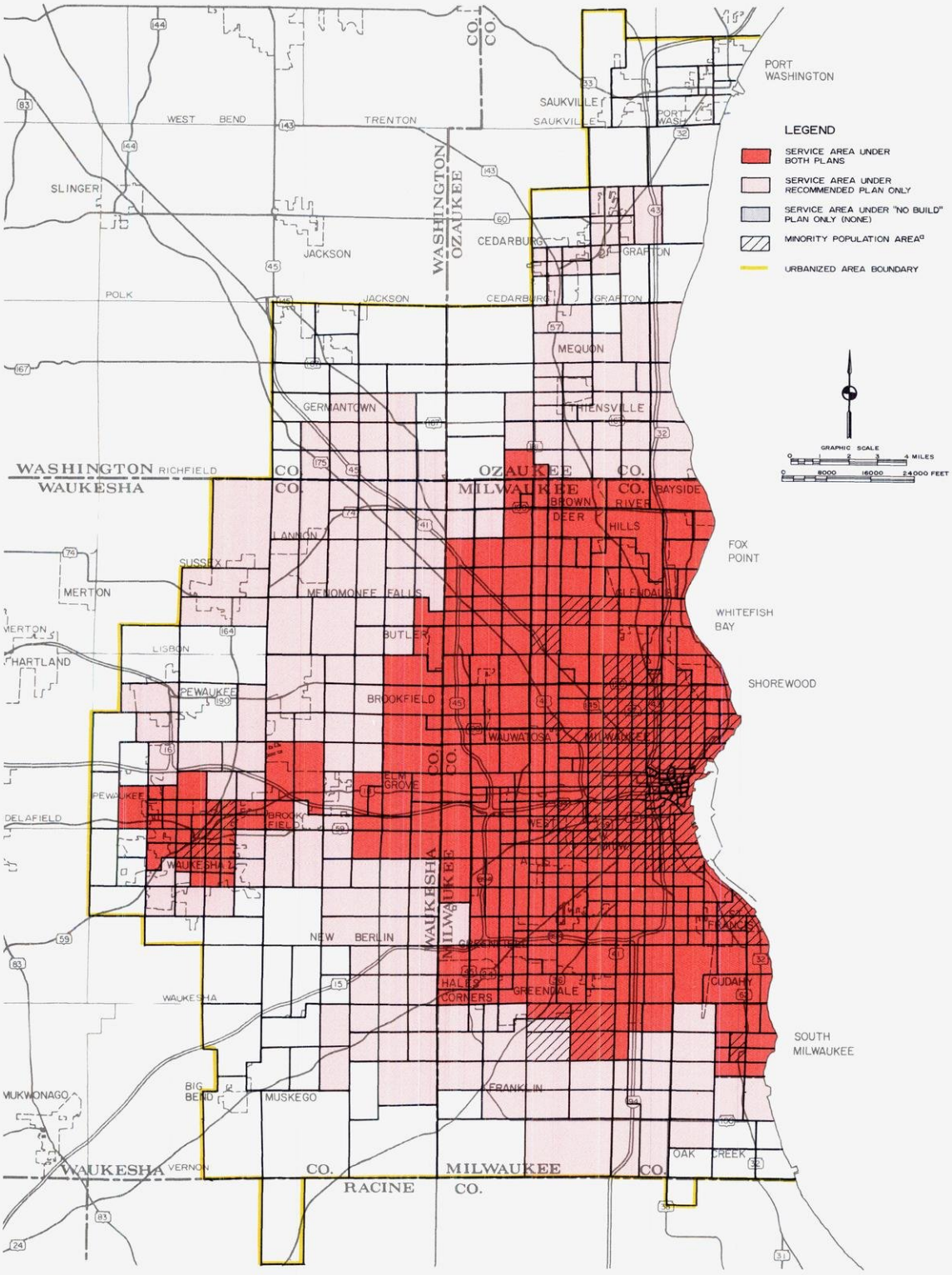
Ambient air particulate matter concentrations due to line source emissions, Map K-16, generally follow the pattern of the regional highway network. As may be seen on this map, the particulate matter isopleths extend outward from Milwaukee County along the major highway corridors. Outside of the central city area of the City of Milwaukee, line source emissions produce nearly twice the ambient air concentration of particulate matter as point source emissions.

As with the 1973 particulate matter concentration isopleth map, Map 41 in Chapter VI, an adjustment factor of 45 $\mu g/m^3$ has been added to the sum of the point, area, and line source concentrations to account for the transport of particulate matter from extraregional sources, the chemical transformation of gaseous pollutants in the atmosphere, and the naturally occurring background levels of particulate matter in the ambient air. In addition, no controls on point, area, or line sources, other than those legally in effect during 1973, have been considered in preparing the above emission and concentration analyses. The isopleth values of the particulate matter concentrations and their spatial distribution on the above maps, therefore, result from the assumption that no further controls will be placed on either regional or extraregional emission sources by the year 2000. The necessity for such controls on particulate matter emissions, however, is evident from the forecast violations of the primary and secondary annual particulate matter air quality standards seen on Map K-13. Strategies for the abatement of these excessive particulate matter levels are contained in SEWRPC Planning Report No. 28.

Carbon Monoxide: Maximum one-hour concentrations of carbon monoxide which may be expected to occur in the Region in the year 2000 under the recommended transportation plan and the most adverse of meteorological conditions are shown on Map K-17. The emissions used for this simulation modeling effort were forecast for the period of 7:00 A.M. to 8:00 A.M., the time of average maximum vehicle use, and for an average winter day when, because of the cold ambient air temperatures, the carbon monoxide emissions are produced in the greatest relative quantities. A low wind speed of two meters per second from the south was also assumed to maximize the carbon monoxide concentrations.

Map K-3

TRANSIT SERVICE AREA IN THE MILWAUKEE URBANIZED AREA UNDER THE "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS



[a] MINORITY POPULATION AREAS WERE DEFINED AS CENSUS TRACTS IN URBANIZED AREAS WHICH, IN 1970, EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF PERSONS WITH INCOMES BELOW THE FEDERALLY DEFINED POVERTY LEVEL (BASED ON INCOME AND SUCH FACTORS AS FAMILY SIZE AND NUMBER OF CHILDREN) OR EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF NONWHITE AND/OR HISPANIC PERSONS.

Source: SEWRPC.

Map K-17 indicates that the maximum one-hour carbon monoxide concentration which would be expected to occur in the Region under the recommended transportation plan is approximately 8 mg/m^3, occurring over a portion of Milwaukee County. This is well below the primary and secondary ambient air quality standard of 40 mg/m^3. The carbon monoxide concentrations from line sources only are presented on Map K-17, primarily because line sources account for 56 percent of the total forecasted carbon monoxide emissions, but also because emissions of this pollutant species from area sources are too widely dispersed across the Region, and those emissions from point sources are released too high in the atmosphere to have a significant influence on ground-level concentrations.

As a point of comparison to the recommended transportation plan, the maximum one-hour carbon monoxide concentrations in the Region under the "no build" alternative transportation plan are presented on Map K-18. As with Map K-17, the carbon monoxide emissions were calculated for the 7:00 A.M. to 8:00 A.M. period for an average winter day. Meteorological assumptions of wind speed and wind direction also were the same for both simulation modeling efforts. Under the "no build" alternative transportation plan, the maximum isopleth value of 8 mg/m^3 is still well below the ambient air quality standard of 40 mg/m^3. The area encompassed by the 8 mg/m^3 isopleth, however, has been substantially increased under the "no build" alternative as compared to the recommended plan. In fact, a corresponding increase in the areas encompassed by each of the isopleths shown is indicated by the "no build" alternative transportation plan. Although both the recommended transportation plan and the "no build" alternative plan are substantially below the ambient air quality standard for carbon monoxide for the year 2000, the recommended plan indicates somewhat lower levels of carbon monoxide pollution throughout the Region.

The maximum eight-hour carbon monoxide concentrations which may be anticipated to occur in the Region in the year 2000 under the recommended transportation plan are shown on Map K-19. Again, as with the assessment of the one-hour carbon monoxide standards, only the emissions from line sources have been found to be significant contributors to the regional levels of this pollutant species. The line source emission forecast was calculated for the period of 5:00 A.M. to 1:00 P.M. on an average winter day and the simulation modeling effort was conducted under the assumption of the most adverse meteorological conditions. As may be seen on Map K-19, even under these conditions the maximum isopleth value of carbon monoxide concentration is 3 mg/m^3, or only about 30 percent of the primary and secondary ambient air quality standards of 10 mg/m^3.

For the purpose of comparison, the maximum eight-hour carbon monoxide concentrations within the Region under the "no build" alternative transportation plan are shown on Map K-20. The "no build" alternative indicates an increase in the maximum isopleth value from 3 mg/m^3 to 4 mg/m^3, and a general increase in the area encompassed by all the isopleths shown. The recommended transportation plan, therefore, is slightly more effective than the "no build" alternative plan in reducing regional carbon monoxide levels. Since the estimated regional carbon monoxide levels are well below the primary and secondary ambient air quality standards by the year 2000, due primarily to the Federal Motor Vehicle Emissions Program, no long-term maintenance strategies need to be addressed. Existing violations of the carbon monoxide air quality standards, however, require that short-term strategies be developed to attain the standards in as expeditious a manner as possible. Such short-term attainment strategies are presented in SEWRPC Planning Report No. 28.

Nitrogen Oxides, Hydrocarbons, and Photochemical Oxidants: Map K-21 indicates the maximum three-hour—6:00 A.M. to 9:00 A.M.—nitrogen oxide concentrations anticipated to occur in the Region in the year 2000 under the recommended transportation plan. The basis of this simulation modeling effort was the line source emission forecast for the 6:00 A.M. to 9:00 A.M. period on an average summer day with low speed—two meters per second—from the southerly direction. Although there is presently no three-hour ambient air quality standard for nitrogen oxides, this map is significant because of the interrelationship between early morning niteogen oxide and hydrocarbon concentrations and the formation of photochemical oxidants.

There is, however, an annual average nitrogen dioxide air quality standard established at 100 µg/m^3 for both the primary and secondary levels. Comparison of computer simulation modeling results of nitrogen oxide concentrations in 1973 to available air quality monitoring data has indicated that nitrogen dioxide comprises about 60 percent of the total estimated nitrogen oxides in the ambient air. Assuming that this relationship holds true for the year 2000, then the maximum nitrogen dioxide concentration in the Region for the three-hour period—6:00 A.M. to 9:00 A.M.—would be 60 percent of the maximum nitrogen oxide isopleth. As may be seen on Map K-21, the maximum nitrogen oxide isopleth, located in Milwaukee County, is 100 µg/m^3. The corresponding nitrogen dioxide concentrations would, therefore, be approximately 60 µg/m^3. Since a maximum three-hour nitrogen dioxide concentration of 60 µg/m^3 is well below the annual standard of 100 ug/m^3, it is improbable that the nitrogen dioxide levels in the Region would exceed the annual standard.

It is important to note that the nitrogen oxide isopleths presented on Map K-21, were simulated under the assumption that no photochemical reactions were taking place. At the present time, there is no computer simulation model available which can adequately account for the chemistry and transport of reactive pollutants. Map K-21, therefore, represents a generalized depiction of nitrogen oxide concentrations as they would be dispersed spatially in the assumed absence of chemical transformations.

Map K-22 represents the maximum three-hour—6:00 A.M. to 9:00 A.M.—nitrogen oxide concentrations in the Region under the same assumptions as Map K-21, except that the line source emissions were forecasted for the "no build" alternative transportation plan. Significant differences are evident in comparing Maps K-21 and K-22. Under the "no build" alternative plan there are two areas in Milwaukee County which have a maximum nitrogen oxide value of 100 ug/m^3—one located near the Zoo Interchange and another near the Marquette Interchange. Under the recommended transportation plan, only a single maximum isopleth of 100 ug/m^3 occurs, and it is located near the Marquette Interchange. Under the recommended plan, however, the area encompassed by the 100 mg/m^3 nitrogen oxide isopleth is substantially greater than under the "no build" plan. Also evident in the recommended plan is the effect of USH 12 Freeway which bisects Walworth County. This facility was not included in the "no build" alternative plan.

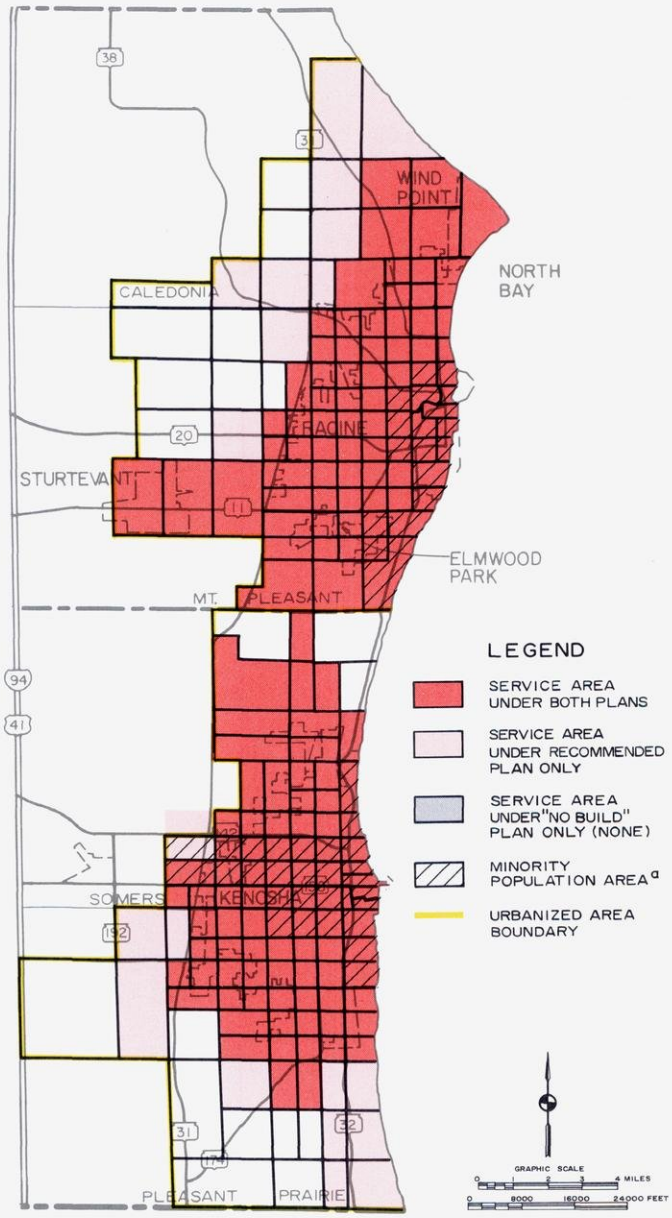
Notwithstanding their apparent differences, both the recommended transportation plan and the "no build" alternative plan represent significant decreases in the ambient air nitrogen oxide concentrations over the Region in the year 2000 as compared with 1973. This reduction is attributable directly to the Federal Motor Vehicle Emissions Control Program. More significantly, based on the maximum nitrogen oxide concentrations forecast for the year 2000 and the relationship between nitrogen dioxide to total nitrogen oxides, it does not appear tht the health-related nitrogen dioxide air quality standard of 100 µg/m^3 will be exceeded anywhere in the Region under the recommended plan.

Maximum three-hour—6:00 A.M. to 9:00 A.M.—hydrocarbon concentrations over the Region in the year 2000 under the recommended land use plan and the recommended transportation plan are shown on Map K-23. These concentrations result from computer-simulating the forecasted hydrocarbon emissions during the three-hour period for an average summer day under adverse meteorological conditions. As with nitrogen oxides, no photochemical reactions are assumed to be taking place. This map, and the other hydrocarbon isopleth maps to follow, must, therefore, be viewed as generalized depictions of the spatial distribution of hydrocarbon concentrations within the Region in the year 2000.

Map K-23 indicates that the three-hour hydrocarbon standard of 160 µg/m^3 for both the primary and secondary levels will be exceeded in a large part of Milwaukee County, and also in smaller areas of Washington and Waukesha Counties in the year 2000. Moreover, since hydrocarbons are capable of long-range transport, it may be assumed that those areas in the Region which are indicated on this isopleth map to be below the standard will, on occasion, surpass the established guideline level of 160 µg/m^3 due to the migration of this pollutant into the Region from external sources.

Map K-4

TRANSIT SERVICE AREA IN THE KENOSHA AND RACINE URBANIZED AREAS UNDER THE "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

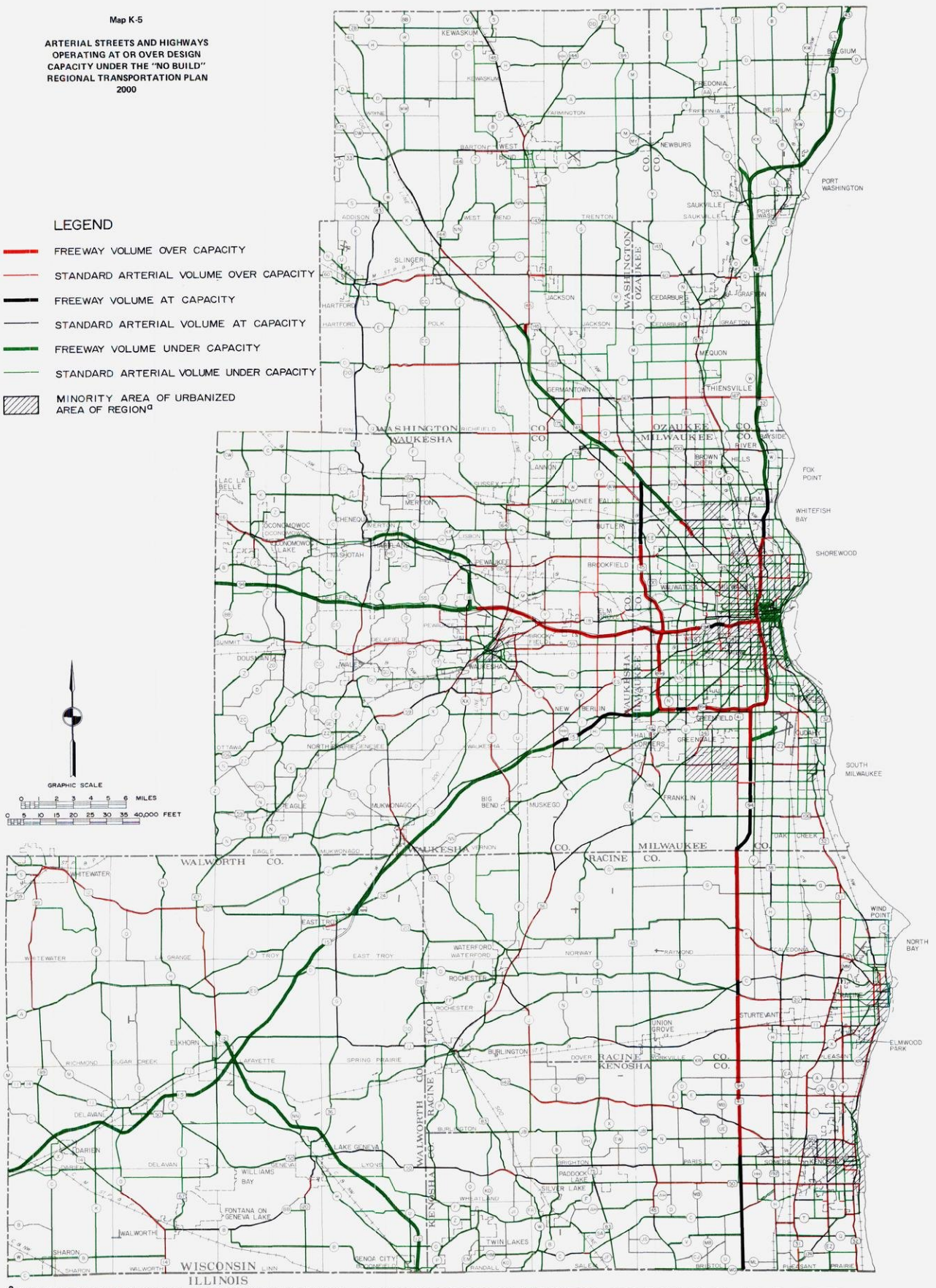


[a] MINORITY POPULATION AREAS WERE DEFINED AS CENSUS TRACTS IN URBANIZED AREAS WHICH, IN 1970, EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF PERSONS WITH INCOMES BELOW THE FEDERALLY DEFINED POVERTY LEVEL (BASED ON INCOME AND SUCH FACTORS AS FAMILY SIZE AND NUMBER OF CHILDREN) OR EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF NON-WHITE AND/OR HISPANIC PERSONS.

Source: SEWRPC.

Map K-5

ARTERIAL STREETS AND HIGHWAYS OPERATING AT OR OVER DESIGN CAPACITY UNDER THE "NO BUILD" REGIONAL TRANSPORTATION PLAN 2000

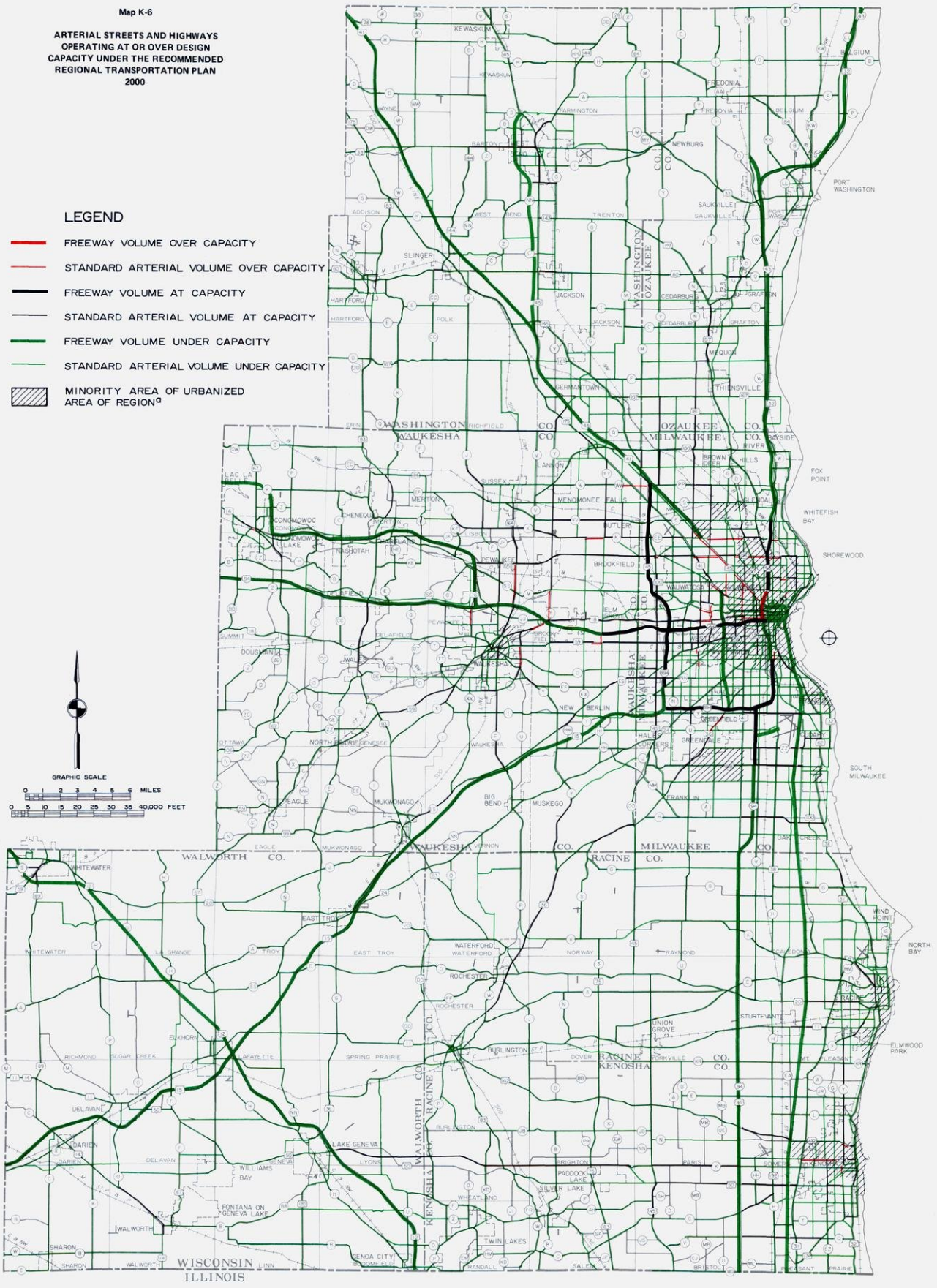


[a] MINORITY POPULATION AREAS WERE DEFINED AS CENSUS TRACTS IN URBANIZED AREAS WHICH, IN 1970, EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF PERSONS WITH INCOMES BELOW THE FEDERALLY DEFINED POVERTY LEVEL (BASED ON INCOME AND SUCH FACTORS AS FAMILY SIZE AND NUMBER OF CHILDREN) OR EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF NONWHITE AND/OR HISPANIC PERSONS.

Source: SEWRPC.

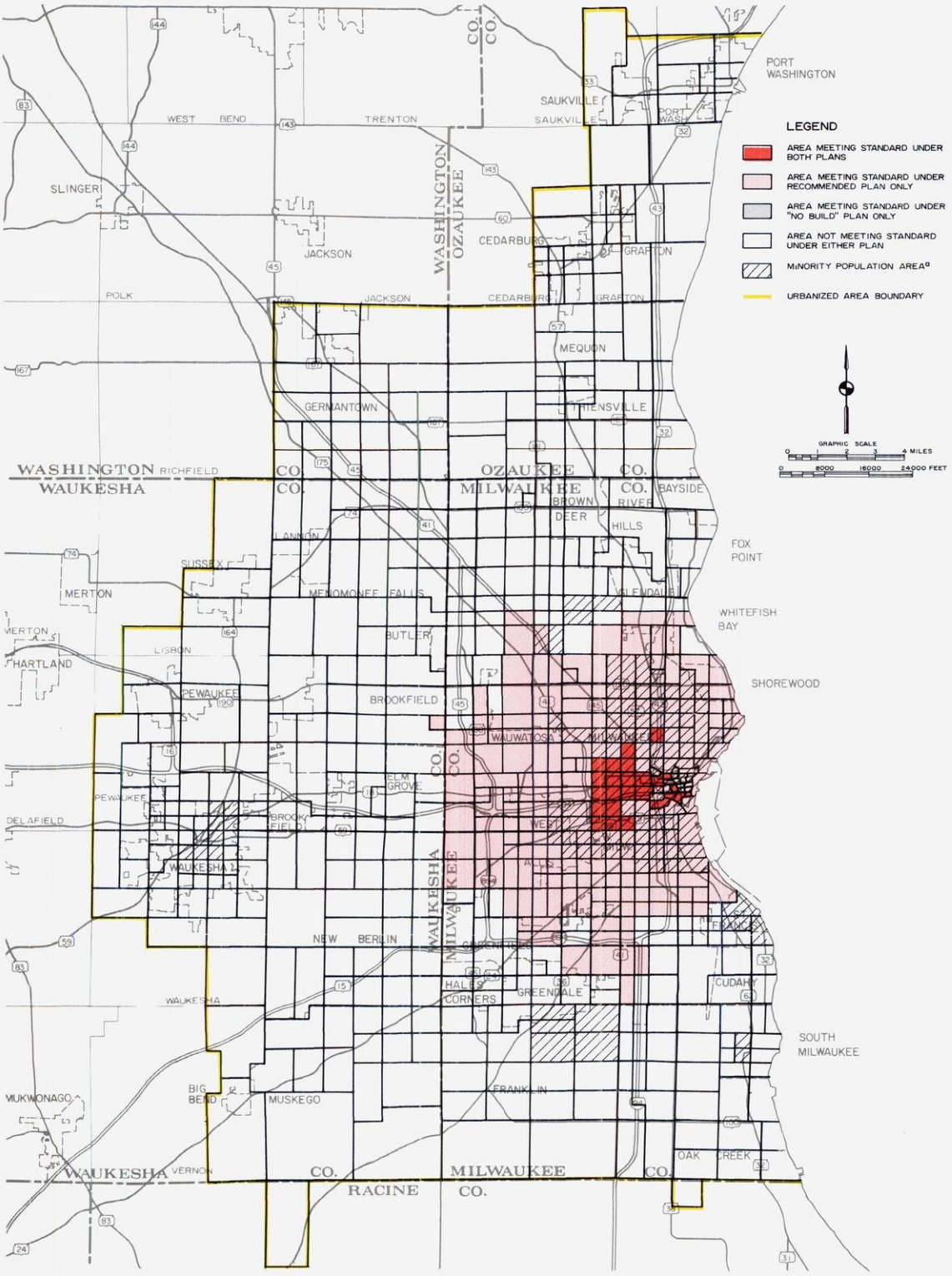
Map K-6

ARTERIAL STREETS AND HIGHWAYS OPERATING AT OR OVER DESIGN CAPACITY UNDER THE RECOMMENDED REGIONAL TRANSPORTATION PLAN 2000



Map K-7

MINORITY POPULATION AREAS MEETING TRANSIT TRAVEL TIME STANDARD OF 30 MINUTES TO 40 PERCENT OF THE EMPLOYMENT OPPORTUNITIES IN THE MILWAUKEE URBANIZED AREA UNDER THE YEAR 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

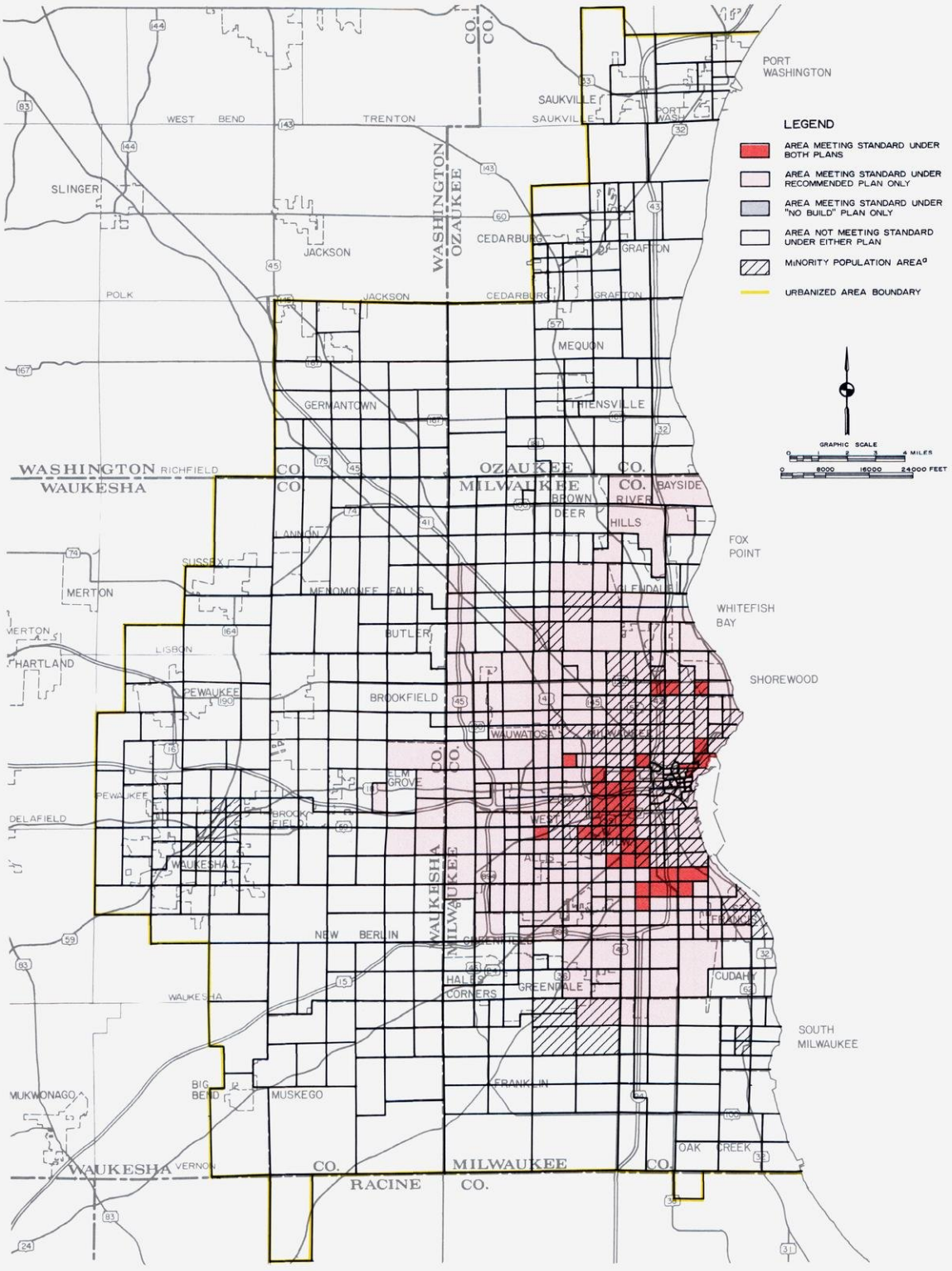


[a] MINORITY POPULATION AREAS WERE DEFINED AS CENSUS TRACTS IN URBANIZED AREAS WHICH, IN 1970, EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF PERSONS WITH INCOMES BELOW THE FEDERALLY DEFINED POVERTY LEVEL (BASED ON INCOME AND SUCH FACTORS AS FAMILY SIZE AND NUMBER OF CHILDREN) OR EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF NONWHITE AND/OR HISPANIC PERSONS.

Source: SEWRPC.

Map K-8

MINORITY POPULATION AREAS MEETING TRANSIT TRAVEL TIME STANDARD OF 35 MINUTES TO THREE MAJOR RETAIL AND SERVICE CENTERS IN THE MILWAUKEE URBANIZED AREA UNDER THE YEAR 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

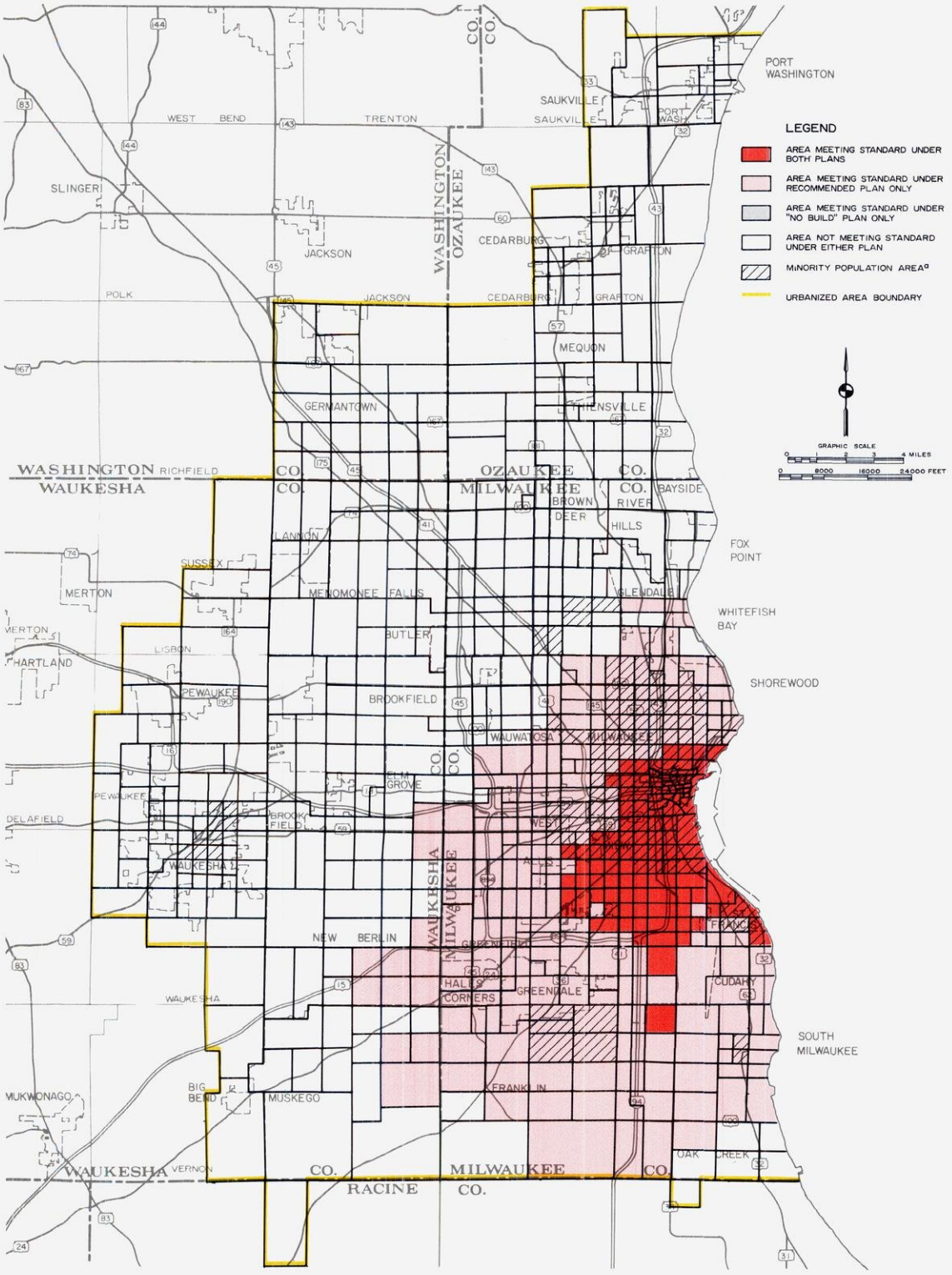


[a] MINORITY POPULATION AREAS WERE DEFINED AS CENSUS TRACTS IN URBANIZED AREAS WHICH, IN 1970, EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF PERSONS WITH INCOMES BELOW THE FEDERALLY DEFINED POVERTY LEVEL (BASED ON INCOME AND SUCH FACTORS AS FAMILY SIZE AND NUMBER OF CHILDREN) OR EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF NONWHITE AND/OR HISPANIC PERSONS.

Source: SEWRPC.

Map K-9

MINORITY POPULATION AREAS MEETING TRANSIT TRAVEL TIME STANDARD OF 60 MINUTES TO A SCHEDULED AIR TRANSPORT AIRPORT IN THE MILWAUKEE URBANIZED AREA UNDER THE YEAR 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS



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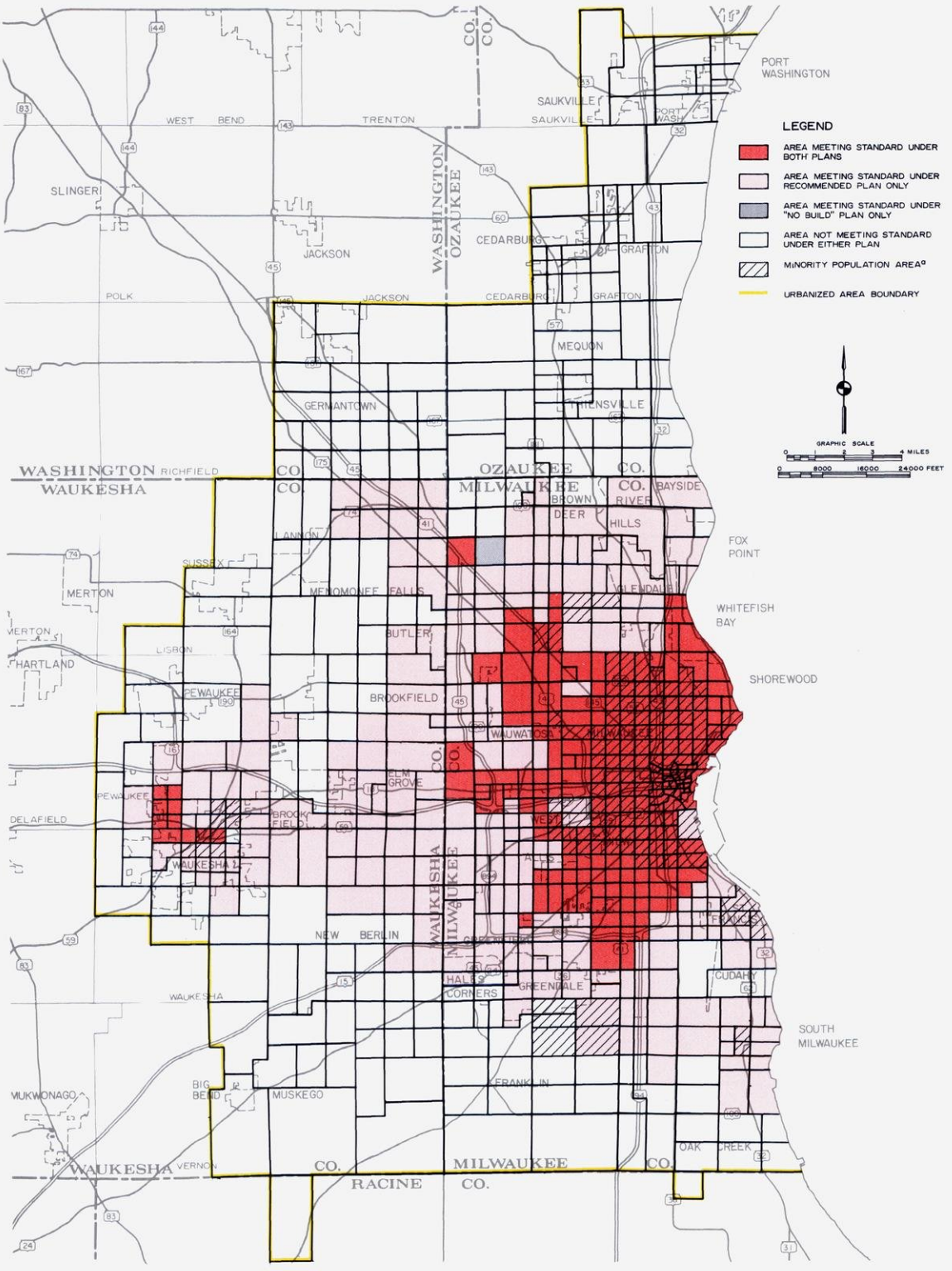
Source: SEWRPC.

Map K-10

MINORITY POPULATION AREAS MEETING TRANSIT TRAVEL TIME STANDARD OF 40 MINUTES TO A MAJOR MEDICAL CENTER OR 30 MINUTES TO A HOSPITAL/MEDICAL CLINIC IN THE MILWAUKEE URBANIZED AREA UNDER THE YEAR 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS



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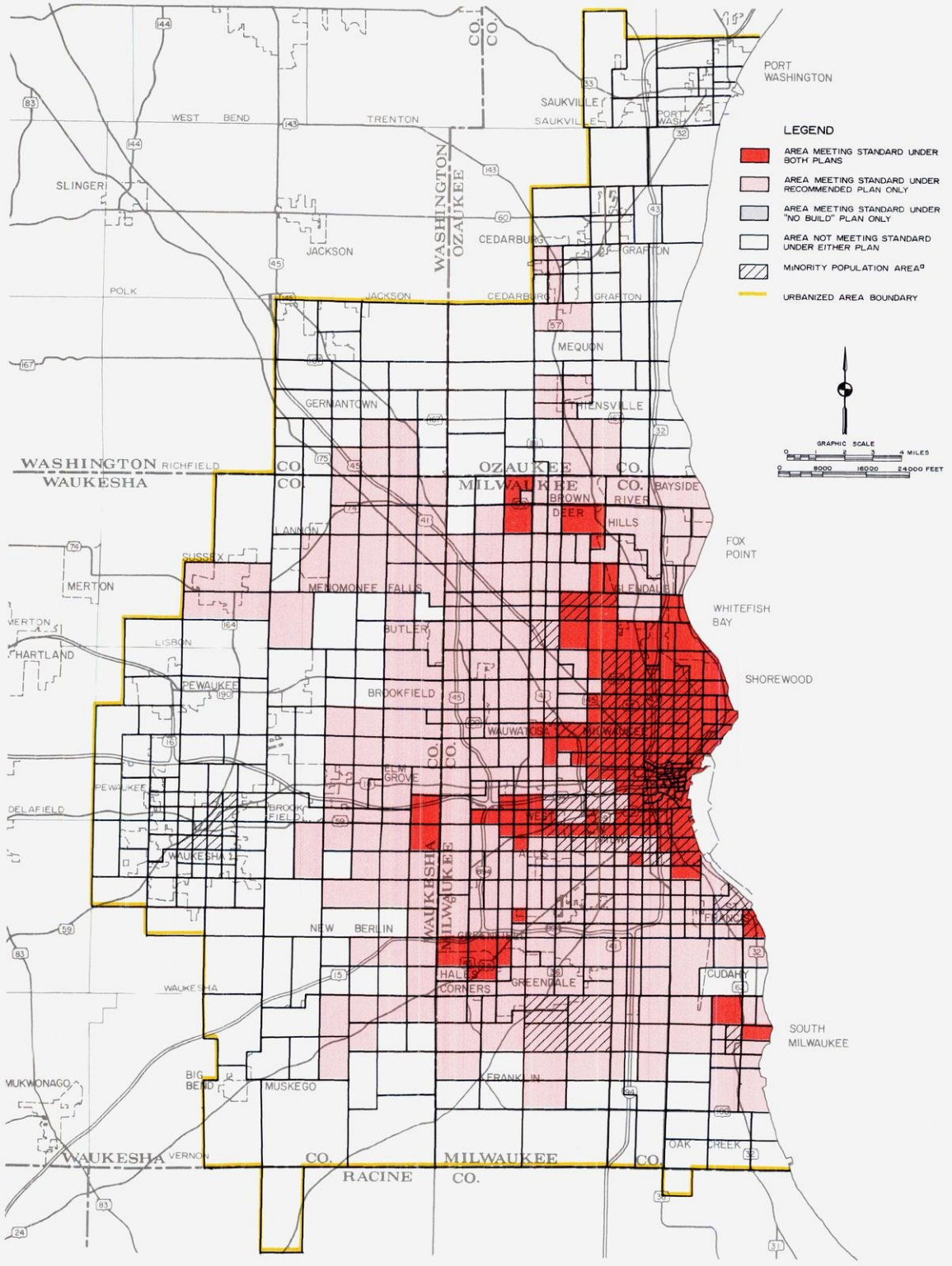
Source: SEWRPC.

Map K-11

MINORITY POPULATION AREAS MEETING TRANSIT TRAVEL TIME STANDARD OF 40 MINUTES TO MAJOR PUBLIC OUTDOOR RECREATION CENTER IN THE MILWAUKEE URBANIZED AREA UNDER THE YEAR 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS

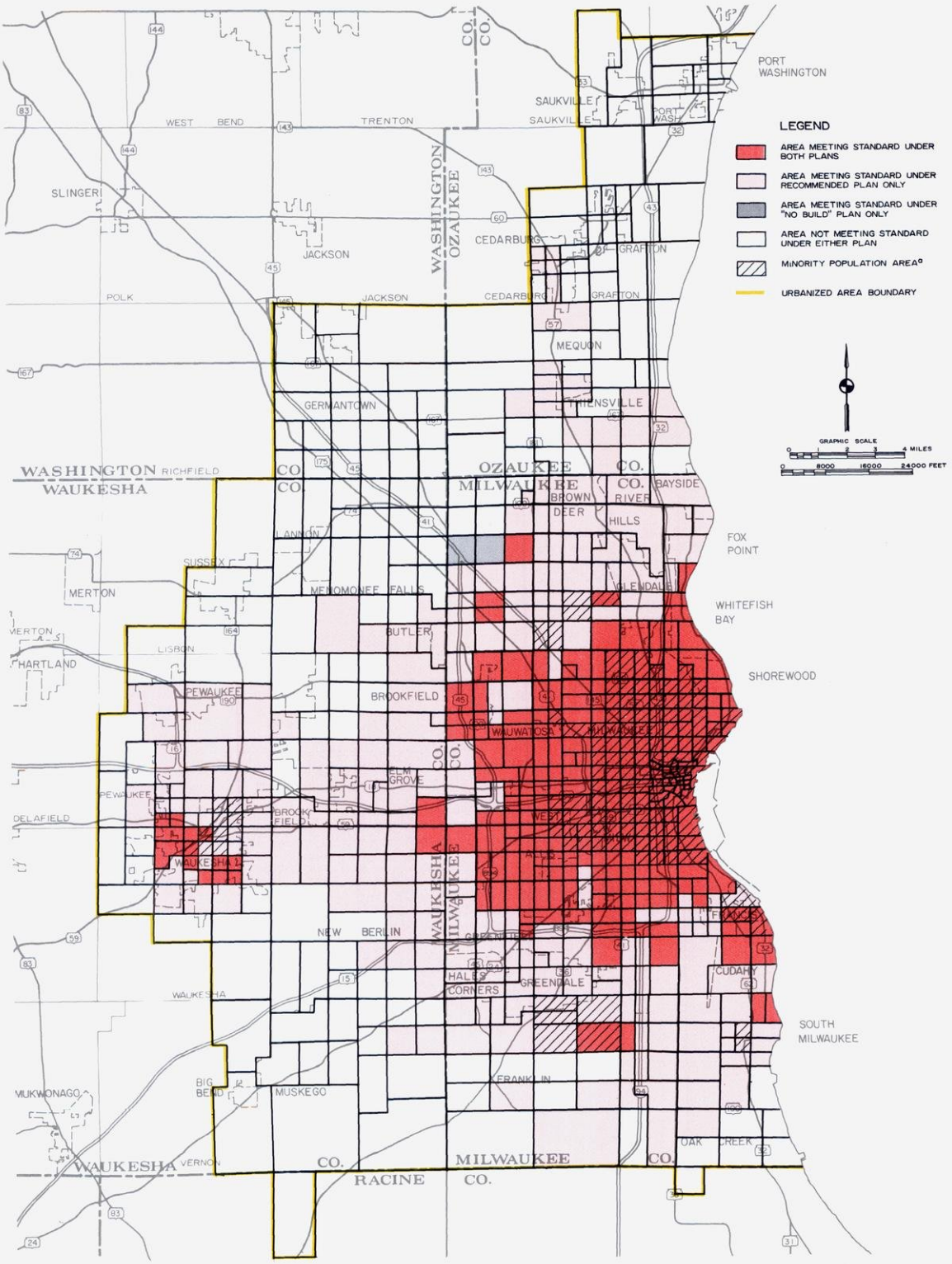


[a] MINORITY POPULATION AREAS WERE DEFINED AS CENSUS TRACTS IN URBANIZED AREAS WHICH, IN 1970, EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF PERSONS WITH INCOMES BELOW THE FEDERALLY DEFINED POVERTY LEVEL (BASED ON INCOME AND SUCH FACTORS AS FAMILY SIZE AND NUMBER OF CHILDREN) OR EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF NONWHITE AND/OR HISPANIC PERSONS.

Source: SEWRPC.

Map K-12

MINORITY POPULATION AREAS MEETING TRANSIT TRAVEL TIME STANDARD OF 40 MINUTES TO A VOCATIONAL SCHOOL, COLLEGE, OR UNIVERSITY IN THE MILWAUKEE URBANIZED AREA UNDER THE YEAR 2000 "NO BUILD" AND RECOMMENDED REGIONAL TRANSPORTATION PLANS



[a] MINORITY POPULATION AREAS WERE DEFINED AS CENSUS TRACTS IN URBANIZED AREAS WHICH, IN 1970, EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF PERSONS WITH INCOMES BELOW THE FEDERALLY DEFINED POVERTY LEVEL (BASED ON INCOME AND SUCH FACTORS AS FAMILY SIZE AND NUMBER OF CHILDREN) OR EXCEEDED THEIR URBANIZED AREA AVERAGE OF THE PERCENTAGE OF NONWHITE AND/OR HISPANIC PERSONS.

Source: SEWRPC.

Table K-13

INVENTORY AND FORECAST AIR POLLUTANT EMISSIONS FROM POINT SOURCES IN THE REGION BY COUNTY: 1973 AND 2000

County	Pollutants (in tons)														
	Particulate Matter			Sulfur Oxides			Carbon Monoxide			Nitrogen Oxides			Hydrocarbons		
	1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change
Kenosha	1,193	151	- 87.34	545	429	- 21.28	37	40	8.11	401	351	- 12.47	1,542	1,891	22.63
Milwaukee	15,360	10,770	- 29.88	147,286	141,642	- 3.83	9,378	12,197	30.06	40,448	39,138	- 3.24	21,680	20,785	- 4.13
Ozaukee	709	606	- 14.53	43,756	43,747	- 0.02	678	420	- 38.05	6,260	9,012	43.96	371	585	57.68
Racine	207	999	382.61	202	19,233	9,421.29	6,408	9,834	53.46	906	15,157	1,572.96	1,156	1,793	55.10
Walworth	217	132	- 39.17	11	16	45.45	1,669	614	- 63.21	187	265	41.71	3	4	33.33
Washington	32	129	303.13	32	982	2,968.75	259	369	42.47	210	2,497	1,089.05	563	751	33.39
Waukesha	255	374	46.67	71	62	12.68	2,366	5,834	146.58	94	84	- 10.64	719	1,041	44.78
Region	17,973	13,161	- 26.77	191,903	206,111	7.40	20,795	29,308	40.94	48,506	66,504	37.10	26,034	26,850	3.13

Source: Wisconsin Department of Natural Resources and SEWRPC.

Table K-14

INVENTORY AND FORECAST AIR POLLUTANT EMISSIONS FROM LINE SOURCES IN THE REGION BY COUNTY BY SEASON: 1973 AND 2000

County	Season	Pollutants (in tons)								
		Particulate Matter			Sulfur Dioxide			Carbon Monoxide		
		1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change
Kenosha	Winter	94.00	101.79	8.29	39.45	69.57	76.35	10,375.18	3,718.03	- 64.16
	Spring	94.00	101.79	8.29	39.45	69.57	76.35	8,971.23	2,794.98	
	Summer	94.00	101.79	8.29	39.45	69.57	76.35	6,915.29	1,656.93	- 76.04
	Fall	94.00	101.79	8.29	39.45	69.57	76.35	8,306.56	2,579.98	- 68.94
	Annual	376.00	407.16	8.29	157.80	278.28	76.35	34,568.26	10,749.92	- 68.90
Milwaukee	Winter	592.00	421.13	- 28.86	185.95	256.42	37.90	80,551.55	21,311.50	- 73.54
	Spring	592.00	421.13	- 28.86	185.95	256.42	37.90	69,753.97	16,327.79	- 76.59
	Summer	592.00	421.13	- 28.86	185.95	256.42	37.90	53,819.52	10,088.09	- 81.26
	Fall	592.00	421.13	- 28.86	185.95	256.42	37.90	64,550.73	15,071.80	- 76.65
	Annual	2,368.00	1,684.52	- 28.86	743.80	1,025.68	37.90	268,675.77	62,799.18	- 76.63
Ozaukee	Winter	47.16	54.85	16.31	18.25	39.27	115.17	4,758.44	1,828.27	- 61.58
	Spring	47.16	54.85	16.31	18.25	39.27	115.17	4,118.22	1,382.22	- 66.44
	Summer	47.16	54.85	16.31	18.25	39.27	115.17	3,176.90	829.85	- 73.88
	Fall	47.16	54.85	16.31	18.25	39.27	115.17	3,812.31	1,275.90	- 66.53
	Annual	188.64	219.40	16.31	73.00	157.08	115.17	15,865.87	5,316.24	- 66.49
Racine	Winter	106.56	105.63	- 0.87	40.38	66.35	64.31	12,841.56	4,253.52	- 66.88
	Spring	106.56	105.63	- 0.87	40.38	66.35	64.31	11,105.20	3,257.98	- 70.66
	Summer	106.56	105.63	- 0.87	40.38	66.35	64.31	8,650.74	2,011.83	- 76.74
	Fall	106.56	105.63	- 0.87	40.38	66.35	64.31	10,281.88	3,007.37	- 70.75
	Annual	426.24	422.52	- 0.87	161.52	265.40	64.31	42,879.38	12,530.70	- 70.78
Walworth	Winter	55.94	97.56	74.4	20.27	75.22	271.09	5,968.25	2,959.13	- 50.42
	Spring	55.94	97.56	74.4	20.27	75.22	271.09	5,174.94	2,258.27	- 56.36
	Summer	55.94	97.56	74.4	20.27	75.22	271.09	4,013.98	1,383.70	- 65.53
	Fall	55.94	97.56	74.4	20.27	75.22	271.09	4,799.93	2,084.56	- 56.57
	Annual	223.76	390.24	74.4	81.08	300.88	271.09	19,957.10	8,685.66	- 56.48
Washington	Winter	70.13	77.02	9.82	31.21	49.91	59.92	6,438.30	2,828.64	- 56.07
	Spring	70.13	77.02	9.82	31.21	49.91	59.92	5,578.90	2,235.29	- 59.93
	Summer	70.13	77.02	9.82	31.21	49.91	59.92	4,316.40	1,470.00	- 65.94
	Fall	70.13	77.02	9.82	31.21	49.91	59.92	5,169.06	2,063.55	- 60.08
	Annual	280.52	308.08	9.82	124.84	199.64	59.92	21,502.66	8,597.28	- 60.02
Waukesha	Winter	199.29	199.49	0.10	65.78	110.66	68.23	22,080.39	8,905.60	- 59.67
	Spring	199.29	199.49	0.10	65.78	110.66	68.23	19,133.99	7,015.86	- 63.33
	Summer	199.29	199.49	0.10	65.78	110.66	68.23	14,807.42	4,586.43	- 69.03
	Fall	199.29	199.49	0.10	65.78	110.66	68.23	17,730.24	6,476.17	- 63.47
	Annual	797.16	797.96	0.10	263.12	442.64	68.23	73,752.04	26,984.06	- 63.41
Region	Annual	4,660.32	4,229.88	9.24	1,605.16	2,669.60	66.31	477,201.08	135,663.04	- 71.57

Table K-14 (continued)

County	Season	Pollutants (in tons)					
		Nitrogen Dioxide			Hydrocarbons		
		1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change
Kenosha	Winter	387.68	569.34	46.86	264.95	216.06	- 18.45
	Spring	491.67	609.52	23.97	352.64	287.26	- 18.54
	Summer	198.80	239.34	20.39	821.51	798.44	- 2.81
	Fall	251.83	364.78	44.85	299.99	264.90	- 11.70
	Annual	1,329.97	1,782.30	34.01	1,739.09	1,623.84	- 12.38
Milwaukee	Winter	3,190.54	4,670.37	46.38	2,090.12	2,294.95	9.80
	Spring	2,456.41	3,583.78	45.90	2,390.12	2,770.55	15.92
	Summer	1,254.95	2,128.79	69.63	4,404.68	5,604.28	27.23
	Fall	1,734.06	2,985.40	72.16	2,036.90	2,223.43	9.16
	Annual	8,635.36	13,366.23	54.78	10,921.81	12,875.07	17.88
Ozaukee	Winter	207.57	315.14	51.82	133.68	143.00	6.97
	Spring	367.89	467.75	27.14	198.84	206.05	3.63
	Summer	146.62	202.49	38.11	396.17	489.04	23.44
	Fall	152.69	249.09	63.13	146.97	165.17	12.38
	Annual	874.82	1,234.12	41.07	875.66	978.17	11.71
Racine	Winter	572.16	791.17	38.28	347.98	289.30	- 16.86
	Spring	750.51	875.41	16.64	478.42	387.56	- 18.99
	Summer	291.62	340.74	16.84	1,218.23	1,160.38	- 4.75
	Fall	357.43	489.35	36.91	414.42	374.15	- 9.72
	Annual	1,971.60	2,495.70	26.58	2,459.05	2,150.71	- 12.54
Walworth	Winter	256.64	740.95	188.71	172.66	167.24	- 3.14
	Spring	617.09	971.70	57.46	326.86	286.86	- 12.38
	Summer	252.98	357.78	41.43	1,068.76	1,010.36	- 5.46
	Fall	259.11	516.52	99.34	303.25	298.40	- 1.60
	Annual	1,385.81	2,586.33	86.63	1,871.53	1,723.44	- 7.91
Washington	Winter	321.44	464.65	44.55	181.44	198.01	9.13
	Spring	662.71	761.74	14.93	321.00	306.39	- 4.55
	Summer	259.30	301.59	16.31	922.77	996.36	7.97
	Fall	309.98	389.09	25.58	280.37	306.76	9.41
	Annual	1,553.43	1,916.21	23.35	1,705.58	1,752.44	2.75
Waukesha	Winter	735.15	1,115.49	51.74	543.30	496.68	- 8.58
	Spring	851.12	1,052.55	23.67	775.62	728.87	- 6.03
	Summer	332.58	412.71	24.09	3,100.70	3,277.51	5.70
	Fall	427.68	658.61	54.00	877.27	855.63	- 2.47
	Annual	2,346.53	3,237.69	37.98	5,296.89	5,254.52	- 0.80
Region	Annual	18,097.52	26,618.58	47.08	24,869.61	26,258.19	5.58

Table K-14

Table K-14 (continued)

County	Season	Pollutants (in tons)					
		Nitrogen Dioxide			Hydrocarbons		
		1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change
Kenosha	Winter	996.95	723.99	- 27.38	1,797.37	360.41	- 79.95
	Spring	923.47	722.12	- 21.80	1,552.57	295.29	- 80.98
	Summer	847.95	664.71	- 21.61	1,180.98	207.46	- 82.43
	Fall	921.03	666.58	- 27.63	1,441.31	272.58	- 81.09
	Annual	3,689.40	2,777.40	- 24.72	5,972.23	1,135.74	- 80.98
Milwaukee	Winter	5,878.50	2,785.85	- 52.61	12,881.91	1,850.18	- 85.64
	Spring	5,445.38	2,765.13	- 49.22	11,138.36	1,526.81	- 86.29
	Summer	5,002.00	2,531.70	- 49.39	8,496.30	1,085.99	- 87.22
	Fall	5,433.19	2,552.42	- 53.02	10,334.67	1,409.36	- 86.36
	Annual	21,759.07	10,635.10	- 51.12	42,851.24	5,872.34	- 86.30
Ozaukee	Winter	503.50	404.95	- 19.57	784.62	180.85	- 76.95
	Spring	466.36	405.58	- 13.03	678.85	149.28	- 78.01
	Summer	428.43	375.01	- 12.47	518.66	106.23	- 79.52
	Fall	465.42	374.38	- 19.56	629.10	137.80	- 78.10
	Annual	1,863.71	1,559.92	- 16.30	2,611.23	574.16	- 78.01
Racine	Winter	1,102.68	728.18	- 33.96	2,145.73	397.99	- 81.45
	Spring	1,021.47	724.97	- 29.04	1,853.95	328.24	- 82.30
	Summer	937.77	665.99	- 28.98	1,411.29	233.25	- 83.47
	Fall	1,018.51	669.20	- 34.30	1,720.77	303.00	- 82.39
	Annual	4,080.43	2,788.34	- 31.67	7,131.74	1,262.48	- 82.30
Walworth	Winter	588.84	787.01	33.65	986.39	296.64	- 69.93
	Spring	545.79	790.98	44.92	855.75	248.26	- 70.99
	Summer	501.34	734.11	46.43	657.79	180.79	- 72.52
	Fall	544.11	730.14	34.19	795.59	229.17	- 71.19
	Annual	2,180.08	3,042.24	39.55	3,295.52	954.86	- 71.03
Washington	Winter	770.72	582.82	- 24.38	1,051.58	270.41	- 74.29
	Spring	714.06	583.86	- 18.23	911.54	228.36	- 74.95
	Summer	656.04	539.99	- 17.69	699.60	168.75	- 75.88
	Fall	712.45	538.95	- 24.35	846.30	210.80	- 75.09
	Annual	2,853.27	2,245.62	- 21.30	3,509.02	878.32	- 74.97
Waukesha	Winter	2,060.98	1,392.72	- 32.42	3,701.53	811.25	- 78.08
	Spring	1,909.56	1,382.34	- 27.61	3,206.18	678.06	- 78.85
	Summer	1,754.08	1,265.63	- 27.85	2,455.64	492.72	- 79.94
	Fall	1,904.74	1,276.01	- 33.00	2,977.70	625.91	- 78.98
	Annual	7,629.36	5,316.70	- 30.31	12,341.05	2,607.94	- 78.87
Region	Annual	44,055.32	28,365.32	- 35.61	77,712.03	13,285.84	- 82.90

Source: Southeastern Wisconsin Regional Planning Commission.

Table K-15

AIR POLLUTANT EMISSIONS FROM AREA SOURCES IN THE REGION BY SOURCE CATEGORY: 1973

Source Category	Particulate Matter	Sulfur Oxides	Carbon Monoxide	Nitrogen Oxides	Hydrocarbons
Agricultural Equipment	578.32	392.98	19,787.20	4,505.81	1,527.27
Agricultural Tilling	59.46	--	--	--	--
Aircraft Operations	61.92	59.20	6,429.36	518.56	929.32
Commercial Institutional Fuel Use	1,672.81	10,344.41	2,307.33	4,693.10	678.29
Dry Cleaning Operations	--	--	--	--	2,410.01
Forest Wildfires	22.26	--	176.86	5.04	30.36
Gasoline Marketing	--	--	--	--	4,931.06
General Utility Engines	178.36	17.38	14,669.37	73.83	5,690.47
Incineration	353.05	52.13	263.66	100.80	186.18
Industrial Fuel Use	264.87	843.76	362.97	3,056.22	63.91
Power Boat Operations	--	40.18	20,506.57	41.01	6,972.22
Travel by Railroad Engines	20.67	47.08	183.17	300.21	139.30
Railroad Yard Work	62.93	139.15	705.35	1,044.74	403.50
Residential Fuel Use	1,326.85	4,079.19	1,429.84	3,495.18	614.76
Rock Handling and Storage	299.39	--	--	--	--
Small Point Sources	128.97	43.61	19.50	165.31	101.20
Snowmobile Operations	7.63	0.24	267.23	2.73	172.14
Travel on Unpaved Roads	327.00	--	--	--	--
Unpaved Auto Lots	86.38	--	--	--	--
Unpaved Truck Lots	77.00	--	--	--	--
Untreated Aggregate Storage Piles	333.00	--	--	--	--
Vessels	9.50	24.06	36.51	94.98	19.62
Total	5,870.37	16,083.37	67,144.92	18,097.52	24,869.61

Source: SEWRPC.

As may be seen on Map K-24, area sources are a major contributor to the forecasted regional hydrocarbon levels, particularly in rural areas. Although hydrocarbon concentrations from area sources alone are not forecast to exceed the standard, the maximum isopleth value shown on Map K-24 is approximately 78 percent of the 160 $\mu g/m^3$ primary and secondary air quality standard.

Forecast regional hydrocarbon concentrations from point sources, presented on Map K-25, are particularly significant in Milwaukee County. The forecast maximum three-hour isopleth value shown on Map K-25 is 100 $\mu g/m^3$, or approximately 56 percent of the air quality standard, and occurs on the northeast side of the City of Milwaukee. Area source and point source hydrocarbon concentrations together, therefore, are forecast to produce a violation of the hydrocarbon air quality standard over a broad geographic extent in Milwaukee County.

Furthermore, compounding the forecast regional hydrocarbon problem are the maximum three-hour hydrocarbon concentratigns from line sources as shown on Map K-26. The maximum isopleth value on this map is 50 $\mu g/m^3$ and is again located within the City of Milwaukee. It is evident that the "no build" alternative transportation plan, shown on Map K-27, slightly reduces the area encompassed by the 50 $\mu g/m^3$ isopleth in the City of Milwaukee, but this alternative also increases the maximum three-hour hydrocarbon concentrations in areas of Racine, Kenosha, and Washington Counties.

Since the maximum regional three-hour hydrocarbon concentrations are forecast to exceed the ambient air quality standard in the year 2000, it may be anticipated that the photochemical oxidant air quality standard will also be violated. Strategies for the abatement of hydrocarbon emissions will, therefore, be required to reduce regional oxidant concentrations to nontoxic levels. Such strategies, which include, but are not limited to, controls on the use of solvents in industrial processes, the use of vapor recovery devices in gasoline marketing, and transportation control measures, are evaluated in SEWRPC Planning Report No. 28.

Sulfur Oxides: As mentioned in Chapter VI, insufficient sulfur dioxide monitoring data was available to calibrate and validate the air quality simulation model for 1973. As an alternative, the regional air quality maintenance planning program is developing an emissions inventory for sulfur oxides for the year 1976. Upon completion, this inventory will be used to calibrate the Wisconsin Atmospheric Diffusion Model and thereby enable forecasts of regional sulfur dioxide levels in the year 2000 to be prepared. This analyses is contained in the regional air quality maintenance planning report.

SUMMARY

This appendix has presented an environmental assessment of the year 2000 land use and transportation plans for southeastern Wisconsin. The most important environmental impacts are summarized below:

1. The recommended regional land use plan represents a development framework for southeastern Wisconsin which would help abate existing and avoid creation of serious new and costly environmental problems, and contributes to the creation of a more healthy, attractive, and efficient settlement pattern. From an environmental protection point of view, the recommended land use plan—termed the controlled centralization alternative—is more sound than the alternative land use plan—termed the controlled decentralization alternative—which was prepared and evaluated in the land use plan revision and reevaluation process.

2. Anticipated growth in, and redistribution of, the regional population will require the conversion of a substantial amount of open land to urban use. Under the recommended land use plan, this loss of open space would be minimized through the development of new urban land primarily at a medium-density level in concentric rings along the periphery of, and outward from, existing urban centers. A total of 113 square miles of open land, representing only an additional 4 percent of the total area of the Region, would be converted to urban use upon implementation of the recommended plan. In contrast to this rather compact form of development, the other alternative considered in the land use plan revision process, the controlled decentralization alternative, proposed widespread development of very low-density residential land in outlying areas of the Region, with the result that about 235 square miles of open land would be converted to urban use.

3. Under the recommended plan, all new urban development would be served with public sanitary sewerage facilities, and sewerage facilities would be extended to certain existing urban areas not presently served. As a result, 92 percent of all urban land within the Region would be provided with public sanitary sewer service by the year 2000. The recommended plan seeks to avoid development which relies on septic systems and private wells and thereby minimize problems with surface water pollution and contamination of groundwater which may result from malfunctioning and poorly maintained septic systems. Conversely, the controlled decentralization alternative envisions a substantial amount of suburban residential development reliant on septic systems and private wells, and, as a result, only 63 percent of all urban land in the Region would be provided with public sanitary sewer service by the plan design year.

4. The recommended land use plan envisions the restoration of deteriorated urban areas and the conservation of stable urban areas. Such efforts should restore the beauty of deteriorated urban neighborhoods; contribute to the health and safety of the restored structures and surrounding areas; maximize use of existing infrastructure; and lessen the need for new residential and related urban land and the conversion of open land to urban use. On the other hand, the controlled decentralization alternative, since it is designed to accommodate a continued rapid out-migration of population from the older central cities of the Region, could be expected to be implemented with much less emphasis on urban rehabilitation and conversion.

5. The recommended plan calls for two totally new major retail and service centers in the Region and the strengthening and improvement of two central business districts so that they would function as major commercial centers by the year 2000. Moreover, the plan recommends the expansion of five existing industrial sites in order that they would function as major industrial centers by the plan design year. While major commercial and industrial sites may create certain environmental problems such as increased runoff and higher traffic loads, the provision of major commercial and industrial centers, properly situated with respect to the existing and proposed transportation system and residential areas, is environmentally more sound than the alternative of meeting the same needs through spot commercial and industrial development along major streets and highways.

6. The recommended plan proposes the development of two new major parks—parks of at least 250 acres—and the expansion of one existing major park. Implementation of these major park proposals would result in the public acquisition and permanent preservation of 1,000 acres of high-value resource areas in essentially open use, in the regional primary environmental corridor. While the development of recreation facilities requires some alteration of natural conditions of the proposed sites, good park design techniques can minimize potential adverse environmental impacts.

7. The recommended land use plan envisions the preservation of the remaining primary environmental corridors in the Region, which represent, in effect, a composite of the most important elements of the natural resource base. A total of 437 square miles of net corridor land would be preserved through a combination of public acquisition and the application of land use controls to privately owned land. The preservation of these corridors is considered essential to the maintenance of a wholesome environment in the Region, to the preservation of the Region's cultural and natural heritage and natural beauty, and to the prevention of new and the intensification of existing environmental problems such as flooding and water pollution.

8. The recommended land use plan proposes the preservation of almost all of the remaining prime agricultural lands, the most productive farmland in the Region. Of the 633 square miles of net prime agricultural land in the Region in 1970, only 13 square miles would be converted to urban use under the recommended plan. The preservation of such lands contributes to the maintenance of an ecological balance between plants and animals; maintains the rural character and natural beauty of the outlying areas of the Region; and lends form and structure to urban development. Moreover, the effective preservation of prime agricultural lands through suitable land use controls may encourage landowners to implement conservation practices and pollution control measures, knowing that their land will not be converted to other uses.

9. The recommended regional transportation plan provides for increased accessibility and reduced traffic congestion as compared to the "no build" option, and thereby avoids an adverse impact on the long-term maintenance and enhancement of the Region, which the transportation system supports. Specifically, the recommended plan results in a reduction in travel time within the Region of 32,000 hours each weekday. Less than 11 percent of the arterial street and highway system under the recommended plan is at, or over, design capacity, while about 24.5 percent of the "no build" plan arterial street and highway system is at, or over, design capacity. Accessibility in the urbanized areas of the Region by automobile and transit to work, shopping, medical, recreation, higher education, and air travel facilities, as measured by the meeting of minimum acceptable standards is, however, nearly the same under both the recommended plan and "no build" plan, except for transit accessibility in the Milwaukee urbanized area. The greater level of transit accessibility in the Milwaukee urbanized area under the recommended plan results in substantially greater accessibility of minority populations in the Milwaukee urbanized area by transit to employment and major retail and service centers within the Milwaukee urbanized area.

10. The recommended transportation plan, although providing for increased accessibility and reduced traffic congestion as compared to the "no build" plan, results in some potentially adverse impacts on the environment of the Region, including the dislocation of households, the location of some new transportation facilities within environmental corridors, and the potential of exposing a somewhat larger aggregate area of the Region to unacceptable levels of traffic-related noise. In comparison to the "no build" plan, the recommended plan dislocates 768 more residential structures and 80 more nonresidential structures, and locates 61 more miles of transportation facilities in environmental corridors. The plan could result in somewhat greater exposure of the Region's population to traffic-related noise, as 258 more miles of arterial streets and highways under the recommended plan, compared to the "no build" plan, have the potential to generate higher than acceptable noise levels. However, each of these adverse impacts of the recommended plan has the potential for amelioration through good project planning and design. Project planning and design can adjust the location of facilities to minimize dislocation and reduce intrusion of facilities into environmental corridors. And it can include design measures as necessary, including vertical displacement, gradient modification, and shielding, to minimize exposure to traffic-related noise.

11. The recommended transportation plan requires a substantial resource commitment for the future of the Region, as compared to the "no build" plan. The recommended plan represents a greater tax base loss of about $103 million and involves a difference in transportation construction or capital costs within the Region to the year 2000 of about $1.15 billion, or 85 percent greater than the "no build" plan, and a difference in transportation operation and maintenance costs of about $582 million, or 36 percent greater than the "no build" plan. Transportation user costs of travel time and accidents under the recommended plan, however, could be expected to be about $2.41 billion, or nearly 4 percent less over the design period than under the "no build" plan.

Table K-16

INVENTORY AND FORECAST AIR POLLUTANT EMISSIONS FROM AREA SOURCES IN THE REGION BY COUNTY BY SEASON: 1973 AND 2000

County	Season	Pollutants (in tons)								
		Particulate Matter			Sulfur Dioxide			Carbon Monoxide		
		1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change	1973	2000	1973-2000 Percent Change
Kenosha	Winter	132.75	181.35	36.61	553.27	1,008.35	82.25	486.11	584.09	20.16
	Spring	122.97	156.98	27.66	340.13	638.48	87.72	1,129.91	828.72	- 26.66
	Summer	44.19	56.92	28.81	80.04	172.56	115.59	3,027.26	3,131.90	3.46
	Fall	71.94	102.54	42.54	241.04	492.24	104.13	642.59	734.57	14.31
	Annual	371.85	495.90	33.36	1,214.47	2,311.57	90.34	5,285.87	5,212.82	- 1.38
Milwaukee	Winter	1,078.87	1,404.14	30.15	3,964.00	7,088.20	78.81	3,275.64	5,548.07	69.37
	Spring	804.78	1,075.73	33.67	2,336.99	4,631.53	98.10	4,076.39	6,689.18	64.10
	Summer	540.62	746.65	38.11	577.92	1,774.88	207.12	9,308.23	13,912.06	49.50
	Fall	701.68	962.10	37.11	1,726.94	3,803.02	120.21	3,156.17	5,455.52	72.85
	Annual	3,125.95	4,186.49	33.92	8,605.86	17,297.61	101.00	19,816.44	31,566.68	59.30
Ozaukee	Winter	76.93	128.32	67.52	256.53	556.40	116.89	249.04	251.31	0.92
	Spring	88.42	128.87	45.76	170.76	374.54	119.34	806.88	427.10	- 47.07
	Summer	43.69	63.09	44.40	46.11	123.23	167.25	1,792.06	2,074.35	15.75
	Fall	52.86	87.96	66.40	116.90	289.35	147.52	339.36	324.77	- 4.30
	Annual	261.91	407.14	55.46	590.30	1,343.48	127.59	3,187.34	3,038.60	- 4.67
Racine	Winter	202.65	257.24	26.94	800.80	1,365.52	70.52	646.89	920.77	42.34
	Spring	187.12	227.29	21.47	497.64	875.49	75.93	1,641.46	1,234.48	- 24.79
	Summer	73.39	90.90	23.86	121.09	251.17	107.42	4,768.59	4,525.22	- 5.10
	Fall	113.26	149.63	32.11	353.12	676.76	91.65	931.87	1,180.52	26.68
	Annual	576.42	722.37	25.32	1,772.65	3,168.86	78.76	7,988.79	7,766.81	- 2.90
Walworth	Winter	73.42	172.83	135.39	257.26	958.95	272.75	387.50	647.71	67.15
	Spring	117.53	193.62	64.74	185.80	635.72	242.15	1,592.85	988.38	- 37.95
	Summer	39.64	64.04	61.55	46.97	180.19	283.63	5,073.87	5,046.54	- 0.73
	Fall	55.06	109.75	99.40	119.70	479.90	300.92	864.38	1,036.94	19.96
	Annual	285.65	538.48	88.51	609.73	2,254.71	269.79	7,918.61	7,661.99	- 3.24
Washington	Winter	105.78	175.35	65.77	414.62	858.92	107.16	538.34	701.50	30.31
	Spring	138.29	188.04	35.98	282.08	575.06	103.86	1,730.25	1,038.08	- 40.00
	Summer	55.97	74.01	32.23	74.51	173.08	132.29	4,530.48	3,064.10	- 32.37
	Fall	79.83	117.76	47.51	193.35	437.37	126.21	937.12	1,005.80	7.33
	Annual	379.87	552.78	45.52	964.56	2,044.35	111.95	7,736.20	5,725.69	- 25.99
Waukesha	Winter	278.29	439.43	57.90	1,079.88	2,200.78	103.80	893.34	1,192.67	33.51
	Spring	251.71	355.34	41.17	648.34	1,370.05	111.32	2,205.34	1,926.45	- 12.65
	Summer	150.90	192.15	27.34	140.59	364.27	159.10	10,117.61	10,618.80	4.95
	Fall	187.82	279.54	48.83	456.98	1,061.57	132.30	1,995.37	3,804.01	90.64
	Annual	868.72	1,246.64	43.50	2,325.79	4,996.53	114.83	15,211.67	17,376.11	14.23
Region	Annual	5,870.37	8,149.80	38.83	16,083.37	33,417.11	107.77	67,144.92	78,378.70	16.73

Source: SEWRPC.

12. Regional levels of carbon monoxide concentrations under the recommended plan are forecast to be well below the primary and secondary eight-hour ambient air quality standard of 10 mg/m^3 and well below the primary and secondary one-hour ambient air quality standard of 40 mg/m^3. Regional levels of nitrogen dioxide are also forecast to be well below the primary and secondary annual average ambient air quality standard of 100 $\mu g/m^3$. It is not anticipated that any further controls over emissions of these two pollutant species, other than the emission standards defined by the Federal Motor Vehicle Emissions Control Program, will be required in the Region by the year 2000.

13. Regional levels of carbon monoxide concentrations under the recommended plan are forecast to be less than levels under the "no build" plan. However, under both plans regional carbon monoxide levels are anticipated to be well below the primary and secondary eight-hour ambient air quality standard of 10 mg/m^3 and well below the primary and secondary one-hour ambient air quality standard of 40 mg/m^3. Regional levels of nitrogen dioxide under both the recommended and "no build" plans are also forecast to be well below the primary and secondary annual average ambient air quality standard of 100 $\mu g/m^3$. It is not anticipated that any further controls over emissions of these two pollutant species, other than the emission standards defined by the Federal Motor Vehicle Emissions Control Program, will be required in the Region by the year 2000.

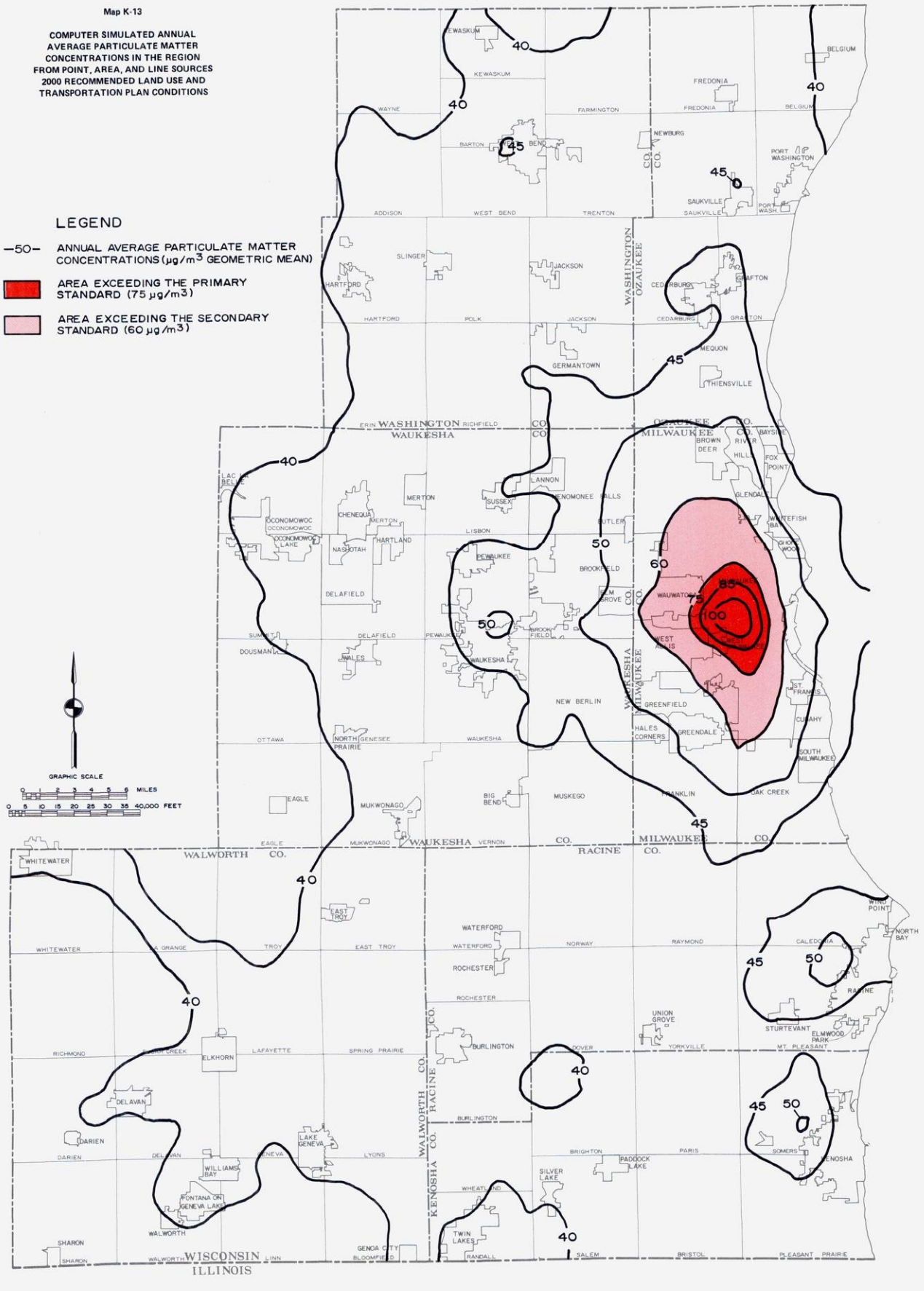
14. Hydrocarbon concentrations are forecast to be similar in the Region under the recommended and "no build" plans. Concentrations under each plan are forecast to exceed the primary and secondary three-hour ambient air quality standard of 160 $\mu g/m^3$ in the year 2000. The forecast violations of the hydrocarbon air quality standard are anticipated to cause the photochemical oxidant standard, 160 $\mu g/m^3$ of ozone averaged over one hour, to be exceeded within the Region. Strategies for the abatement of hydrocarbon emissions in the Region are presented in SEWRPC Planning Report No. 28.

15. Under the recommended land use plan and both the recommended and "no build" transportation plans, violations of the national ambient air quality standards for particulate matter, hydrocarbons, and photochemical oxidants were forecast to occur in certain subareas within the Region, particularly in Milwaukee County. Little difference was found in the effects of the recommended and "no build" transportation plans on regional ambient air quality in the year 2000. Strategies for the abatement of forecast violations of the national ambient air quality standards within the Region will be evaluated under the regional air quality maintenance planning program, and any transportation controls, if recommended, will probably be equally applicable to either the "no build" or recommended transportation plan.

Thus, the recommended controlled centralization land use plan compared to the alternative controlled decentralization land use plan would require the conversion of less open land to urban use, serve a much greater percentage of new urban development with public sanitary sewerage service, encourage preservation and redevelopment of existing urban areas, maximize use of existing infrastructure, and preserve more prime agricultural land within the Region. The recommended transportation plan compared to the "no build" plan would provide increased accessibility and reduced traffic congestion; provide minorities in the Milwaukee urbanized area with greater accessibility by transit to employment and major retail and service centers and allow reductions in motor fuel consumption and transportation user costs comprised of travel time, out-of-pocket expenses, and accidents. It should be noted, however, that the recommended plan would require greater residential and nonresidential dislocations; increased construction of transportation facilities within environmental corridors; potentially increased exposure of the Region to a higher than acceptable noise level; and a greater commitment of resources to transportation facility construction, operation, and maintenance.

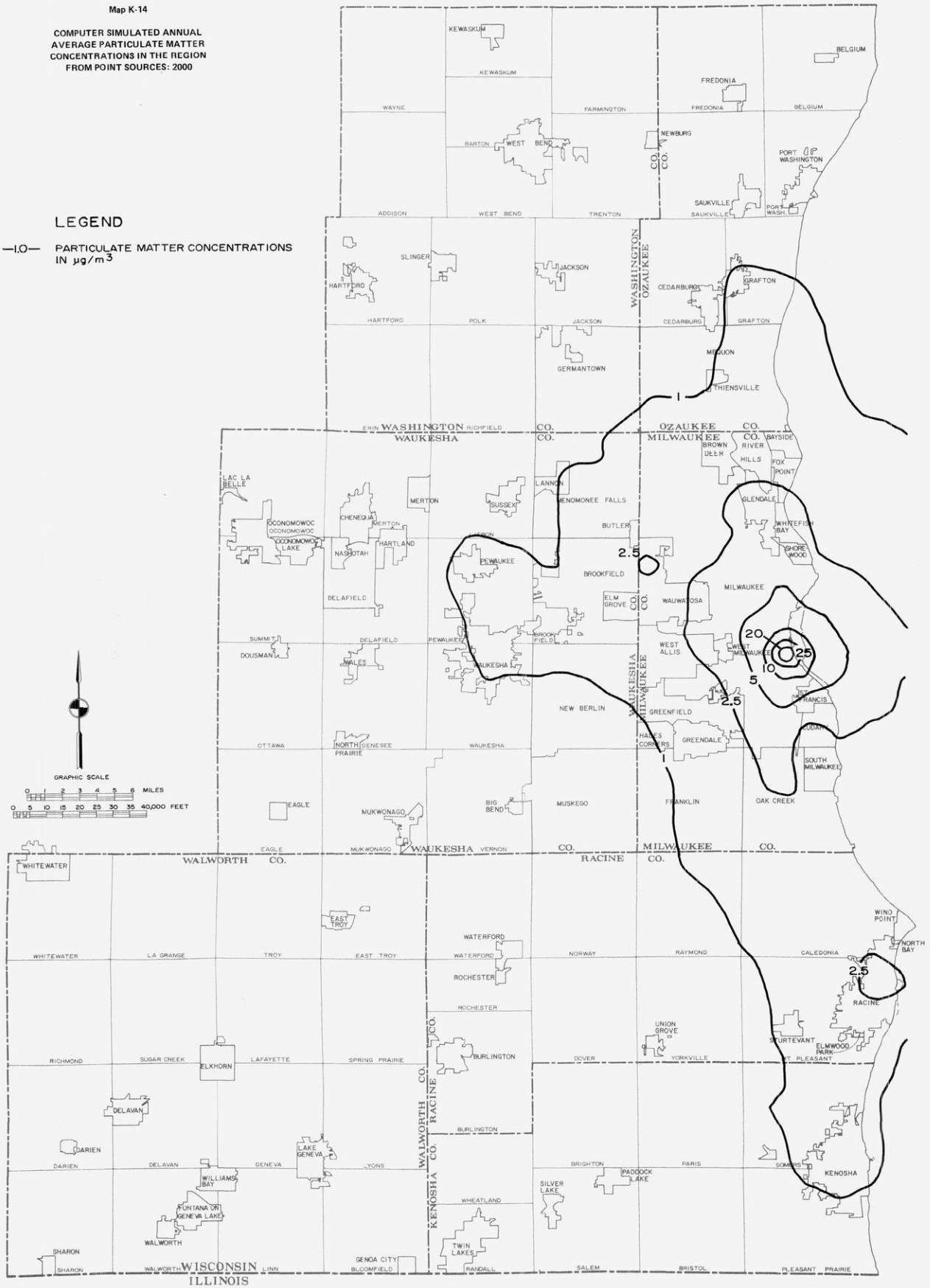
Map K-13

COMPUTER SIMULATED ANNUAL AVERAGE PARTICULATE MATTER CONCENTRATIONS IN THE REGION FROM POINT, AREA, AND LINE SOURCES 2000 RECOMMENDED LAND USE AND TRANSPORTATION PLAN CONDITIONS



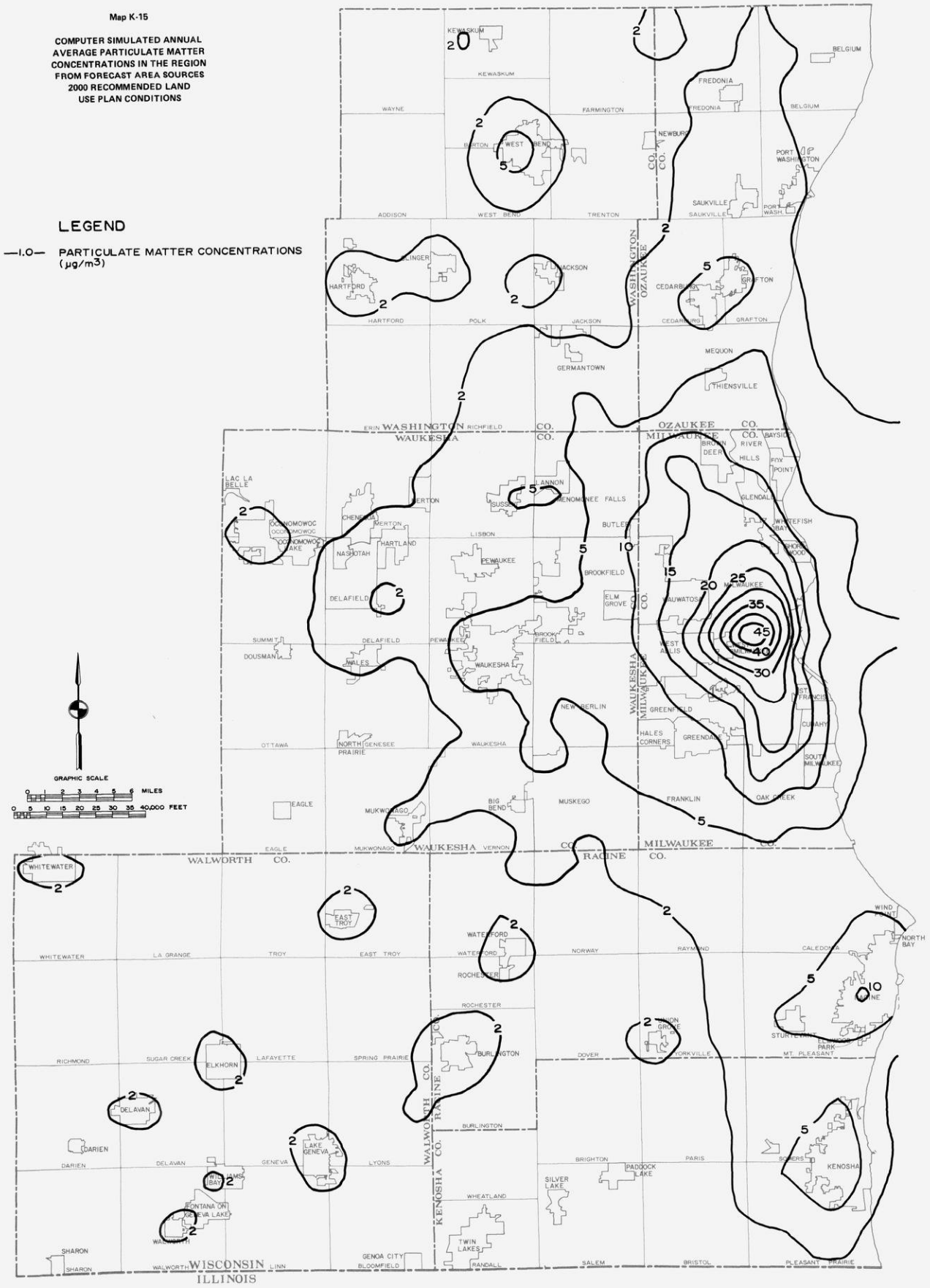
Map K-14

COMPUTER SIMULATED ANNUAL AVERAGE PARTICULATE MATTER CONCENTRATIONS IN THE REGION FROM POINT SOURCES: 2000



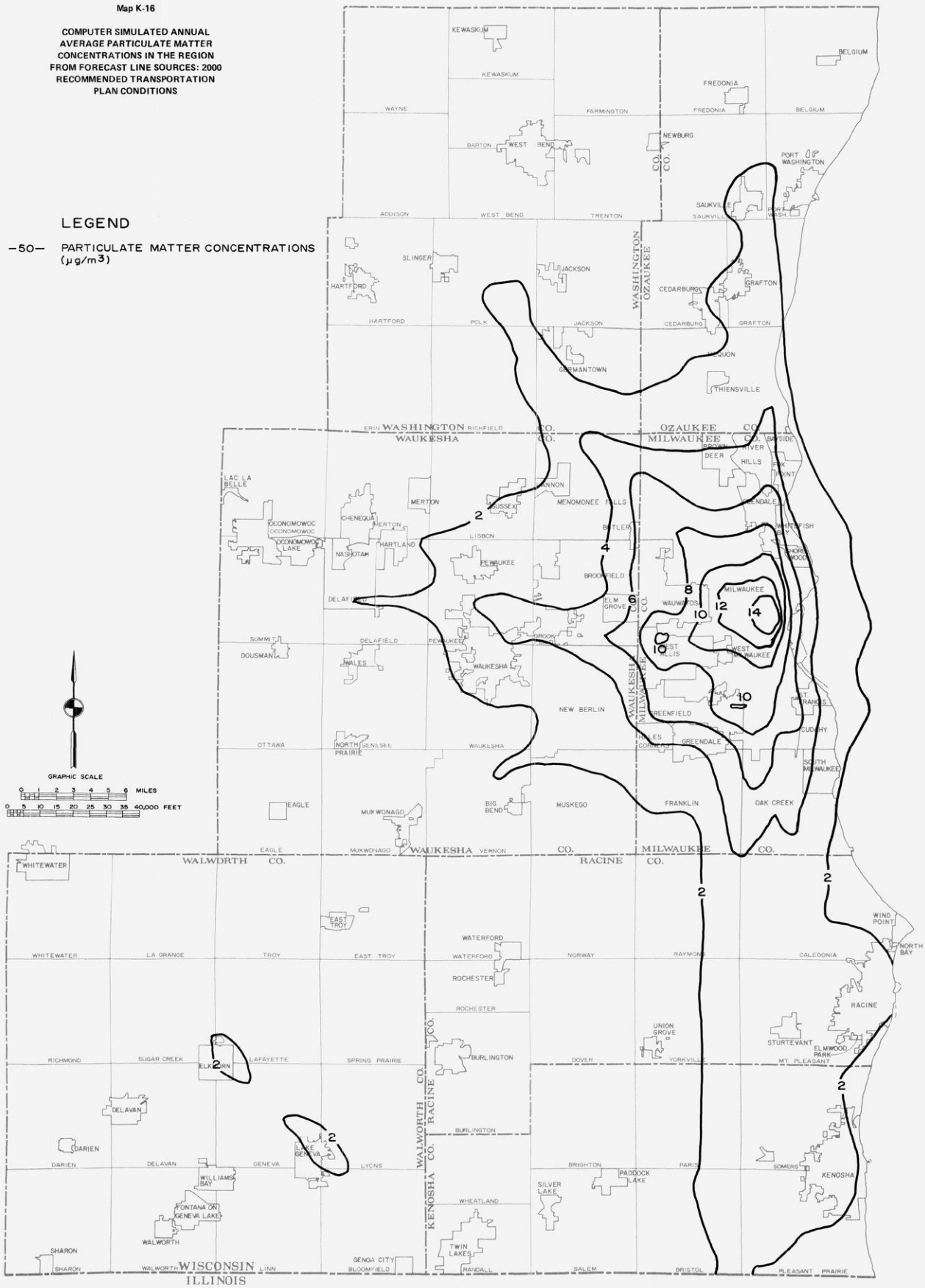
Map K-15

COMPUTER SIMULATED ANNUAL AVERAGE PARTICULATE MATTER CONCENTRATIONS IN THE REGION FROM FORECAST AREA SOURCES 2000 RECOMMENDED LAND USE PLAN CONDITIONS



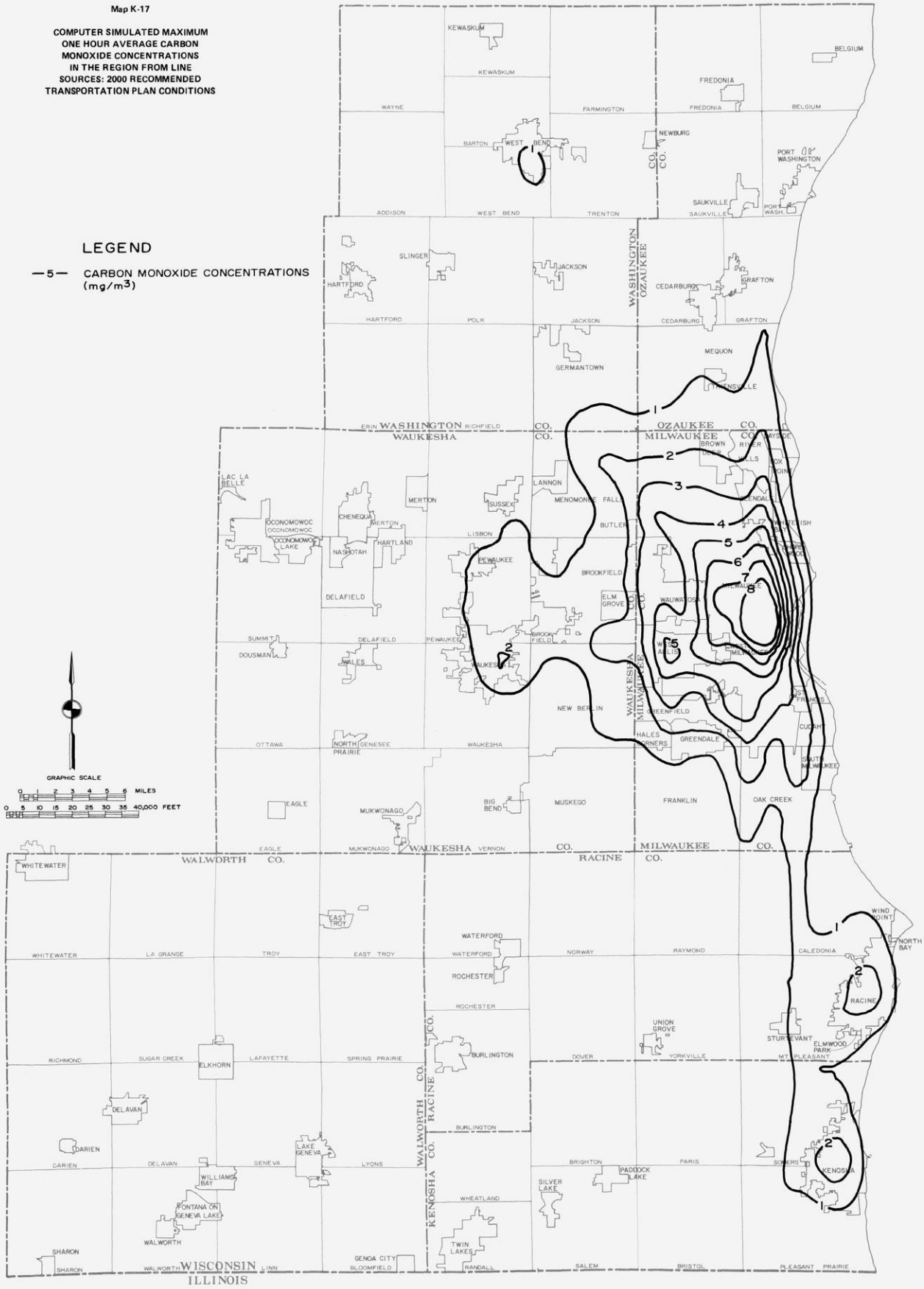
Map K-16

COMPUTER SIMULATED ANNUAL AVERAGE PARTICULATE MATTER CONCENTRATIONS IN THE REGION FROM FORECAST LINE SOURCES: 2000 RECOMMENDED TRANSPORTATION PLAN CONDITIONS



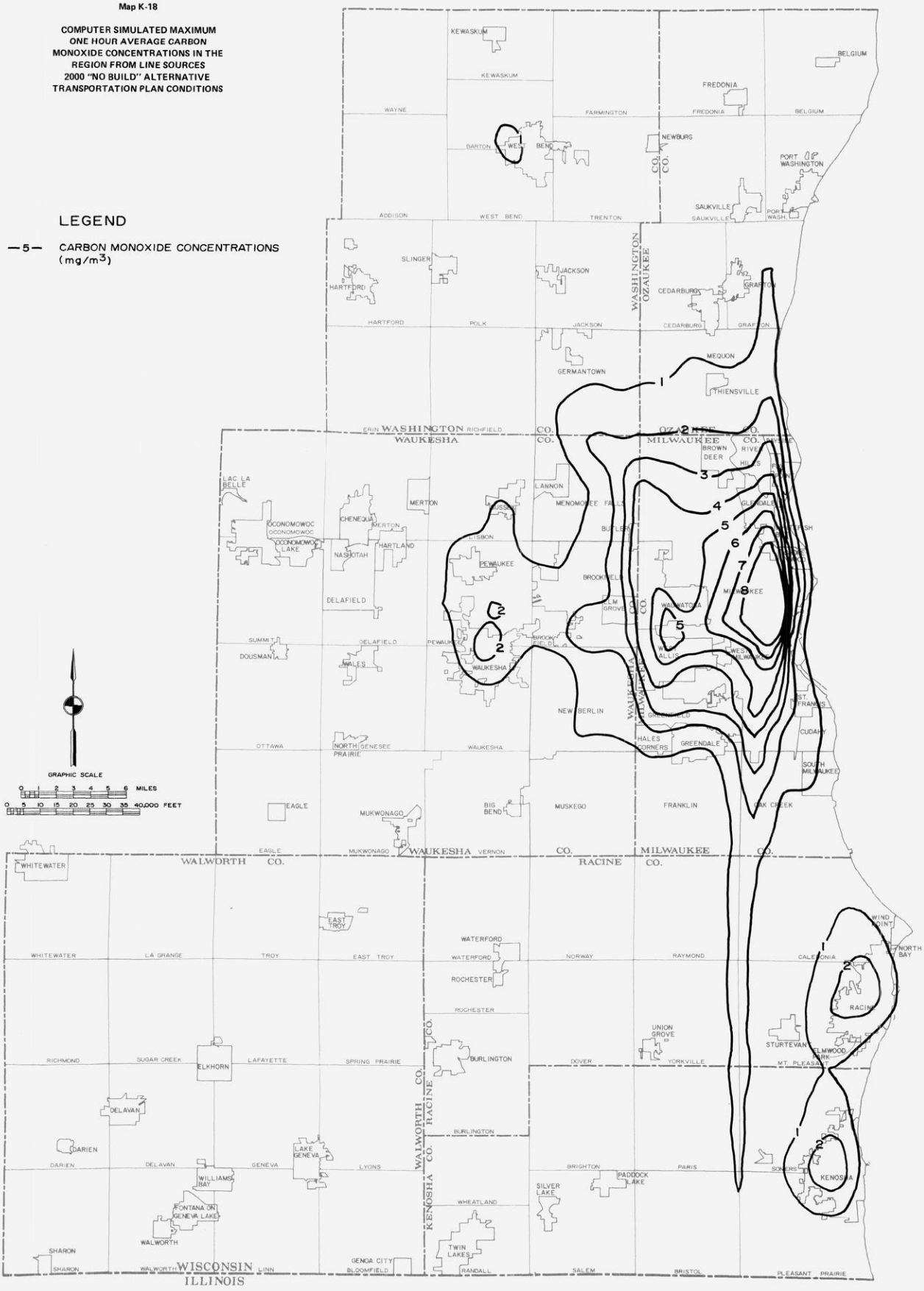
Map K-17

COMPUTER SIMULATED MAXIMUM ONE HOUR AVERAGE CARBON MONOXIDE CONCENTRATIONS IN THE REGION FROM LINE SOURCES: 2000 RECOMMENDED TRANSPORTATION PLAN CONDITIONS



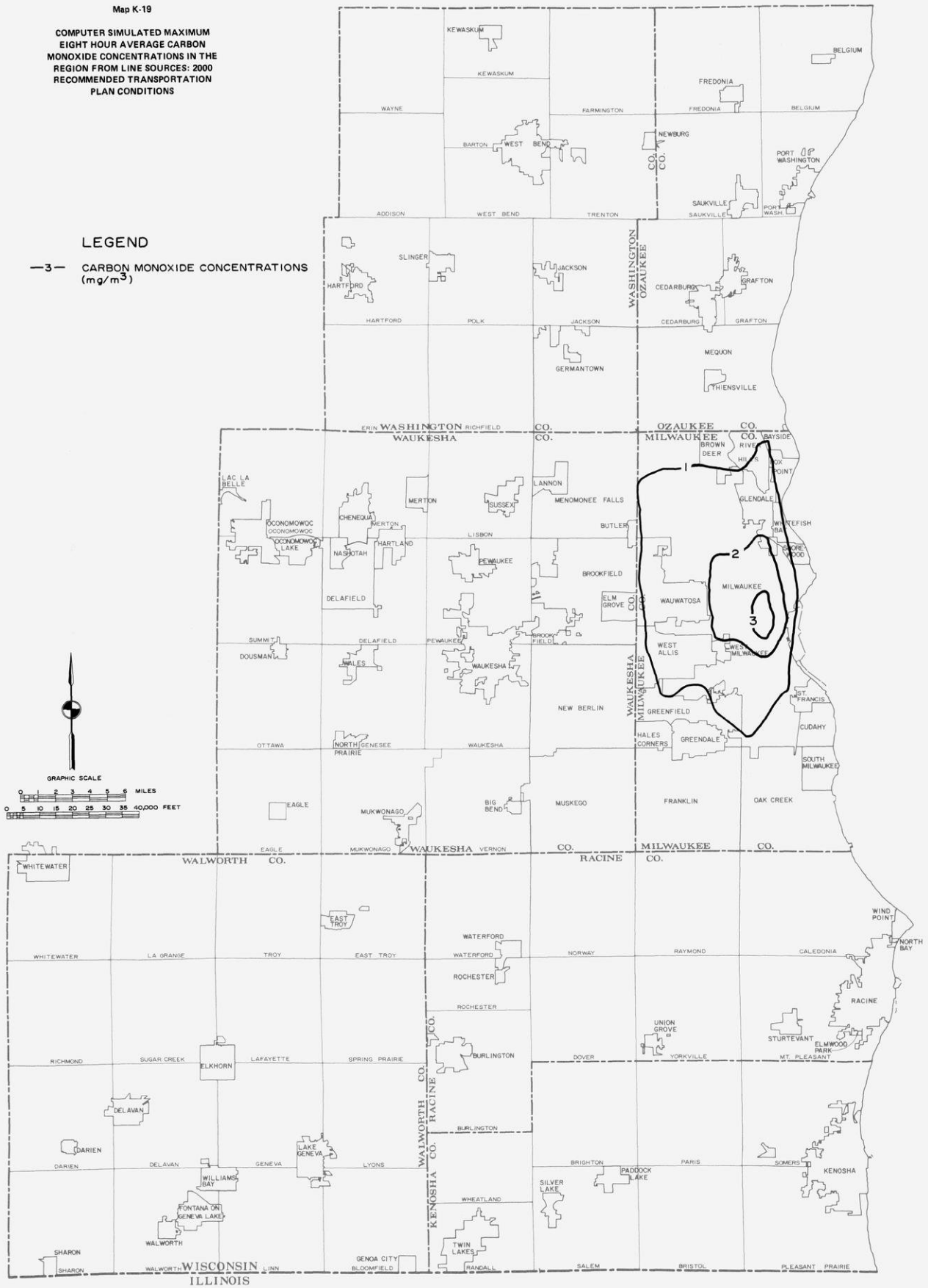
Map K-18

COMPUTER SIMULATED MAXIMUM ONE HOUR AVERAGE CARBON MONOXIDE CONCENTRATIONS IN THE REGION FROM LINE SOURCES 2000 "NO BUILD" ALTERNATIVE TRANSPORTATION PLAN CONDITIONS



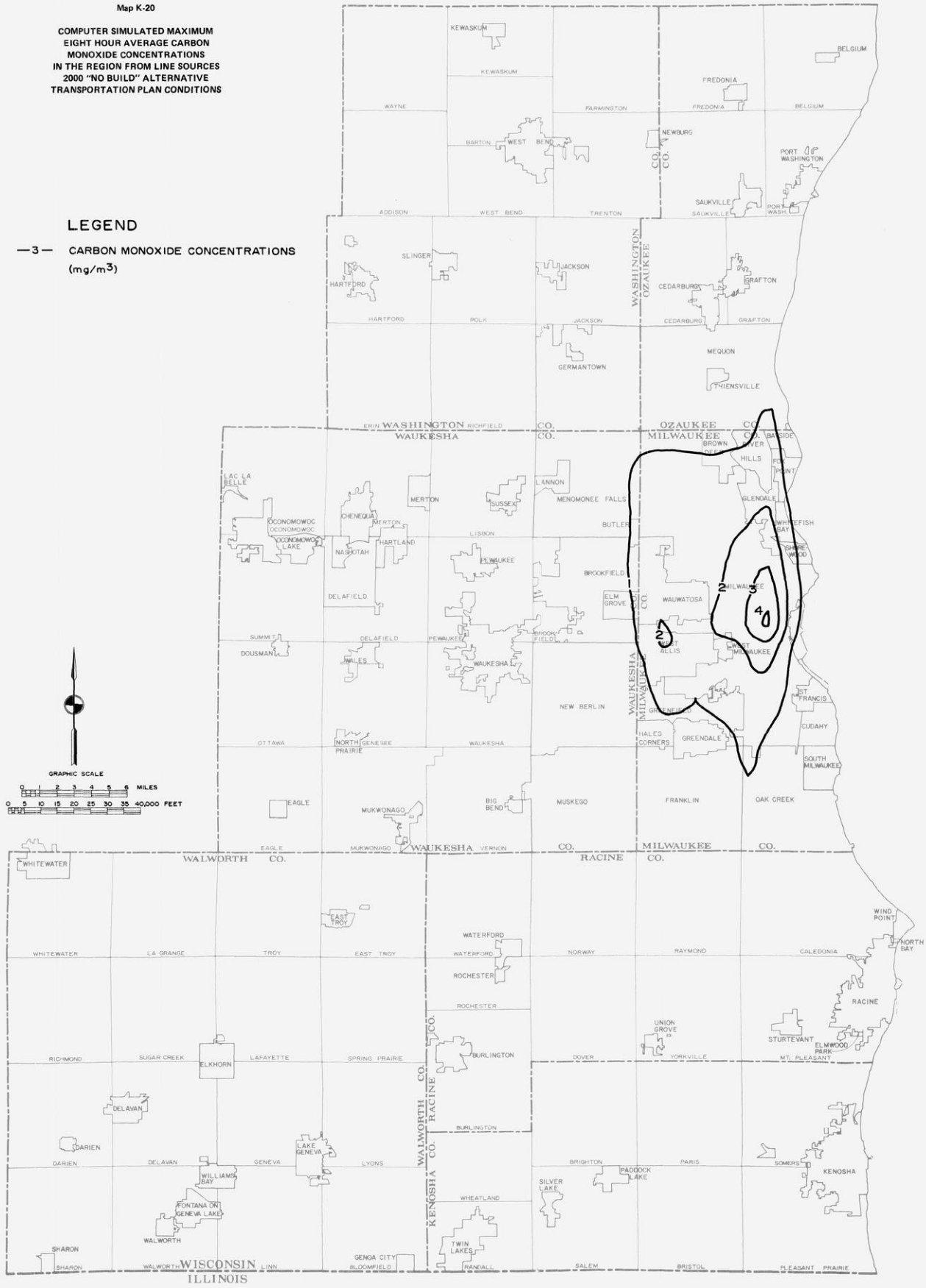
Map K-19

COMPUTER SIMULATED MAXIMUM EIGHT HOUR AVERAGE CARBON MONOXIDE CONCENTRATIONS IN THE REGION FROM LINE SOURCES: 2000 RECOMMENDED TRANSPORTATION PLAN CONDITIONS



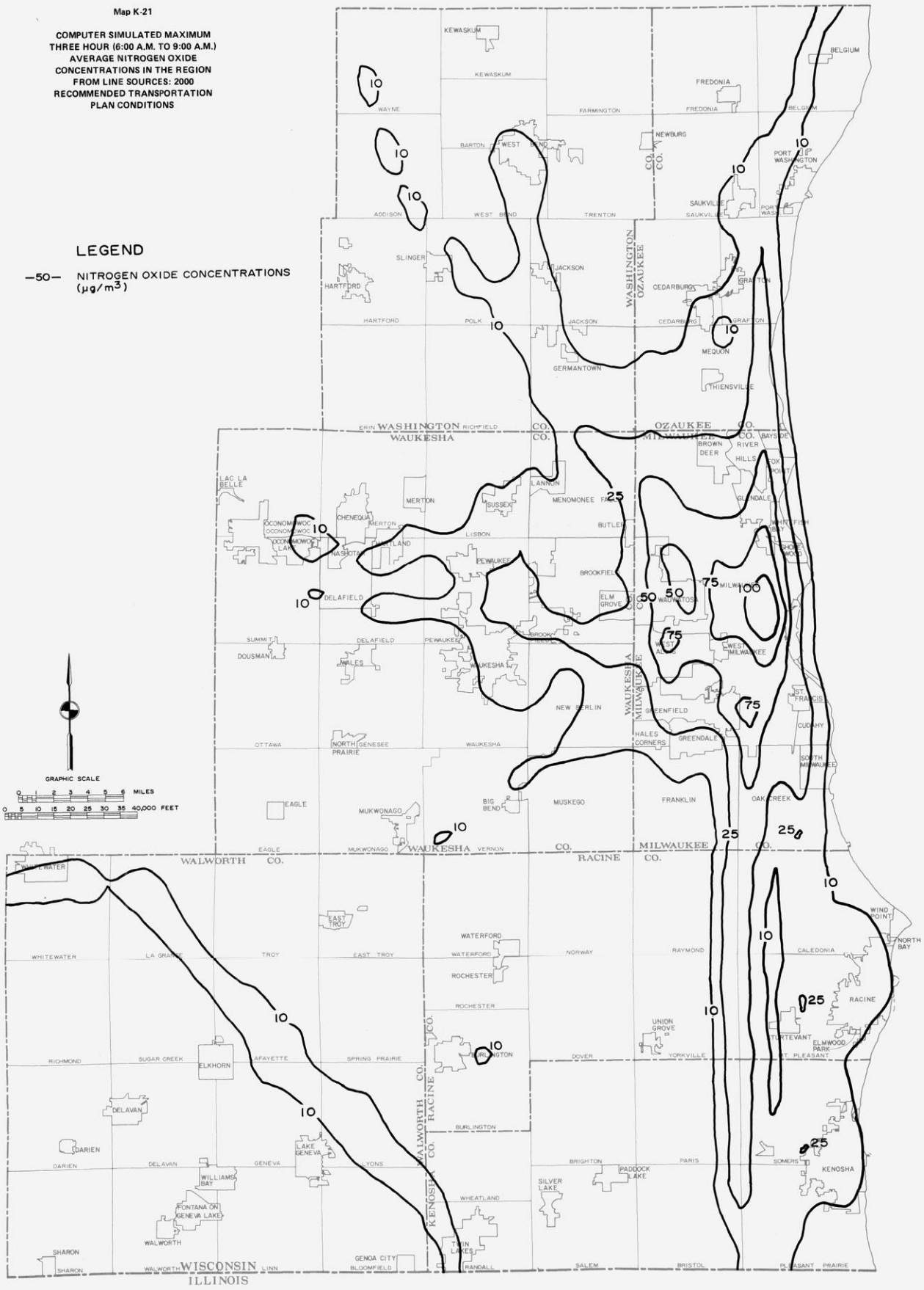
Map K-20

COMPUTER SIMULATED MAXIMUM EIGHT HOUR AVERAGE CARBON MONOXIDE CONCENTRATIONS IN THE REGION FROM LINE SOURCES 2000 "NO BUILD" ALTERNATIVE TRANSPORTATION PLAN CONDITIONS



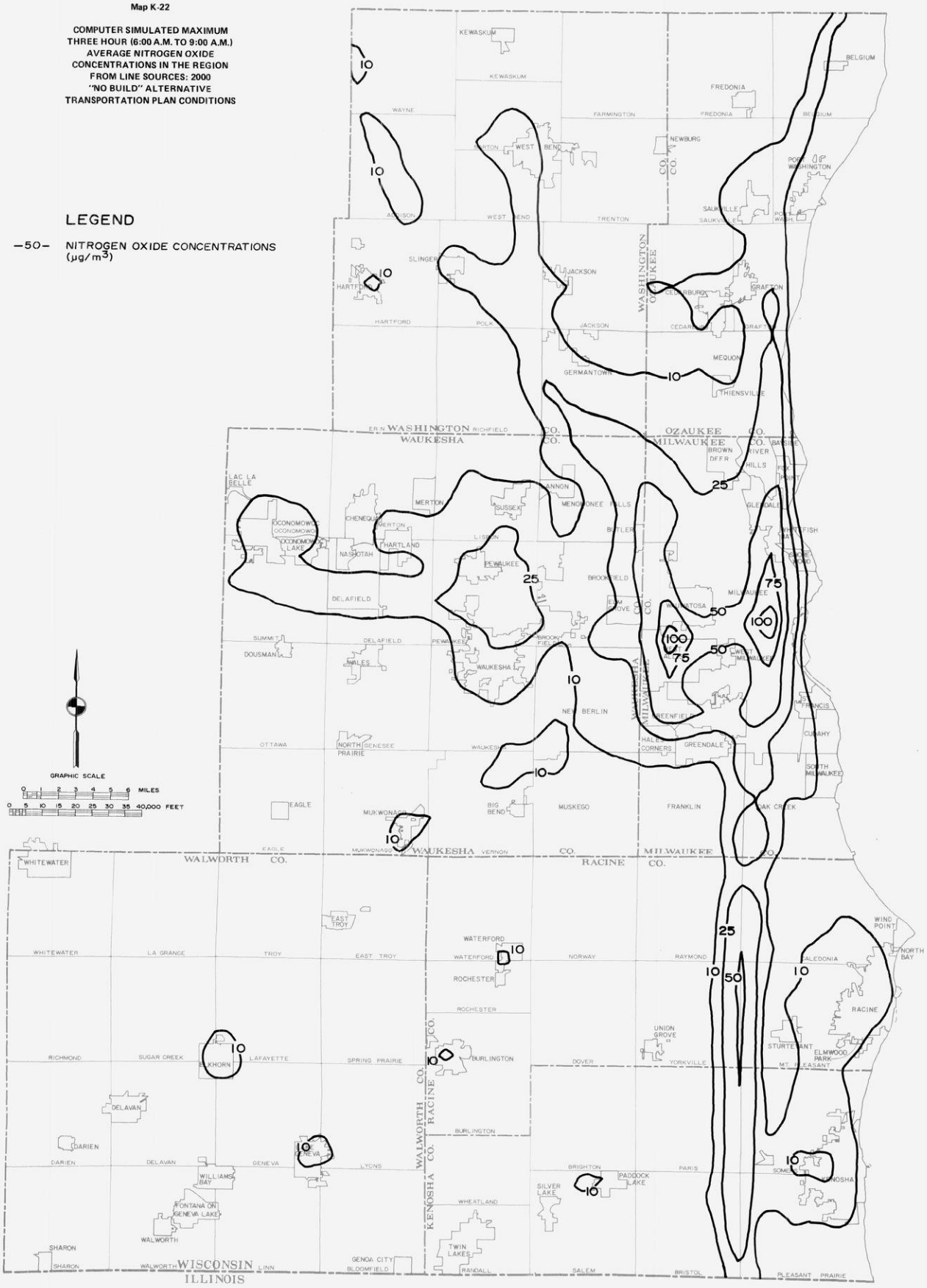
Map K-21

COMPUTER SIMULATED MAXIMUM THREE HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE NITROGEN OXIDE CONCENTRATIONS IN THE REGION FROM LINE SOURCES: 2000 RECOMMENDED TRANSPORTATION PLAN CONDITIONS



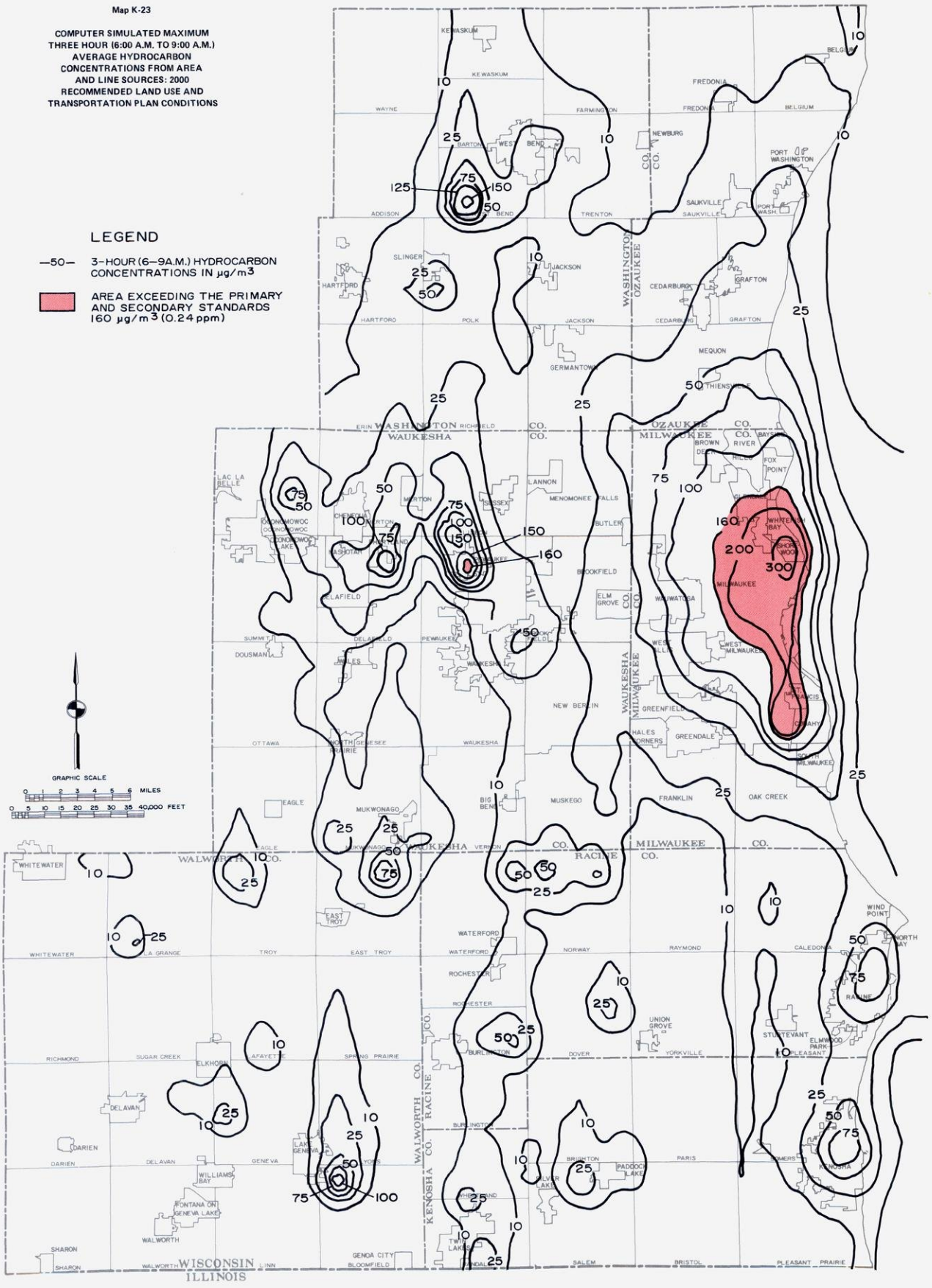
Map K-22

COMPUTER SIMULATED MAXIMUM THREE HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE NITROGEN OXIDE CONCENTRATIONS IN THE REGION FROM LINE SOURCES: 2000 "NO BUILD" ALTERNATIVE TRANSPORTATION PLAN CONDITIONS



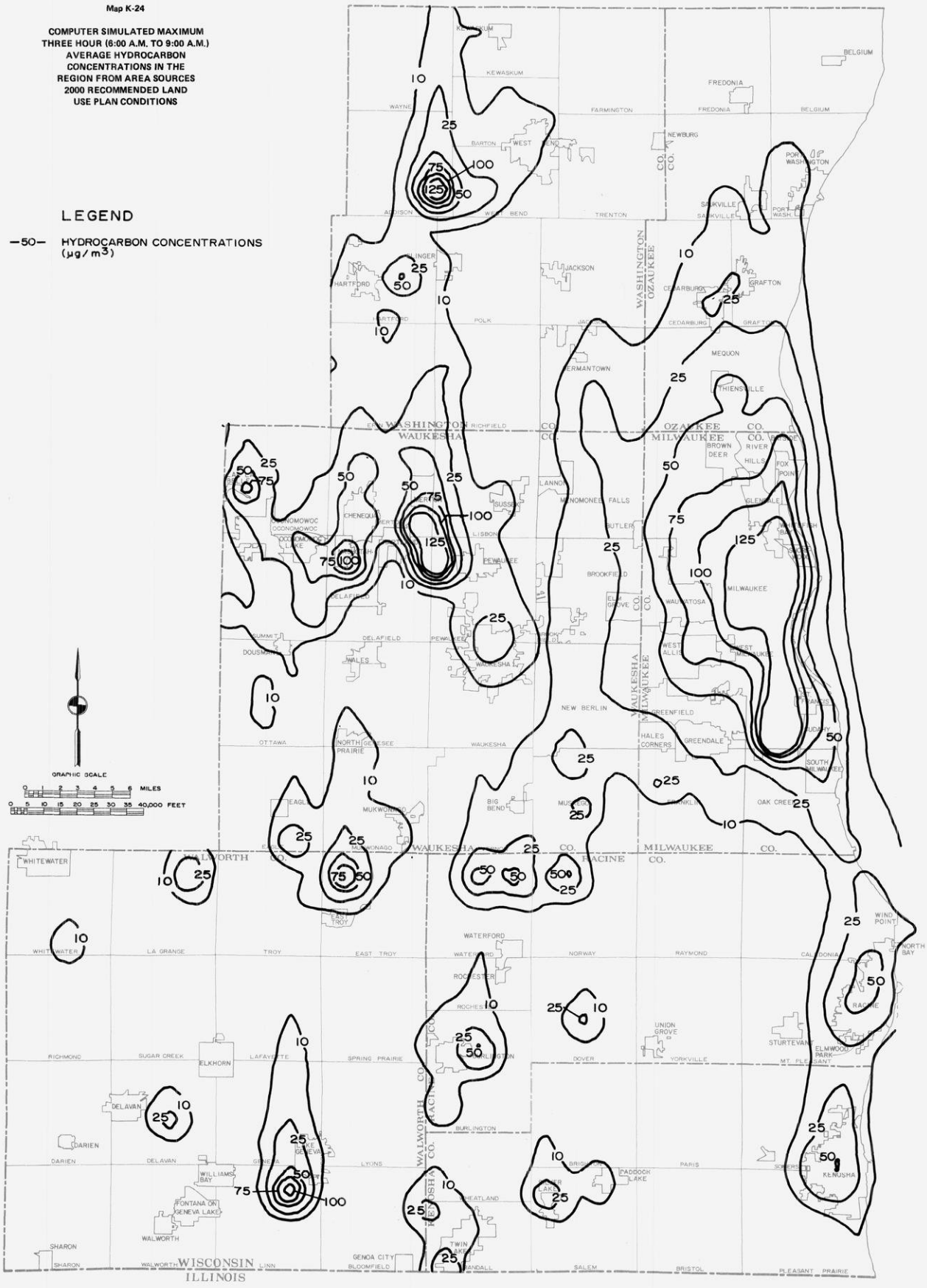
Map K-23

COMPUTER SIMULATED MAXIMUM THREE HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE HYDROCARBON CONCENTRATIONS FROM AREA AND LINE SOURCES: 2000 RECOMMENDED LAND USE AND TRANSPORTATION PLAN CONDITIONS



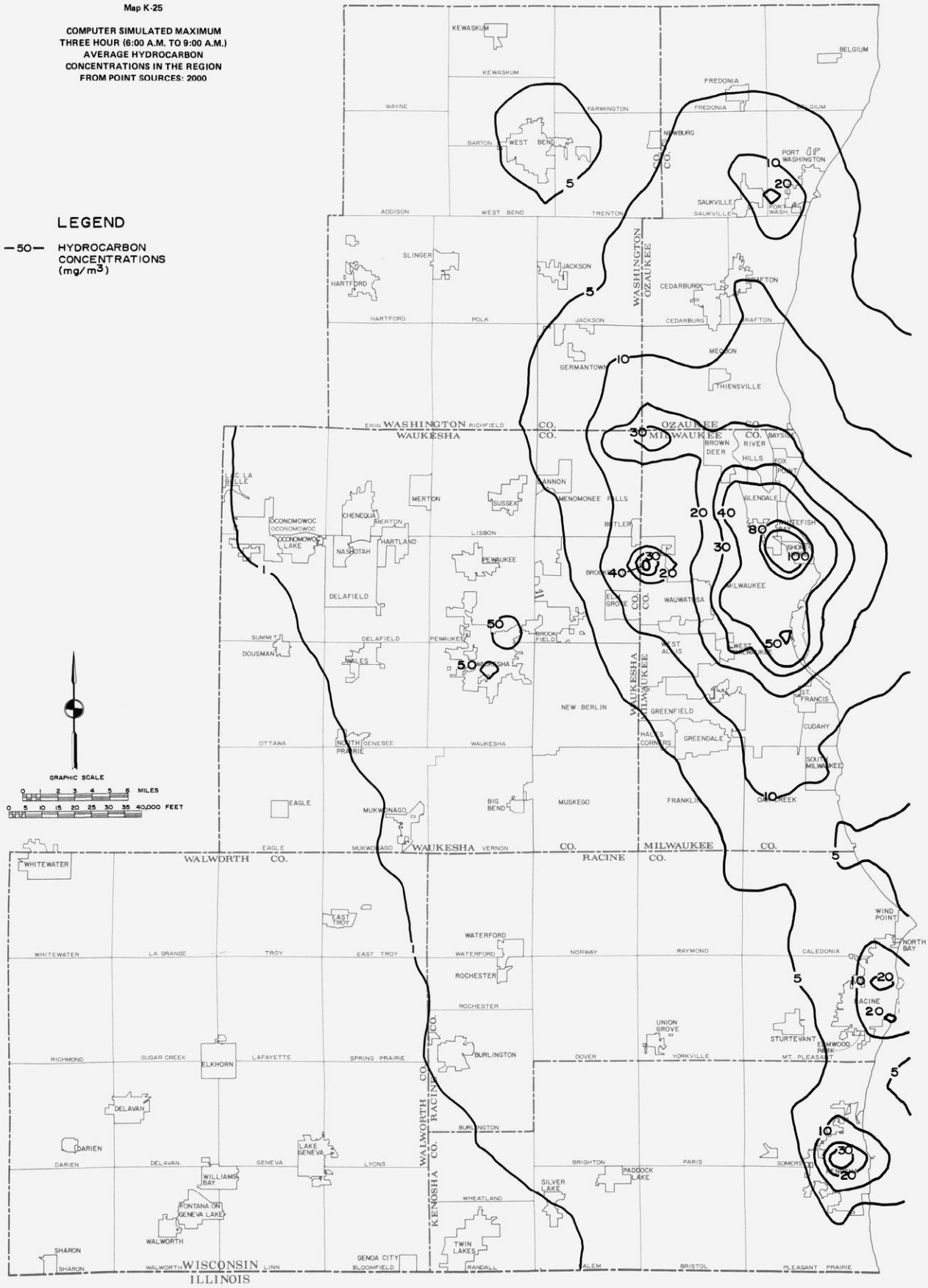
Map K-24

COMPUTER SIMULATED MAXIMUM THREE HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE HYDROCARBON CONCENTRATIONS IN THE REGION FROM AREA SOURCES 2000 RECOMMENDED LAND USE PLAN CONDITIONS



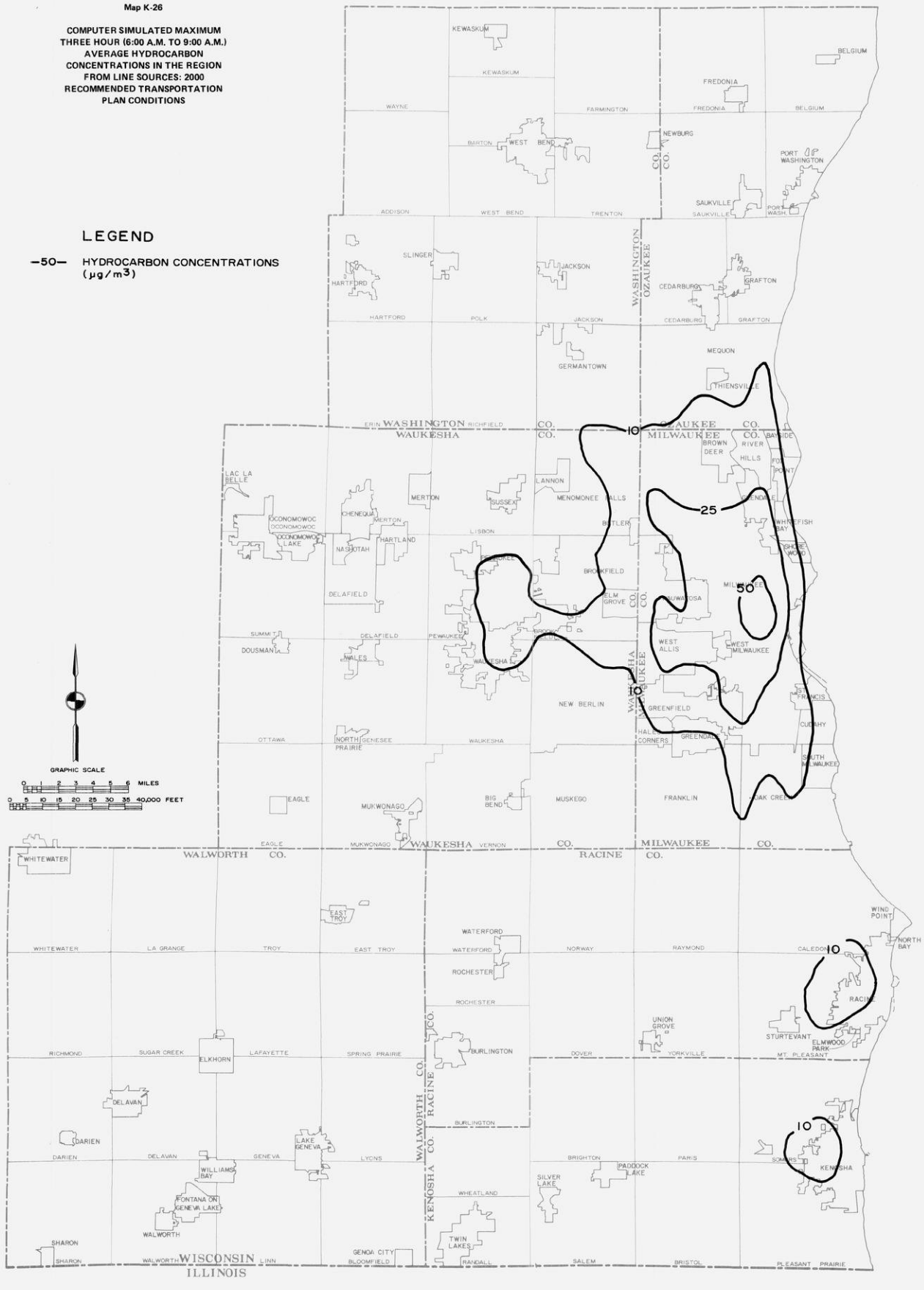
Map K-25

COMPUTER SIMULATED MAXIMUM THREE HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE HYDROCARBON CONCENTRATIONS IN THE REGION FROM POINT SOURCES: 2000



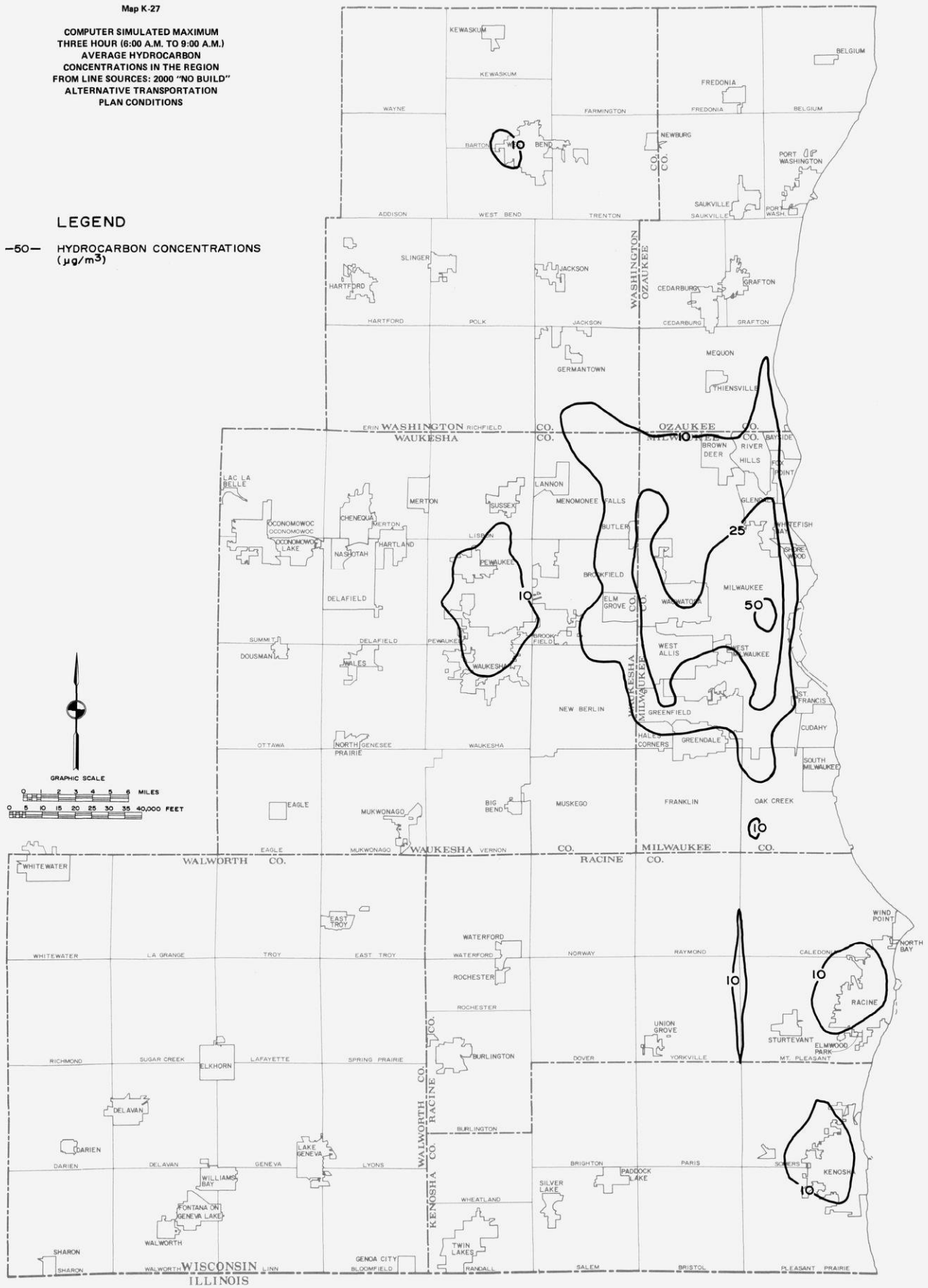
Map K-26

COMPUTER SIMULATED MAXIMUM THREE HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE HYDROCARBON CONCENTRATIONS IN THE REGION FROM LINE SOURCES: 2000 RECOMMENDED TRANSPORTATION PLAN CONDITIONS



Map K-27

COMPUTER SIMULATED MAXIMUM THREE HOUR (6:00 A.M. TO 9:00 A.M.) AVERAGE HYDROCARBON CONCENTRATIONS IN THE REGION FROM LINE SOURCES: 2000 "NO BUILD" ALTERNATIVE TRANSPORTATION PLAN CONDITIONS



Appendix L

DETAILED DATA—ALTERNATIVE AND FINAL RECOMMENDED REGIONAL TRANSPORTATION PLANS

Table L-1

COMPARISON OF AUTOMOBILES AVAILABLE IN THE REGION BY COUNTY 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

County	Existing 1972			Planned Increment		Total 2000		
	Household Population	Automobiles	Persons per Automobile	Household Population	Automobiles	Household Population	Automobiles	Persons per Automobile
Kenosha	122,700	48,700	2.5	48,800	38,300	171,500	87,000	2.0
Milwaukee . . .	1,060,500	386,600	2.7	- 36,200	41,900	1,024,300	428,500	2.4
Ozaukee	61,400	27,300	2.2	51,600	30,300	113,000	57,600	2.0
Racine.	177,100	70,900	2.5	35,600	31,500	212,700	102,400	2.1
Walworth. . . .	72,300	32,000	2.3	19,500	17,300	91,800	49,300	1.9
Washington . .	71,400	28,900	2.5	70,100	43,600	141,500	72,500	1.9
Waukesha. . . .	245,300	110,200	2.2	166,800	95,000	412,100	205,200	2.0
Total	1,810,700	704,600	2.6	356,200	297,900	2,166,900	1,002,500	2.2

Source: SEWRPC.

Table L-2

COMPARISON OF THE DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY TRIP PURPOSE: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Trip Purpose Category	Internal Person Trips Generated on An Average Weekday															
	Transit				Automobile Driver				Automobile Passenger				Total			
	1972		2000		1972		2000		1972		2000		1972		2000	
	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total	Number of Trips	Percent of Total
Home-based Work.	70,900	19.8	135,300	21.7	848,800	29.3	1,098,400	29.2	135,800	11.2	130,900	9.6	1,055,500	23.7	1,364,600	23.7
Home-based Shopping . .	18,800	5.2	41,700	6.7	444,500	15.4	571,300	15.1	210,300	17.4	236,700	17.3	673,600	15.1	848,700	14.8
Home-based Other	28,300	7.9	91,500	14.7	976,300	33.8	1,252,800	33.3	528,000	43.7	604,300	44.3	1,532,600	34.3	1,948,600	33.9
Nonhome-based	13,100	3.7	10,800	1.7	555,700	19.2	751,600	20.0	211,000	17.4	238,900	17.5	779,800	17.5	1,001,300	17.4
School	226,700[a]	63.4	344,300[b]	55.2	67,400	2.3	90,000	2.4	124,800	10.3	153,400	11.3	418,900	9.4	587,700	10.2
Total	357,800[a]	100.0	623,600[b]	100.0	2,892,700	100.0	3,764,100	100.0	1,209,900	100.0	1,363,200	100.0	4,460,400	100.0	5,750,900	100.0

[a] *Includes 173,600 school trips made on school buses.*

[b] *Includes 288,600 school trips made on school buses.*

Source: SEWRPC.

Table L-3

COMPARISON OF THE DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE REGION BY MODE OF TRAVEL: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Mode of Travel	Internal Person Trips Generated on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number of Trips	Percent of Total	Number of Trips	Percent Change	Number of Trips	Percent of Total
Automobile Driver.	2,884,700	64.7	879,400	30.5	3,764,100	62.9
Automobile Passenger . . .	1,217,900	27.3	145,300	11.9	1,363,200	24.1
Transit Passenger.	184,200	4.1	150,800	81.9	335,000	7.8
School Bus Passenger	173,600	3.9	115,000	66.2	288,600	5.2
Total	4,460,400	100.0	1,290,500	28.9	5,750,900	100.0

Source: SEWRPC.

Table L-4

COMPARISON OF THE DISTRIBUTION OF INTERNAL PERSON TRIPS IN THE URBANIZED AREAS OF THE REGION BY MODE OF TRAVEL: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Mode of Travel	Internal Person Trips Generated on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number of Trips	Percent of Total	Number of Trips	Percent Change	Number of Trips	Percent of Total
Kenosha Urbanized Area						
Automobile Driver	208,500	66.7	40,400	19.4	248,900	62.8
Automobile Passenger	92,600	29.7	15,000	16.2	107,600	27.1
Transit Passenger	2,900	0.9	15,800	544.8	18,700	4.7
School Bus Passenger	8,300	2.7	12,900	155.4	21,200	5.4
Total	312,300	100.0	84,100	26.9	396,400	100.0
Milwaukee Urbanized Area						
Automobile Driver	2,061,700	64.2	396,900	19.3	2,458,300	63.9
Automobile Passenger	858,300	26.7	36,100	4.2	894,400	23.3
Transit Passenger	177,800	5.5	116,800	65.7	294,600	7.7
School Bus Passenger	116,900	3.6	80,500	68.9	197,400	5.1
Total	3,214,700	100.0	630,000	19.6	3,844,700	100.0
Racine Urbanized Area						
Automobile Driver	233,100	65.6	11,200	4.8	244,300	62.1
Automobile Passenger	105,100	29.6	2,800	2.7	107,900	27.4
Transit Passenger	3,100	0.9	17,600	567.7	20,700	5.3
School Bus Passenger	14,000	3.9	6,500	46.4	20,500	5.2
Total	355,300	100.0	38,100	10.7	393,400	100.0

Source: SEWRPC.

Table L-5

COMPARISON OF THE DISTRIBUTION OF TOTAL VEHICLE TRIPS IN THE REGION BY VEHICLE CLASS 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Vehicle Class	Total Vehicle Trips Generated on An Average Weekday					
	Existing 1972		Planned Increment		Total 2000	
	Number of Trips	Percent of Total	Number of Trips	Percent Change	Number of Trips	Percent of Total
Automobile						
Internal	2,884,700	84.0	879,400	30.5	3,764,100	84.0
External[a]	100,800	2.9	58,500	58.0	159,300	3.5
Other[b]	34,200	1.0	6,200	18.1	40,400	0.9
Subtotal	3,019,600	87.9	944,100	31.3	3,963,800	88.4
Truck						
Internal	383,600	11.2	89,000	23.2	472,600	10.6
External	25,000	0.7	15,800	63.2	40,800	0.9
Other[b]	6,000	0.2	--	--	6,000	0.1
Subtotal	414,600	12.1	104,800	25.3	519,400	11.6
Total	3,434,200	100.0	1,048,900	30.5	4,483,200	100.0

[a] *Includes light trucks, i.e., those under 6,000 pounds gross weight.*

[b] *Includes vehicle trips made by persons residing in group quarters and by nonresidents of the Region.*

Source: SEWRPC.

Table L-6

COMPARISON OF URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO SELECTED SUBAREAS THROUGH TRAVEL ON ARTERIAL STREETS AND HIGHWAYS: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Urbanized Area	Urbanized Area Population		Urbanized Area Population Meeting Travel Time Standard on Arterial Streets and Highways (hundreds)			
			Existing 1972		Proposed 2000	
	Existing 1972	Proposed 2000	Number	Percent	Number	Percent
Kenosha	890	1,333	--	--	--	--
Employment-Related[a]	--	--	890	100.0	1,333	100.0
Major Retail-Service[b]	--	--	--	--	1,299	97.5
Medical Facility[c]	--	--	890	100.0	1,333	100.0
Major Park[d]	--	--	890	100.0	1,333	100.0
Higher Education Facility[e]	--	--	890	100.0	1,333	100.0
Scheduled Air Transport Airport[f]	--	--	890	100.0	1,333	100.0
Milwaukee	12,796	14,721	--	--	--	--
Employment-Related	--	--	12,333	96.4	13,934	94.7
Major Retail-Service	--	--	12,976	100.0	14,494	98.5
Medical Facility	--	--	12,796	100.0	14,721	100.0
Major Park	--	--	12,796	100.0	14,721	100.0
Higher Education Facility	--	--	12,796	100.0	14,721	100.0
Scheduled Air Transport Airport	--	--	12,796	100.0	14,721	100.0
Racine	1,213	1,509	--	--	--	--
Employment-Related	--	--	1,190	98.1	1,509	100.0
Major Retail-Service	--	--	91	7.5	1,509	100.0
Medical Facility	--	--	1,213	100.0	1,509	100.0
Major Park	--	--	1,213	100.0	1,509	100.0
Higher Education Facility	--	--	1,213	100.0	1,509	100.0
Scheduled Air Transport Airport	--	--	1,213	100.0	1,509	100.0

[a] *Standard: 30 minutes overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes overall travel time of a major regional medical center and/or 30 minutes overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes overall travel time of a scheduled air transport airport.*

Source: SEWRPC.

Table L-7

COMPARISON OF URBANIZED AREA POPULATION MEETING TRAVEL TIME STANDARDS TO SELECTED SUBAREAS THROUGH TRAVEL ON TRANSIT: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLANS

Urbanized Area	Urbanized Area Population		Urbanized Area Population Meeting Travel Time Standard on Transit Systems (hundreds)			
			Existing 1972		Proposed 2000	
	Existing 1972	Proposed 2000	Number	Percent	Number	Percent
Kenosha	890	1,333	--	--	--	--
Employment-Related[a]	--	--	408	45.8	1,021	76.1
Major Retail-Service[b]	--	--	--	--	--	--
Medical Facility[c]	--	--	709	79.6	863	64.7
Major Park[d]	--	--	201	22.6	253	19.0
Higher Education Facility[e]	--	--	341	38.3	745	55.9
Scheduled Air Transport Airport[f]	--	--	--	--	--	--
Milwaukee	12,796	14,721	--	--	--	--
Employment-Related	--	--	233	1.8	6,598	44.8
Major Retail-Service	--	--	2,796	21.8	8,172	55.5
Medical Facility	--	--	9,508	74.3	11,480	78.0
Major Park	--	--	7,998	62.5	11,880	80.7
Higher Education Facility	--	--	11,555	90.3	11,952	81.2
Scheduled Air Transport Airport	--	--	2,565	20.0	8,179	55.6
Racine	1,213	1,509	--	--	--	--
Employment-Related	--	--	239	20.0	1,061	70.3
Major Retail-Service	--	--	--	--	--	--
Medical Facility	--	--	455	37.5	559	37.0
Major Park	--	--	262	21.6	482	31.9
Higher Education Facility	--	--	1,012	83.4	1,290	85.5
Scheduled Air Transport Airport	--	--	--	--	--	--

[a] *Standard: 30 minutes overall travel time of 40 percent of urbanized area employment opportunities.*

[b] *Standard: 35 minutes overall travel time of three major retail and service centers.*

[c] *Standard: 40 minutes overall travel time of a major regional medical center and/or 30 minutes overall travel time of a hospital or medical clinic.*

[d] *Standard: 40 minutes overall travel time of a major public outdoor recreation center.*

[e] *Standard: 40 minutes overall travel time of a vocational school, college, or university.*

[f] *Standard: 60 minutes overall travel time of a scheduled air transport airport.*

Source: SEWRPC.

Table L-8

TRANSPORTATION SYSTEM CAPITAL, OPERATION AND MAINTENANCE, AND USER COSTS IN THE REGION OVER THE PERIOD 1976-2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Cost Element	Recommended Plan Costs (dollars)
System Element Costs	
Arterial Streets and Highways	
Construction	1,845,891,000
Operation and Maintenance	504,848,600
Subtotal	2,350,739,600
Nonarterial Streets	
Construction	471,756,600
Operation and Maintenance	579,736,600
Subtotal	1,051,493,200
Mass Transit	
Construction	175,533,000
Operation and Maintenance	1,097,252,000
Subtotal	1,272,785,000
Total–System Element Costs	4,675,017,800
User Costs	
Street and Highway	
Time	36,810,489,000
Out-of-Pocket	22,550,808,000
Accident	4,667,530,000
Subtotal	64,028,827,000
Transit	
Time	3,175,037,000
Accident	28,481,000
Subtotal	3,203,518,000
Total–User Costs	67,232,345,000
Total	71,907,362,800

Source: SEWRPC.

Table L-9

TRANSPORTATION SYSTEM CAPITAL COSTS IN THE REGION OVER THE PERIOD 1976-2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Transportation System Improvement	Recommended Plan Costs (dollars)
Street and Highway System	
Right-of-Way	
Freeways	60,630,000
Surface Arterials	50,865,800
Subtotal	111,495,800
Construction	
Freeways	450,476,000
Surface Arterials	1,081,525,500
Subtotal	1,532,001,500
Nonarterials	174,541,200
Subtotal	1,706,542,700
Resurfacing	
Arterials	202,393,700
Nonarterials	297,215,400
Subtotal	499,609,100
Subtotal–Arterial Streets and Highways	1,845,891,000
Subtotal–Nonarterial Streets and Highways	471,756,600
Total–Arterial and and Nonarterial Streets and Highways	2,317,647,600
Transit System	
Right-of-Way Acquisition	2,333,000
Construction	
Transitway	--
Exclusive Lanes	100,000
Stations and Terminals	11,352,000
Offices, Maintenance, and Storage Buildings	12,648,000
Subtotal	24,100,000
Operating Equipment	
Buses	146,100,000
Supervisory and Maintenance Vehicles, Shelters and Signs, Tools and Spare Parts	3,000,000
Subtotal	149,100,000
Total Transit System	175,533,000
Total Transportation System	2,493,180,600

Source: SEWRPC.

Table L-10

TRANSIT SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION BY URBANIZED AREA OVER THE PERIOD 1976-2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Urbanized Area and Cost Item	Recommended Plan Costs (dollars)
Kenosha Urbanized Area	
Capital Cost	3,128,000
Operation and Maintenance Cost. . .	33,096,000
Average Annual Cost	1,449,000
Milwaukee Urbanized Area	
Capital Cost	168,760,000
Operation and Maintenance Cost. . .	1,029,138,000
Average Annual Cost	47,916,000
Racine Urbanized Area	
Capital Cost	3,645,000
Operation and Maintenance Cost. . .	35,018,000
Average Annual Cost	1,547,000
Southeastern Wisconsin Region	
Capital Cost	175,533,000
Operation and Maintenance Cost. . .	1,097,252,000
Average Annual Cost	50,911,000

Source: SEWRPC.

Table L-11

ARTERIAL STREET AND HIGHWAY SYSTEM CAPITAL AND OPERATION AND MAINTENANCE COSTS IN THE REGION BY COUNTY OVER THE PERIOD 1976-2000 FINAL RECOMMENDED TRANSPORTATION PLAN

County and Cost Item	Recommended Plan Costs (dollars)
Kenosha County	
Capital Cost	
Arterial	179,571,800
Nonarterial	5,879,900
Operation and Maintenance Cost	
Arterial	32,565,000
Nonarterial	42,993,400
Resurfacing Cost	
Arterial	13,949,700
Nonarterial	39,830,900
Total	314,790,700
Average Annual Cost	12,591,600
Milwaukee County	
Capital Cost	
Arterial	637,596,700
Nonarterial	92,938,600
Operation and Maintenance Cost	
Arterial	266,016,300
Nonarterial	290,528,800
Resurfacing Cost	
Arterial	92,142,700
Nonarterial	115,068,600
Total	1,494,291,700
Average Annual Cost	59,771,700
Ozaukee County	
Capital Cost	
Arterial	67,694,300
Nonarterial	11,265,500
Operation and Maintenance Cost	
Arterial	22,525,000
Nonarterial	28,251,200
Resurfacing Cost	
Arterial	14,837,600
Nonarterial	26,095,500
Total	170,669,100
Average Annual Cost	6,826,800
Racine County	
Capital Cost	
Arterial	216,507,900
Nonarterial	21,772,800
Operation and Maintenance Cost	
Arterial	42,807,000
Nonarterial	47,540,100
Resurfacing Cost	
Arterial	14,294,800
Nonarterial	24,893,800
Total	367,816,400
Average Annual Cost	14,712,600
Walworth County	
Capital Cost	
Arterial	96,952,800
Nonarterial	10,054,000
Operation and Maintenance Cost	
Arterial	32,455,000
Nonarterial	36,023,100
Resurfacing Cost	
Arterial	21,327,900
Nonarterial	19,161,500
Total	215,974,300
Average Annual Cost	8,639,000
Washington County	
Capital Cost	
Arterial	135,119,900
Nonarterial	9,534,600
Operation and Maintenance Cost	
Arterial	32,482,800
Nonarterial	34,379,600
Resurfacing Cost	
Arterial	17,214,800
Nonarterial	15,864,900
Total	244,596,600
Average Annual Cost	9,783,900
Waukesha County	
Capital Cost	
Arterial	310,053,900
Nonarterial	23,095,800
Operation and Maintenance Cost	
Arterial	75,997,500
Nonarterial	100,020,400
Resurfacing Cost	
Arterial	28,626,200
Nonarterial	56,300,200
Total	594,094,000
Average Annual Cost	23,763,700
Southeastern Wisconsin Region	
Capital Cost	
Arterial	1,643,497,300
Nonarterial	174,541,200
Operation and Maintenance Cost	
Arterial	504,848,600
Nonarterial	579,736,600
Resurfacing Cost	
Arterial	202,393,700
Nonarterial	297,215,400
Total	3,402,232,800
Average Annual Cost	136,089,300

Source: SEWRPC.

Table L-12

DETAILED COST ESTIMATES OF STREET AND HIGHWAY CONSTRUCTION AND MAINTENANCE: FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN

Kenosha County	
Cost Element	Recommended Plan Costs (dollars)
Right-of-Way	
Standard Arterial	
Rural	5,937,800
Urban Acquisition	2,724,600
Urban Relocation	68,400
Subtotal	8,730,800
Freeway	
Acquisition	5,010,000
Relocation	289,800
Subtotal	5,299,800
Total	14,030,600
Number of Families Relocated	
Arterials	7
Freeways	34
Number of Businesses Relocated	
Arterials	1
Freeways	1
Road Construction	
Arterial	
Standard	113,541,200
Freeway	52,000,000
Subtotal	165,541,200
Nonarterial	5,879,900
Total	171,421,100
Resurfacing	
Arterial	13,949,700
Nonarterial	39,830,900
Total	53,780,600
Road Maintenance	
Arterial	32,565,000
Nonarterial	42,993,400
Total	75,558,400
Year 2000 Annual	
Arterial	1,578,500
Nonarterial	1,943,200
Total Cost	314,790,700

Milwaukee County	
Cost Element	Recommended Plan Costs (dollars)
Right-of-Way	
Standard Arterial	
Rural	--
Urban Acquisition	4,692,800
Urban Relocation	317,400
Subtotal	5,010,200
Freeway	
Acquisition	43,188,000
Relocation	2,792,000
Subtotal	45,980,000
Total	50,990,200
Number of Families Relocated	
Arterials	17
Freeways	576
Number of Businesses Relocated	
Arterials	5
Freeways	39
Road Construction	
Arterial	
Standard	337,030,500
Freeway	249,576,000
Subtotal	586,606,500
Nonarterial	92,938,600
Total	679,545,100
Resurfacing	
Arterial	92,142,700
Nonarterial	115,068,600
Total	207,211,300
Road Maintenance	
Arterial	266,016,400
Nonarterial	290,528,800
Total	556,545,100
Year 2000 Annual	
Arterial	11,805,200
Nonarterial	12,387,000
Total Cost	1,494,291,700

Table 12 (continued)

Ozaukee County	
Cost Element	Recommended Plan Costs (dollars)
Right-of-Way	
Standard Arterial	
Rural	1,460,700
Urban Acquisition	3,193,800
Urban Relocation	249,600
Subtotal	4,904,100
Freeway	
Acquisition	--
Relocation	--
Subtotal	--
Total	4,904,100
Number of Families Relocated	
Arterials	16
Freeways	--
Number of Businesses Relocated	
Arterials	5
Freeways	--
Road Construction	
Arterial	
Standard	62,290,200
Freeway	500,000
Subtotal	62,790,200
Nonarterial	11,265,500
Total	74,055,700
Resurfacing	
Arterial	14,837,600
Nonarterial	26,095,500
Total	40,933,100
Road Maintenance	
Arterial	22,525,000
Nonarterial	28,251,200
Total	50,776,200
Year 2000 Annual	
Arterial	1,003,500
Nonarterial	1,358,900
Total Cost	170,669,100

Racine County	
Cost Element	Recommended Plan Costs (dollars)
Right-of-Way	
Standard Arterial	
Rural	5,047,600
Urban Acquisition	3,004,500
Urban Relocation	299,400
Subtotal	8,351,500
Freeway	
Acquisition	5,010,000
Relocation	840,200
Subtotal	5,850,200
Total	14,201,700
Number of Families Relocated	
Arterials	12
Freeways	72
Number of Businesses Relocated	
Arterials	11
Freeways	7
Road Construction	
Arterial	
Standard	150,306,200
Freeway	52,000,000
Subtotal	202,306,200
Nonarterial	21,772,800
Total	224,079,000
Resurfacing	
Arterial	14,294,800
Nonarterial	24,893,800
Total	39,188,600
Road Maintenance	
Arterial	42,807,000
Nonarterial	47,540,100
Total	90,347,100
Year 2000 Annual	
Arterial	2,115,400
Nonarterial	2,072,600
Total Cost	367,816,400

Table 12 (continued)

Walworth County	
Cost Element	Recommended Plan Costs (dollars)
Right-of-Way	
Standard Arterial	
Rural	3,526,000
Urban Acquisition	964,400
Urban Relocation	7,200
Subtotal	4,497,600
Freeway	
Acquisition	1,100,000
Relocation	100,000
Subtotal	1,200,000
Total	5,697,600
Number of Families Relocated	
Arterials	1
Freeways	2
Number of Businesses Relocated	
Arterials	--
Freeways	2
Road Construction	
Arterial	
Standard	70,255,200
Freeway	21,000,000
Subtotal	91,255,200
Nonarterial	10,054,000
Total	101,309,200
Resurfacing	
Arterial	21,327,900
Nonarterial	19,161,500
Total	40,489,400
Road Maintenance	
Arterial	32,455,000
Nonarterial	36,023,100
Total	68,478,100
Year 2000 Annual	
Arterial	1,427,900
Nonarterial	1,580,900
Total Cost	215,974,300

Washington County	
Cost Element	Recommended Plan Costs (dollars)
Right-of-Way	
Standard Arterial	
Rural	3,300,700
Urban Acquisition	3,407,400
Urban Relocation	28,800
Subtotal	6,736,900
Freeway	
Acquisition	725,000
Relocation	175,000
Subtotal	900,000
Total	7,636,900
Number of Families Relocated	
Arterials	4
Freeways	8
Number of Businesses Relocated	
Arterials	--
Freeways	7
Road Construction	
Arterial	
Standard	93,583,000
Freeway	33,900,000
Subtotal	127,483,000
Nonarterial	9,534,600
Total	137,017,600
Resurfacing	
Arterial	17,214,800
Nonarterial	15,864,900
Total	33,079,700
Road Maintenance	
Arterial	32,482,800
Nonarterial	34,379,600
Total	66,862,400
Year 2000 Annual	
Arterial	1,525,300
Nonarterial	1,773,100
Total Cost	244,596,600

Table 12 (continued)

Waukesha County	
Cost Element	Recommended Plan Costs (dollars)
Right-of-Way	
Standard Arterial	
Rural	7,914,000
Urban Acquisition	4,630,700
Urban Relocation	90,000
Subtotal	12,634,700
Freeway	
Acquisition	1,300,000
Relocation	100,000
Subtotal	1,400,000
Total	14,034,700
Number of Families Relocated	
Arterials	10
Freeways	18
Number of Businesses Relocated	
Arterials	1
Freeways	8
Road Construction	
Arterial	
Standard	254,519,200
Freeway	41,500,000
Subtotal	296,019,200
Nonarterial	23,095,800
Total	319,115,000
Resurfacing	
Arterial	28,626,200
Nonarterial	56,300,200
Total	84,926,400
Road Maintenance	
Arterial	75,997,500
Nonarterial	100,020,400
Total	176,017,900
Year 2000 Annual	
Arterial	3,558,500
Nonarterial	4,806,100
Total Cost	594,094,000

Southeastern Wisconsin Region	
Cost Element	Recommended Plan Costs (dollars)
Right-of-Way	
Standard Arterial	
Rural	27,186,800
Urban Acquisition	22,618,200
Urban Relocation	1,060,800
Subtotal	50,865,800
Freeway	
Acquisition	56,333,000
Relocation	4,297,000
Subtotal	60,630,000
Total	111,495,800
Number of Families Relocated	
Arterials	67
Freeways	710
Number of Businesses Relocated	
Arterials	23
Freeways	64
Road Construction	
Arterial	
Standard	1,081,525,500
Freeway	450,476,000
Subtotal	1,532,001,500
Nonarterial	174,541,200
Total	1,706,542,700
Resurfacing	
Arterial	202,393,700
Nonarterial	297,215,400
Total	499,609,100
Road Maintenance	
Arterial	504,848,600
Nonarterial	579,736,600
Total	1,084,585,200
Year 2000 Annual	
Arterial	23,014,300
Nonarterial	25,921,800
Total Cost	3,402,232,800

Source: SEWRPC.

Table L-13

FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN CAPITAL COSTS BY CATEGORY OF CAPITAL IMPROVEMENT: 1976-2000

Capital Cost Category	Recommended Plan	
	Dollars	Percent
Arterial Street and Highway System		
Preservation	608,863,700	33.0
Improvement	727,083,300	39.4
Expansion	509,944,000	27.6
Subtotal	1,845,891,000	100.0
Transit System		
Preservation	97,982,000	55.8
Improvement	13,100,000	7.5
Expansion	64,451,000	36.7
Subtotal	175,533,000	100.0
Total Transportation System		
Preservation	706,845,700	35.0
Improvement	740,183,300	36.6
Expansion	574,395,000	28.4
Total	2,021,424,000	100.0

Source: SEWRPC.

Table L-15

COMPARISON OF MOTOR FUEL CONSUMPTION BY VEHICLES TRAVELING IN THE REGION BY FUEL TYPE 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Vehicle Type	Annual Motor Fuel Consumption (million gallons)		
	1972	Change 1972-2000	2000
Assuming 1980 Vehicle Efficiency Standards (19 MPG)			
Street and Highway			
Gasoline	546	142	688
Diesel	22	13	35
Subtotal	568	155	723
Transit (Diesel)	8	3	11
Total	576	158	734
Percent Increase over 1972	--	--	27.4
Assuming 1985 Vehicle Efficiency Standards (27 MPG)			
Street and Highway			
Gasoline	546	-66	480
Diesel	22	13	35
Subtotal	568	-53	515
Transit (Diesel)	8	3	11
Total	576	-50	526
Percent Decrease from 1972	--	--	8.7

Source: SEWRPC.

Table L-14

USER AND SYSTEM COSTS AND BENEFIT/COST RATIO: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Transportation Systems Plan	Costs 1976-2025 (dollars)		Benefits	Costs	Benefit/Cost Ratio
	Road User	Capital and Operation and Maintenance			
"No Build"	43,355,181,000	1,685,667,000	--	--	--
Recommended Plan	42,064,443,000	2,607,621,500	1,290,738,000	921,954,500	1.40

Source: SEWRPC.

Table L-16

TRANSIT SERVICE, SYSTEM UTILIZATION, AND PERFORMANCE CHARACTERISTICS IN THE KENOSHA URBANIZED AREA: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Characteristic	Existing 1972	Planned Increment	Total 2000
Service Area			
Square Miles	20.2	18.5	38.7
Population	83,900	37,100	121,000
Percent of Urbanized Area Population	97.0	--	90.8
System Characteristics			
Daily Vehicle Miles			
Primary	--	--	--
Secondary	--	--	--
Tertiary	1,140	5,020	6,160
Total	1,140	5,020	6,160
Vehicle Requirements (buses)			
Peak Period	12	21	33
Midday	6	16	22
Daily Seat Miles	43,300	233,900	277,200
Median Headway (minutes)			
Peak Period	60	- 40	20
Midday	60	- 30	30
Daily Operating Cost	$1,370	$6,030	$7,400
Operating Cost per Vehicle Mile	$ 1.20	--	$ 1.20
Basic Fare	$ 0.25	--	$ 0.25
System Utilization			
Daily Revenue Passengers	2,800	15,900	18,700
Percent Utilization—Passenger Miles Used per Seat Mile Available	22.2	- 7.1	15.1
Average Number of Transfers per Trip	0.6	- 0.6	0.0
Passengers per Vehicle Mile	2.5	0.5	3.0
Passenger Miles per Vehicle Hours	50.6	34.6	85.2
Passenger Miles per Daily Operating Cost	7.0	- 1.3	5.7
Operating Cost per Passenger	$ 0.49	$ - 0.09	$ 0.40
Rides per Capita	6.0	38.8	44.8

Source: SEWRPC.

Table L-17

TRANSIT SERVICE, SYSTEM UTILIZATION, AND PERFORMANCE CHARACTERISTICS IN THE MILWAUKEE URBANIZED AREA: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Characteristic	Existing 1972	Planned Increment	Total 2000
Service Area			
Square Miles	164.8	271.6	436.4
Population	1,043,600	337,000	1,380,600
Percent of Urbanized Area Population	82.3	--	93.8
System Characteristics			
Daily Vehicle Miles			
Primary	1,410	35,510	36,920
Secondary	--[a]	--	48,210
Tertiary	60,670	40,320	100,990
Total	62,080	124,040	186,120
Vehicle Requirements (buses)			
Peak Period	442	585	1,027
Midday	220	407	627
Daily Seat Miles	3,220,640	6,085,460	9,306,100
Median Headway (minutes)			
Peak Period	24.0	--	--
Midday	28.0	--	--
Daily Operating Cost	$75,700	$132,900	$208,600
Operating Cost per Vehicle Mile	$ 1.22	$ - 0.10	$ 1.12
Basic Fare	$ 0.40	$ 0.10	$ 0.50
System Utilization			
Daily Revenue Passengers	177,800	116,800	294,600
Percent Utilization—Passenger Miles Used per Seat Mile Available	36.5	- 19.7	16.8
Average Number of Transfers per Trip	0.4	0.1	0.5
Passengers per Vehicle Mile	2.9	- 1.3	1.6
Passenger Miles per Vehicle Hours	210.1	- 81.6	128.5
Passenger Miles per Daily Operating Cost	15.5	- 8.0	7.5
Operating Cost per Passenger	$ 0.43	$ 0.28	$ 0.71
Rides per Capita	50.2	11.7	61.9

[a] *Included in tertiary.*

Source: SEWRPC.

Table L-18

TRANSIT SERVICE, SYSTEM UTILIZATION, AND PERFORMANCE CHARACTERISTICS IN THE RACINE URBANIZED AREA: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Characteristic	Existing 1972	Planned Increment	Total 2000
Service Area			
Square Miles	17.5	25.1	42.6
Population	100,600	39,900	140,500
Percent of Urbanized Area Population	87.3	--	93.1
System Characteristics			
Daily Vehicle Miles			
Primary	--	--	--
Secondary	--	--	--
Tertiary	1,560	4,770	6,330
Total	1,560	4,770	6,330
Vehicle Requirements (buses)			
Peak Period	10	28	38
Midday	10	17	27
Daily Seat Miles	29,600	255,300	284,900
Median Headway (minutes)			
Peak Period	40	- 20	20
Midday	40	- 10	30
Daily Operating Cost	$1,870	$5,720	$7,590
Operating Cost per Vehicle Mile	$ 1.20	--	$ 1.20
Basic Fare	$ 0.40	$ - 0.15	$ 0.25
System Utilization			
Daily Revenue Passengers	3,100	17,600	20,700
Percent Utilization—Passenger Miles Used per Seat Mile Available	36.9	- 20.6	16.3
Average Number of Transfers per Trip	0.5	- 0.4	0.1
Passengers per Vehicle Mile	2.0	1.3	3.3
Passenger Miles per Vehicle Hours	45.5	33.3	78.8
Passenger Miles per Daily Operating Cost	5.8	0.3	6.1
Operating Cost per Passenger	$ 0.60	$ - 0.23	$ 0.37
Rides per Capita	5.2	37.5	42.7

Source: SEWRPC.

Table L-19

LAND TAKING REQUIREMENTS FOR TRANSPORTATION SYSTEM IMPROVEMENTS IN THE REGION BY COUNTY 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

County and Taking	Recommended Plan
Kenosha County	
Number of Residential Units	41
Number of Nonresidential Structures	2
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$ 14,030,600
Milwaukee County	
Number of Residential Units	593
Number of Nonresidential Structures	44
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$ 50,990,200
Ozaukee County	
Number of Residential Units	16
Number of Nonresidential Structures	5
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$ 4,904,100
Racine County	
Number of Residential Units	84
Number of Nonresidential Structures	18
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$ 14,201,700
Walworth County	
Number of Residential Units	3
Number of Nonresidential Structures	2
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$ 5,697,000
Washington County	
Number of Residential Units	12
Number of Nonresidential Structures	7
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$ 7,636,900
Waukesha County	
Number of Residential Units	28
Number of Nonresidential Structures	9
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$ 14,034,700
Southeastern Wisconsin Region	
Number of Residential Units	777
Number of Nonresidential Structures	87
Acquisition, Demolition, and Relocation Cost, Including Right-of-Way	$111,495,200

Source: SEWRPC.

Table L-20

ESTIMATED IMPACT UPON PRIMARY ENVIRONMENTAL CORRIDORS: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Relationship of New or Improved Transportation Facility to Primary Environmental Corridor	Number of Miles of New or Improved Transportation Facilities Included in Recommended Plan
New Construction within Environmental Corridor	30.6
Reconstruction of Existing Facility within Environmental Corridor	31.2

Source: SEWRPC.

Table L-21

MILES OF ARTERIAL STREETS AND HIGHWAYS WITH TRAFFIC-RELATED NOISE EXCEEDING 70 DBA BY COUNTY: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

County	Arterial Miles Exceeding 70 dba								
	1972			Change 1972-2000			2000		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Kenosha County									
Freeway	--	--	--	12.00	--	12.00	12.00	--	12.00
Standard Arterial	12.15	33.85	46.00	34.45	13.80	48.25	46.60	47.65	94.25
Subtotal	12.15	33.85	46.00	46.45	13.80	60.25	58.60	47.65	106.25
Milwaukee County									
Freeway	--	38.00	38.00	1.50	42.00	43.50	1.50	80.00	81.50
Standard Arterial	--	330.00	330.00	2.10	103.18	105.28	2.10	433.18	435.28
Subtotal	--	368.00	368.00	3.60	145.18	148.78	3.60	513.18	516.78
Ozaukee County									
Freeway	--	--	--	21.60	5.80	27.40	21.60	5.80	27.40
Standard Arterial	27.45	14.55	42.00	-25.94	2.25	-23.69	1.51	16.80	18.31
Subtotal	27.45	14.55	42.00	- 4.34	8.05	3.71	23.11	22.60	45.71
Racine County									
Freeway	--	--	--	17.70	6.00	23.70	17.70	6.00	23.70
Standard Arterial	2.30	36.70	39.00	18.10	48.39	66.49	20.40	85.09	105.49
Subtotal	2.30	36.70	39.00	35.80	54.39	90.19	38.10	91.09	129.19
Walworth County									
Freeway	--	--	--	34.24	1.80	36.04	34.24	1.80	36.04
Standard Arterial	33.65	15.35	49.00	- 0.32	10.10	9.78	33.33	25.45	58.78
Subtotal	33.65	15.35	49.00	33.92	11.90	45.82	67.57	27.25	94.82
Washington County									
Freeway	--	--	--	17.84	1.30	19.14	17.84	1.30	19.14
Standard Arterial	16.00	24.00	40.00	19.35	11.50	30.85	35.35	35.50	70.85
Subtotal	16.00	24.00	40.00	37.19	12.80	49.99	53.19	36.80	89.99
Waukesha County									
Freeway	--	--	--	10.78	18.95	29.73	10.78	18.95	29.73
Standard Arterial	27.20	100.80	128.00	37.33	90.73	128.06	64.53	191.53	256.06
Subtotal	27.20	100.80	128.00	48.11	109.68	157.79	75.31	210.48	285.79
Southeastern Wisconsin Region									
Freeway	--	38.00	38.00	115.66	75.85	191.51	115.66	113.85	229.51
Standard Arterial	118.75	555.25	674.00	85.07	279.95	365.02	203.82	835.20	1,039.02
Total	118.75	593.25	712.00	200.73	355.80	556.53	319.48	949.05	1,268.53

Source: SEWRPC.

Table L-22

TOTAL TRAVEL IN THE REGION ON AN AVERAGE WEEKDAY
1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Travel Characteristics	1972		Change 1972-2000		2000	
	Number	Percent of Total	Number	Percent	Number	Percent of Total
Vehicle Miles of Travel (in thousands)						
Arterial Streets and Highways						
Freeway	6,213	30.9	6,396	102.9	12,609	41.6
Standard Arterial	13,911	69.1	3,612	26.0	17,523	57.8
Subtotal	20,124	100.0	10,008	49.7	30,132	99.4
Transit						
Primary	1	1.5	36	--	37	0.1
Secondary	--[a]	--	48	--	48	0.1
Tertiary	64	98.5	50	78.1	114	0.4
Subtotal	65	100.0	134	206.2	199	0.6
Total	20,189	--	10,142	50.2	30,331	100.0
Vehicle Hours of Travel (in thousands)						
Arterial Streets and Highways						
Freeway	139	22.7	127	91.4	266	32.0
Standard Arterial	474	77.3	77	16.2	551	66.4
Subtotal	613	100.0	204	33.3	817	98.4
Transit						
Primary	--[a]	--	2	--	2	0.2
Secondary	--[a]	--	3	--	3	0.4
Tertiary	6	100.0	2	33.3	8	1.0
Subtotal	6	100.0	7	116.7	13	1.6
Total	619	--	211	34.1	830	100.0
Passenger Hours of Travel (in thousands)						
Arterial Streets and Highways	858	93.7	253	29.5	1,111	92.5
Transit	58	6.3	32	55.2	90	7.5
Total	916	100.0	285	31.1	1,201	100.0

[a] *Included in tertiary.*

Source: SEWRPC.

Table L-23

DISTRIBUTION OF MILES OF ARTERIAL STREETS AND HIGHWAY FACILITIES OPERATING AT VARIOUS SERVICE LEVELS IN THE REGION BY COUNTY: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

County and Service Level	Miles of Arterial Facility					
	1972		Change 1972-2000		2000	
	Number	Percent of Total	Number	Percent	Number	Percent of Total
Kenosha County						
Under Design Capacity[a]	243.1	86.9	64.8	26.7	307.9	85.6
At Design Capacity[b]	14.7	5.3	33.8	229.9	48.5	13.5
Over Design Capacity[c]	22.0	7.8	- 18.8	- 85.5	3.2	0.9
Subtotal	279.8	100.0	79.8	28.5	359.6	100.0
Milwaukee County						
Under Design Capacity[a]	601.4	81.9	16.4	2.7	617.8	79.7
At Design Capacity[b]	71.8	9.8	59.0	82.2	130.8	16.9
Over Design Capacity[c]	61.0	8.3	- 34.5	- 56.6	26.5	3.4
Subtotal	734.2	100.0	40.9	5.6	775.1	100.0
Ozaukee County						
Under Design Capacity[a]	234.7	93.8	64.2	27.4	298.9	96.1
At Design Capacity[b]	10.1	4.0	1.9	18.8	12.0	3.9
Over Design Capacity[c]	5.5	2.2	- 5.5	- 100.0	0.0	0.0
Subtotal	250.3	100.0	60.6	24.2	310.9	100.0
Racine County						
Under Design Capacity[a]	310.0	88.7	109.5	35.3	419.5	94.8
At Design Capacity[b]	19.1	5.5	3.7	19.4	22.8	5.2
Over Design Capacity[c]	20.3	5.8	- 20.3	- 100.0	0.0	0.0
Subtotal	349.4	100.0	92.9	26.6	442.3	100.0
Walworth County						
Under Design Capacity[a]	400.7	98.2	72.1	18.0	472.8	97.8
At Design Capacity[b]	2.7	0.7	7.7	285.2	10.4	2.2
Over Design Capacity[c]	4.8	1.2	- 4.8	- 100.0	0.0	0.0
Subtotal	408.2	100.0	75.0	18.4	483.2	100.0
Washington County						
Under Design Capacity[a]	320.4	94.5	98.8	30.8	419.2	95.8
At Design Capacity[b]	9.7	2.9	8.7	89.7	18.4	4.2
Over Design Capacity[c]	9.1	2.7	- 9.1	- 100.0	0.0	0.0
Subtotal	339.2	100.0	98.4	29.0	437.6	100.0
Waukesha County						
Under Design Capacity[a]	581.8	89.7	25.0	4.3	606.8	84.6
At Design Capacity[b]	23.8	3.7	77.6	326.1	101.4	14.1
Over Design Capacity[c]	42.9	6.6	- 33.7	- 78.6	9.2	1.3
Subtotal	648.5	100.0	68.9	10.6	717.4	100.0
Southeastern Wisconsin Region						
Under Design Capacity[a]	2,692.1	89.5	450.8	16.7	3,142.9	89.1
At Design Capacity[b]	151.9	5.0	192.4	126.7	344.3	9.8
Over Design Capacity[c]	165.6	5.5	- 126.7	- 76.5	38.9	1.1
Total	3,009.6	100.0	516.5	17.2	3,526.1	100.0

[a] *Volume-to-capacity ratio.*

[b] *Volume-to-capacity ratio.*

[c] *Volume-to-capacity ratio.*

Source: SEWRPC.

Table L-24

DISTRIBUTION OF PASSENGER MILES OF TRAVEL IN THE REGION BY MODE AND FACILITY TYPE: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Mode/Facility Type	Passenger Miles of Travel on An Average Weekday (thousands)	
	Number	Percent
Freeways	17,148	40.2
Mass Transit	1,655	3.9
Subtotal	18,803	44.1
Standard Arterials	23,831	55.9
Total	42,634	100.0

Source: SEWRPC.

Table L-25

TRAFFIC ACCIDENT EXPERIENCE AND COST ON THE TRANSPORTATION SYSTEM IN THE REGION BY COUNTY 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

County and Accident Characteristics	Street and Highway Systems Cumulative Accident Experience and Cost[a]: 1975-2000
Kenosha	
Number of Property Damage Accidents	154,285
Number of Injuries	50,265
Number of Fatalities	1,065
Cost of Accidents	$ 413.20
Milwaukee	
Number of Property Damage Accidents	1,436,862
Number of Injuries	298,170
Number of Fatalities	2,415
Cost of Accidents	$2,143.69
Ozaukee	
Number of Property Damage Accidents	75,948
Number of Injuries	25,026
Number of Fatalities	532
Cost of Accidents	$ 205.61
Racine	
Number of Property Damage Accidents	168,412
Number of Injuries	55,094
Number of Fatalities	1,166
Cost of Accidents	$ 452.49
Walworth	
Number of Property Damage Accidents	106,746
Number of Injuries	35,270
Number of Fatalities	749
Cost of Accidents	$ 289.59
Washington	
Number of Property Damage Accidents	106,983
Number of Injuries	35,045
Number of Fatalities	742
Cost of Accidents	$ 287.81
Waukesha	
Number of Property Damage Accidents	326,132
Number of Injuries	106,402
Number of Fatalities	2,260
Cost of Accidents	$ 875.14
Southeastern Wisconsin Region	
Number of Property Damage Accidents	2,375,368
Number of Injuries	605,272
Number of Fatalities	8,929
Cost of Accidents	$4,667.53

Transit System and Accident Experience	Transit System Cumulative Accident Experience and Cost 1976-2000
Southeastern Wisconsin Region	
Number of Passenger Accidents	18,157
Number of Vehicle Accidents	15,978
Number of Fatalities	50
Cost of Accidents	$28,481,410

Southeastern Wisconsin Region	
Total Cost of Accidents	$4,696,010,000

[a] *Million dollars.*

Source: SEWRPC.

Table L-26

VEHICLE MILES OF TRAVEL ON THE ARTERIAL STREET AND HIGHWAY SYSTEM IN THE REGION
BY COUNTY: 1972 AND 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

County	Arterial Vehicle Miles of Travel on An Average Weekday (thousands)					
	1972		Change 1972-2000		2000	
	Number	Percent of Total	Number	Percent	Number	Percent of Total
Kenosha						
Freeway	382	26.8	499	130.6	881	31.1
Standard Arterial	1,046	73.2	902	86.2	1,948	68.9
Subtotal	1,428	100.0	1,401	98.1	2,829	100.0
Milwaukee						
Freeway	3,977	37.2	1,917	48.2	5,894	47.6
Standard Arterial	6,718	62.8	- 241	- 3.6	6,477	52.4
Subtotal	10,695	100.0	1,676	15.7	12,371	100.0
Ozaukee						
Freeway	223	26.2	459	205.8	682	44.9
Standard Arterial	627	73.8	210	33.5	837	55.1
Subtotal	850	100.0	669	78.7	1,519	100.0
Racine						
Freeway	415	22.9	762	183.6	1,177	38.2
Standard Arterial	1,398	77.1	505	36.1	1,903	61.8
Subtotal	1,813	100.0	1,267	69.9	3,080	100.0
Walworth						
Freeway	56	6.4	1,180	2,107.1	1,236	50.4
Standard Arterial	817	93.6	397	48.6	1,214	49.6
Subtotal	873	100.0	1,577	180.6	2,450	100.0
Washington						
Freeway	190	16.5	662	348.4	852	42.6
Standard Arterial	961	83.5	186	19.4	1,147	57.4
Subtotal	1,151	100.0	848	73.7	1,999	100.0
Waukesha						
Freeway	970	29.3	917	94.5	1,887	32.1
Standard Arterial	2,344	70.7	1,653	70.5	3,997	67.9
Subtotal	3,314	100.0	2,570	77.5	5,884	100.0
Southeastern Wisconsin Region						
Freeway	6,213	30.9	6,396	102.9	12,609	41.8
Standard Arterial	13,911	69.1	3,612	26.0	17,523	58.2
Total	20,124	100.0	10,008	49.7	30,132	100.0

Source: SEWRPC.

Table L-27

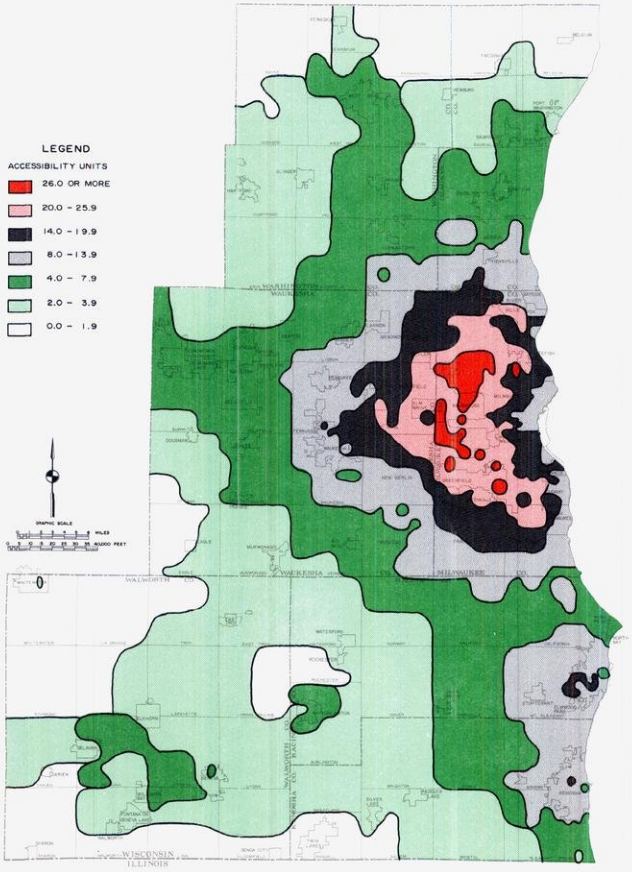
AVERAGE ANNUAL COSTS AND REVENUES: 2000 FINAL RECOMMENDED TRANSPORTATION PLAN

Costs and Revenues	Alternative Revenue Forecasts (millions of dollars)	
	1960-1972 Trend	Modified Trend
Average Annual Cost		
Street and Highway System . . .	136.1	136.1
Transit System	50.9	50.9
Total	187.0	187.0
Average Annual Revenues		
Street and Highway System . . .	191.7	171.3
Transit System (fare box revenue only)	25.8	13.9
Total	217.5	185.2
Surplus	30.5	--
Deficit.	--	1.8

Source: SEWRPC.

Map L-1

ACCESSIBILITY TO LAND USE ACTIVITY IN THE REGION: 2000 FINAL RECOMMENDED REGIONAL TRANSPORTATION PLAN



Source: SEWRPC.

Table L-28

COMPARISON OF THE RELATIVE ABILITY OF THE "NO BUILD" PLAN AND THE 2000 FINAL RECOMMENDED TRANSPORTATION PLAN TO MEET THE TRANSPORTATION DEVELOPMENT STANDARDS

Development Objective and Supporting Standards	"No Build" Plan		Recommended Plan	
Objective No. 1—Effectively Serve Regional Land Use Pattern				
1. Serve Urbanized Area Land Uses				
Percent of Population Served	Highway	Transit	Highway	Transit
a. Employment Opportunities	94.5	14.1	94.7	44.8
b. Major Retail and Service Centers	99.2	5.0	98.5	55.5
c. Medical Center Hospital/Clinic	100.0	45.4	100.0	78.0
d. Major Outdoor Recreation Center	100.0	36.5	100.0	80.7
e. Higher Educational Facility	100.0	57.7	100.0	81.2
f. Scheduled Air Transport Airport	100.0	10.7	100.0	55.6
2. Adequate Accessibility	$148,050 \times 10^6$		$147,800 \times 10^6$	
Objective No. 2—Minimize Costs and Energy Utilization				
1. Minimize Sum of Transportation System Capital and Operating Costs	$72,591 Million		$71,907 Million	
2. Direct Benefits Exceed Direct Costs (ratio)	--		1.4	
3. Maximize Use of Existing Facilities	$92.8 Million		$1,314.6 Million	
4. Minimize Energy Utilization, Particularly Petroleum-Based Fuels	758 Million Gallons		734 Million Gallons	
Objective No. 3—Provide Flexible, Balanced Transportation System				
1. Arterial Street and Highway System				
a. Arterial Spacing	Met		Met	
b. Freeway Warrants	Not Met		Met	
2. Transit System				
a. Mass Transit Warrants Percent Cost Paid by Equivalent Farebox Revenue	88.9		70.3	
b. Minimize Subsidy per Ride	$0.16		$0.34	
c. Primary Rapid Transit Warrants	Not Met		Met	
d. Primary/Secondary Transit to Reduce Peak Hour Congestion	Not Met		Met	
e. Primary/Secondary Transit Collection-Distribution	Not Met		Met	
f. Service Area (square miles)	281.1		436.4	
Percent of Population of Urbanized Area Served	73.2		93.8	
g. Transit Route Alignment Transfers/Trip	0.4		0.5	
h. Median Headways—Peak	20.0 Minutes		16.0 Minutes	
—Midday	24.0 Minutes		20.5 Minutes	
i. Transit Stop Spacing	Met		Met	
j. Transit User Walking Distance in CBD	Met		Met	
k. Percent Transit to Milwaukee CBD	13.5		25.3	
l. Elderly-Handicapped Transit Service	Could be Met		Could be Met	
3. Parking				
a. Transit Station Parking	Not Met		Met	
b. Parking Spaces in CBD per 1,000 Auto CBD Destinations	330		400	
c. CBD Walking Distance for Short-Term Parkers	Could be Met		Could be Met	
4. System Adaptability	Could be Met		Could be Met	
Objective No. 4—Minimize Disruption				
1. Advance Right-of-Way Reservation	Could be Met		Could be Met	
2. Minimize Penetration of Neighborhood Units	Met		Could be Met	
3. Minimize Dislocation of Households and Nonresidential Structures	9 Households 4 Nonresidential Structures		777 Households 87 Nonresidential Structures	
4. Minimize Penetration of Environmental Corridors	Met		61.8 Miles	
5. Minimize Land Used for Transportation and Terminal Facilities (cost of right-of-way)	$3,164,000		$106,138,000	
6. Minimize Property Tax Base Reduction	$3,164,000		$106,138,000	
7. Minimize Harmful and Annoying Noise Exposure	1,011 Miles		1,269 Miles	
8. Minimize Destruction of Cultural Sites	Could be Met		Could be Met	
Objective No. 5—Facilitate Traffic Flow				
1. Minimize Passenger Hours of Travel	1,233,000 Hours/Day		1,201,000 Hours/Day	
2. Minimize Vehicle Hours of Travel	866,000 Hours/Day		830,000 Hours/Day	
3. Minimize Vehicle Miles of Travel	31,470,000 Miles/Day		30,331,000 Miles/Day	
4. Adequate Street and Highway Capacity (volume-to-capacity ratio equal to or less than 1.1)	86.7 Percent		98.9 Percent	
5. Adequate Transit Capacity (load capacity of less than 1.0)	Met		Met	
6. Overall Travel Speeds	Met		Met	
Objective No. 6—Reduce Accident Exposure				
1. Maximize Travel on Facilities with Lowest Accident Exposure	36.8 Percent of Passenger Miles of Travel		44.1 Percent of Passenger Miles of Travel	
2. Maintain Volume-to-Capacity Ratio Equal to or Less than 0.9	75.5 Percent		89.1 Percent	
3. Provide Railroad Grade Separation or Warning Devices as Warranted	Could be Met		Could be Met	
Objective No. 7—Aesthetic Quality				
1. Minimize Destruction of Visually Pleasing Objects and Vistas	Could be Met		Could be Met	
2. Provide Aesthetic Quality Design Standards	Could be Met		Could be Met	

Source: SEWRPC.

Table L-29

FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES SELECTED SYSTEM CHARACTERISTICS FOR THE SOUTHEASTERN WISCONSIN REGION

Plan Element	Alternative Transportation–2000					
	1972 Base Year	"No Build" Plan	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Arterial Street and Highway System						
Freeway (Miles)	163	238	344	344	344	238
Standard Arterial (Miles)	2,847	3,072	3,145	3,144	3,144	3,212
Total (Miles)	3,010	3,310	3,489	3,488	3,488	3,450
Mass Transit System-Milwaukee						
Round Trip Route Miles						
Primary	150	271	1,062	1,092	1,092	993
Secondary	56	14	351	353	353	361
Tertiary	855	1,275	1,653	1,645	1,645	1,675
Total	1,061	1,560	3,066	3,090	3,090	3,029
Special Facilities						
Transitway (Miles)	--	--	20	--	--	--
Exclusive Lanes (Miles)	--	--	10	10	10	10
Stations	--	16	44	38	38	32
Number of Buses Required	442	436	1,093	1,091	1,085	1,212
Basic Fare	$0.40	$0.50	$0.50	$0.25	$0.50	$0.25
Average Total CBD Work Trip Parking Fee	$0.38	$0.54	$0.54	$0.64	$1.00	$0.64
Mass Transit System-Kenosha						
Round Trip Route Miles	59	130	147	147	147	147
Number of Buses Required	12	31	33	33	33	33
Basic Fare	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25
Mass Transit System-Racine						
Round Trip Route Miles	81	132	153	153	153	153
Number of Buses Required	10	26	38	38	38	38
Basic Fare	$0.40	$0.25	$0.25	$0.25	$0.25	$0.25
Travel Demand Characteristics						
Automobile Availability (Thousands)	705	1,096	992	993	993	998
Average Weekday Internal Person Trips (Millions)	4.46	5.88	5.74	5.74	5.74	5.74
Average Weekday Transit Trips	184,200	160,900	346,700	448,200	347,100	483,700
Proportion of Trips Made by Transit (Percent)	4.1	2.7	6.1	7.9	6.1	8.4
Estimated Yearly Transit Revenue Passengers (Millions)	53.7	46.7	100.5	130.0	100.7	140.3
Historical Equivalent of Proposed Transit Utilization (Year)	--	1975	1960	1956	1960	1955
Vehicle Miles of Travel						
Total (Millions)	20.12	31.40	30.41	29.86	30.24	29.74
On Freeway (Millions)	6.21	11.34	13.31	13.06	12.86	9.80
Percent of Total on Freeway	31	36	44	44	43	33
Arterial Street and Highway Congestion						
Over Capacity (Miles)	166	439	26	30	37	121
Over Capacity (Percent of Total System)	6	13	1	1	1	4
At Capacity (Miles)	152	369	289	264	341	516
At Capacity (Percent of Total System)	5	11	8	8	10	15
Proportion of Total Person Travel on Safest Facilities						
Freeways (Percent)	30	36	42	41	41	31
Mass Transit (Percent)	4	1	4	6	4	6
Motor Fuel Consumption						
Average Annual (Millions of Gallons)	576	667	656	652	737	656
Average Annual Assuming 50 Percent Increase in Automobile Vehicle Efficiency (Millions of Gallons)	576	557	551	547	528	552
Noise						
Miles of Transportation Facilities Exceeding 70 dba	712	1,011	1,272	1,272	1,274	1,020
Dislocation						
Number of Residential Units	--	9	2,073	1,936	1,870	193
Number of Nonresidential Units	--	4	215	190	192	59

Source: SEWRPC.

Table L-30

FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES COSTS AND REVENUES FOR THE SOUTHEASTERN WISCONSIN REGION

Plan Element	Alternative Transportation Plans—2000				
	"No Build" Plan	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Average Annual Public Cost (Millions)					
Capital					
Highways	50.2	99.1	98.7	99.2	76.9
Transit	3.7	11.7	8.1	7.4	7.9
Subtotal	53.9	110.8	106.8	106.6	84.8
Operation and Maintenance					
Highways	40.9	43.2	43.1	43.1	42.8
Transit	23.0	45.2	46.5	44.9	47.9
Subtotal	63.9	88.4	89.6	88.0	90.7
Total	117.8	199.2	196.4	194.6	175.5
Average Annual Public Revenues—Includes Anticipated Transit Farebox Revenues (Millions)					
Historic Trend (1960-1972)	209.3	218.1	213.8	218.1	214.8
Modified Trend	183.2	185.3	184.3	185.3	184.5
Transportation System Cost/Revenue Analysis					
Historic Trend					
Average Annual Costs (Millions)	117.8	199.2	196.4	194.6	175.5
Average Annual Revenues (Millions)	209.3	218.1	213.8	218.1	214.8
Difference (Revenue minus Costs-Millions)	91.5	18.9	17.4	23.5	39.3
Modified Trend					
Average Annual Costs (Millions)	117.8	199.2	196.4	194.6	175.5
Average Annual Revenues (Millions)	183.2	185.3	184.3	185.3	184.5
Difference (Revenue minus Costs-Millions)	65.4	- 13.9	- 12.1	- 9.3	9.0
Average Annual Public Transit Subsidy Required					
Historic Trend (Millions)	9.1	30.5	32.5	25.9	32.7
Modified Trend (Millions)	14.8	42.9	41.6	38.3	42.6
Economic Analysis[a]					
Capital Costs (Millions)	690.0	1,424.2	1,373.3	1,371.0	1,093.5
Operation and Maintenance Costs (Millions)	995.7	1,341.0	1,360.0	1,336.5	1,373.9
Total (Millions)	1,685.7	2,765.2	2,733.3	2,707.5	2,467.4
User Costs (Millions)	43,355.2	42,179.4	42,033.8	42,265.2	42,655.7
Benefit/Cost Ratio	--	1.09	1.26	1.07	0.89

[a] *Present worth cumulative total 1975-2025.*

Source: SEWRPC.

Table L-31

FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES
KENOSHA COUNTY

Plan Element	1972 Base Year	Alternative Transportation Plans—2000				
		"No Build" Plan	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Arterial Street and Highway System						
Freeway (Miles)	12	12	24	24	24	12
2-Lane Standard Arterial (Miles)	244	287	261	261	261	261
4-Lane Standard Arterial (Miles)	24	33	63	63	63	75
6-Lane Standard Arterial (Miles)	--	--	10	10	10	10
Total (Miles)	280	332	358	358	358	358
Mass Transit System-Kenosha						
Round Trip Route Miles	59	130	147	147	147	147
Number of Buses Required	12	31	33	33	33	33
Basic Fare	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25
Automobile Availability (Thousands)	49	87	87	87	87	87
Vehicle Miles of Travel						
Total (Millions)	1.43	3.02	2.83	2.84	2.83	2.84
On Freeway (Millions)	0.38	0.76	0.90	0.89	0.88	0.61
Percent of Total on Freeway	27	25	32	31	31	22
Arterial Street and Highway Congestion						
Over Capacity (Miles)	22	72	3	3	3	16
Over Capacity (Percent of Total System)	8	22	1	1	1	5
At Capacity (Miles)	14	53	48	48	48	88
At Capacity (Percent of Total System)	5	16	13	13	13	25
Noise						
Miles of Transportation Facilities Exceeding 70 dba	46	91	106	106	106	74
Dislocation						
Number of Residential Units	--	--	51	51	51	20
Number of Nonresidential Units	--	--	5	5	5	9

Source: SEWRPC.

Table L-32

FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES
MILWAUKEE COUNTY

Plan Element	1972 Base Year	Alternative Transportation Plans–2000				
		"No Build" Plan	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Arterial Street and Highway System						
Freeway (Miles)	64	69	94	94	94	70
2-Lane Standard Arterial (Miles)	339	232	301	302	302	294
4-Lane Standard Arterial (Miles)	269	293	326	324	324	308
6-Lane Standard Arterial (Miles)	62	143	55	55	55	80
Total (Miles)	734	737	776	775	775	752
Mass Transit System-Milwaukee						
Round Trip Route Miles						
Primary	150	271	1,062	1,092	1,092	993
Secondary	56	14	351	353	353	361
Tertiary	855	1,275	1,653	1,645	1,645	1,675
Total	1,061	1,560	3,066	3,090	3,090	3,029
Special Facilities						
Transitway (Miles)	--	--	20	--	--	--
Exclusive Lanes (Miles)	--	--	10	10	10	10
Stations	--	16	44	38	38	32
Number of Buses Required	442	436	1,093	1,191	1,085	1,212
Basic Fare	$0.40	$0.50	$0.50	$0.25	$0.50	$0.25
Average Total CBD Work Trip Parking Fee	$0.38	$0.54	$0.54	$0.64	$1.00	$0.64
Automobile Availability (Thousands)	387	517	419	419	419	423
Vehicle Miles of Travel						
Total (Millions)	10.70	13.53	12.70	12.22	12.51	11.85
On Freeway (Millions)	3.98	5.98	6.52	6.30	6.13	4.67
Percent of Total on Freeway	37	44	51	52	49	39
Arterial Street and Highway Congestion						
Over Capacity (Miles)	61	94	10	11	19	58
Over Capacity (Percent of Total System)	8	13	1	1	2	8
At Capacity (Miles)	72	93	93	69	115	169
At Capacity (Percent of Total System)	10	13	12	9	15	23
Noise						
Miles of Transportation Facilities Exceeding 70 dba	368	464	517	517	519	469
Dislocation						
Number of Residential Units	--	9	1,804	1,667	1,667	27
Number of Nonresidential Units	--	4	165	140	140	7

Source: SEWRPC.

Table L-33

FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES
OZAUKEE COUNTY

Plan Element	1972 Base Year	Alternative Transportation Plans—2000				
		"No Build" Plan	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Arterial Street and Highway System						
Freeway (Miles)	11	28	28	28	28	28
2-Lane Standard Arterial (Miles)	233	271	254	254	254	254
4-Lane Standard Arterial (Miles)	7	5	28	28	28	28
6-Lane Standard Arterial (Miles)	--	--	--	--	--	--
Total (Miles)	251	304	310	310	310	310
Mass Transit System-Milwaukee						
Round Trip Route Miles						
Primary	150	271	1,062	1,092	1,092	993
Secondary	56	14	351	353	353	361
Tertiary	855	1,275	1,653	1,645	1,645	1,675
Total	1,061	1,560	3,066	3,090	3,090	3,029
Special Facilities						
Transitway (Miles)	--	--	20	--	--	--
Exclusive Lanes (Miles)	--	--	10	10	10	10
Stations	--	16	44	38	38	32
Number of Buses Required	442	436	1,093	1,191	1,085	1,212
Basic Fare	$0.40	$0.50	$0.50	$0.25	$0.50	$0.25
Average Total CBD Work Trip Parking Fee	$0.38	$0.54	$0.54	$0.64	$1.00	$0.64
Automobile Availability (Thousands)	27	58	57	57	57	58
Vehicle Miles of Travel						
Total (Millions)	0.85	1.62	1.48	1.47	1.48	1.50
On Freeway (Millions)	0.22	0.75	0.66	0.65	0.64	0.66
Percent of Total on Freeway	26	46	45	44	44	44
Arterial Street and Highway Congestion						
Over Capacity (Miles)	6	20	--	--	--	--
Over Capacity (Percent of Total System)	2	7	--	--	--	--
At Capacity (Miles)	10	15	6	8	8	4
At Capacity (Percent of Total System)	4	5	2	3	3	1
Noise						
Miles of Transportation Facilities Exceeding 70 dba	42	44	45	45	45	47
Dislocation						
Number of Residential Units	--	--	16	16	16	16
Number of Nonresidential Units	--	--	5	5	5	5

Source: SEWRPC.

Table L-34

FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES
RACINE COUNTY

Plan Element	1972 Base Year	Alternative Transportation Plans–2000				
		"No Build" Plan	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Arterial Street and Highway System						
Freeway (Miles)	12	12	24	24	24	12
2-Lane Standard Arterial (Miles)	304	343	310	310	310	310
4-Lane Standard Arterial (Miles)	28	33	61	61	61	73
6-Lane Standard Arterial (Miles)	6	2	14	14	14	14
Total (Miles)	350	390	409	409	409	409
Mass Transit System-Racine						
Round Trip Route Miles	81	132	153	153	153	153
Number of Buses Required	10	26	38	38	38	38
Basic Fare	$0.40	$0.25	$0.25	$0.25	$0.25	$0.25
Automobile Availability (Thousands)	71	103	102	102	102	102
Vehicle Miles of Travel						
Total (Millions)	1.81	3.16	3.11	3.10	3.09	3.14
On Freeway (Millions)	0.42	0.92	1.20	1.19	1.19	0.90
Percent of Total on Freeway	23	29	39	38	39	29
Arterial Street and Highway Congestion						
Over Capacity (Miles)	20	63	--	--	--	18
Over Capacity (Percent of Total System)	6	16	--	--	--	4
At Capacity (Miles)	19	46	29	29	29	61
At Capacity (Percent of Total System)	5	12	7	7	7	15
Noise						
Miles of Transportation Facilities Exceeding 70 dba	39	79	126	126	126	81
Dislocation						
Number of Residential Units	--	--	111	111	111	46
Number of Nonresidential Units	--	--	16	16	16	13

Source: SEWRPC.

Table L-35

FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES
WALWORTH COUNTY

Plan Element	1972 Base Year	Alternative Transportation Plans—2000				
		"No Build" Plan	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Arterial Street and Highway System						
Freeway (Miles)	19	50	67	67	67	50
2-Lane Standard Arterial (Miles)	379	391	389	389	389	374
4-Lane Standard Arterial (Miles)	10	10	27	27	27	46
6-Lane Standard Arterial (Miles)	--	--	--	--	--	--
Total (Miles)	408	451	483	483	483	470
Automobile Availability (Thousands)	32	49	49	49	49	49
Vehicle Miles of Travel						
Total (Millions)	0.87	1.96	2.44	2.44	2.44	2.54
On Freeway (Millions)	0.06	0.50	1.23	1.24	1.23	0.87
Percent of Total on Freeway	6	25	50	51	51	34
Arterial Street and Highway Congestion						
Over Capacity (Miles)	5	34	--	--	--	18
Over Capacity (Percent of Total System)	1	8	--	--	--	4
At Capacity (Miles)	3	27	10	10	10	19
At Capacity (Percent of Total System)	1	6	2	2	2	4
Noise						
Miles of Transportation Facilities Exceeding 70 dba	49	74	96	96	96	77
Dislocation						
Number of Residential Units	--	--	3	3	3	11
Number of Nonresidential Units	--	--	2	2	2	10

Source: SEWRPC.

Table L-36

FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES
WASHINGTON COUNTY

Plan Element	1972 Base Year	Alternative Transportation Plans–2000				
		"No Build" Plan	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Arterial Street and Highway System						
Freeway (Miles)	7	9	42	42	42	9
2-Lane Standard Arterial (Miles)	306	374	368	368	368	368
4-Lane Standard Arterial (Miles)	27	28	31	31	64	64
6-Lane Standard Arterial (Miles)	--	--	--	--	--	--
Total (Miles)	340	411	441	441	441	441
Mass Transit System-Milwaukee						
Round Trip Route Miles						
Primary	150	271	1,062	1,092	1,092	993
Secondary	56	14	351	353	353	361
Tertiary	855	1,275	1,653	1,645	1,645	1,675
Total	1,061	1,560	3,066	3,090	3,090	3,029
Special Facilities						
Transitway (Miles)	--	--	20	--	--	--
Exclusive Lanes (Miles)	--	--	10	10	10	10
Stations	--	16	44	38	38	32
Number of Buses Required	442	436	1,093	1,191	1,085	1,212
Basic Fare	$0.40	$0.50	$0.50	$0.25	$0.50	$0.25
Average Total CBD Work Trip Parking Fee	$0.38	$0.54	$0.54	$0.64	$1.00	$0.64
Automobile Availability (Thousands)	29	73	73	73	73	73
Vehicle Miles of Travel						
Total (Millions)	1.15	1.89	2.02	2.02	2.04	1.98
On Freeway (Millions)	0.19	0.25	0.87	0.88	0.88	0.30
Percent of Total on Freeway	17	13	43	43	43	15
Arterial Street and Highway Congestion						
Over Capacity (Miles)	9	32	--	--	--	--
Over Capacity (Percent of Total System)	3	8	--	--	--	--
At Capacity (Miles)	10	52	16	16	16	37
At Capacity (Percent of Total System)	3	13	4	4	4	8
Noise						
Miles of Transportation Facilities Exceeding 70 dba	40	48	92	92	92	61
Dislocation						
Number of Residential Units	--	--	12	12	12	11
Number of Nonresidential Units	--	--	12	12	12	10

Source: SEWRPC.

Table L-37

FINAL REGIONAL TRANSPORTATION PLAN ALTERNATIVES
WAUKESHA COUNTY

Plan Element	1972 Base Year	Alternative Transportation Plans—2000				
		"No Build" Plan	Plan A	Plan A'(25)	Plan A'(50)	Plan R
Arterial Street and Highway System						
Freeway (Miles)	38	58	65	65	65	58
2-Lane Standard Arterial (Miles)	566	584	498	498	498	498
4-Lane Standard Arterial (Miles)	41	43	132	132	132	135
6-Lane Standard Arterial (Miles)	4	2	18	18	18	20
Total (Miles)	649	687	713	713	713	711
Mass Transit System-Milwaukee						
Round Trip Route Miles						
Primary	150	271	1,062	1,092	1,092	993
Secondary	56	14	351	353	353	361
Tertiary	855	1,275	1,653	1,645	1,645	1,675
Total	1,061	1,560	3,066	3,090	3,090	3,029
Special Facilities						
Transitway (Miles)	--	--	20	--	--	--
Exclusive Lanes (Miles)	--	--	10	10	10	10
Stations	--	16	44	38	38	32
Number of Buses Required	442	436	1,093	1,191	1,085	1,212
Basic Fare	$0.40	$0.50	$0.50	$0.25	$0.50	$0.25
Average Total CBD Work Trip Parking Fee	$0.38	$0.54	$0.54	$0.64	$1.00	$0.64
Automobile Availability (Thousands)	110	209	205	205	205	205
Vehicle Miles of Travel						
Total (Millions)	3.31	6.22	5.83	5.78	5.86	5.88
On Freeway (Millions)	0.97	2.19	1.93	1.93	1.90	1.79
Percent of Total on Freeway	29	35	33	33	32	30
Arterial Street and Highway Congestion						
Over Capacity (Miles)	43	125	14	17	15	11
Over Capacity (Percent of Total System)	7	18	2	2	2	2
At Capacity (Miles)	24	84	87	83	115	137
At Capacity (Percent of Total System)	4	12	12	12	16	20
Noise						
Miles of Transportation Facilities						
Exceeding 70 dba	128	212	291	291	291	213
Dislocation						
Number of Residential Units	--	--	76	76	76	62
Number of Nonresidential Units	--	--	10	10	10	5

Source: SEWRPC.

Appendix M

MODEL RESOLUTION FOR ADOPTION OF THE REGIONAL LAND USE AND REGIONAL TRANSPORTATION PLANS FOR SOUTHEASTERN WISCONSIN—2000

The following resolution is intended to be used as a guide by local units of government when taking action to adopt the regional land use and transportation plans. Certain paragraphs are applicable only to counties and others are applicable only to cities, villages, and towns. These paragraphs have been placed in italics. The resolution has been drafted for use primarily by county and local plan commissions. It is also recommended that the plans be adopted by the county and local governing bodies.

RESOLUTION NO._____

WHEREAS, the Southeastern Wisconsin Regional Planning Commission, which was duly created by the Governor of the State of Wisconsin in accordance with Section 66.945 of the Wisconsin Statutes on the 8th day of August 1960, upon petition of the counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha, has the function and duty of making and adopting a master plan for the physical development of the Region; and

WHEREAS, the Southeastern Wisconsin Regional Planning Commission has:

1. Collected, compiled, processed, and analyzed various types of demographic, economic, public utility, financial and natural resource, land use, and transportation data and materials pertaining to the Region.

2. Prepared objectives, principles, and standards for regional land use and transportation development.

3. Forecast regional growth and change as related to population, employment, automobile and motor truck availability, public revenue, and land use.

4. Developed, compared, and evaluated alternative land use and transportation plans for the Region.

5. Selected and adopted on December 19, 1977, a land use plan for the development of the Region to the year 2000, which is intended to amend and extend the 1990 regional land use plan adopted at the meeting of the Commission held on December 1, 1966.

6. Selected and adopted on June 1, 1978, a transportation plan for the development of the Region to the year 2000, which is intended to amend and extend the 1990 regional transportation plan adopted at the meeting of the Commission held on December 1, 1966, and as previously amended thereafter; and

WHEREAS, the aforementioned inventories, analyses, objectives, principles, standards, forecasts, alternative plans, and adopted plans are set forth in a published report entitled SEWRPC Planning Report No. 25, A Regional Land Use Plan and A Regional Transportation Plan for Southeastern Wisconsin—2000, comprised of the following volumes:

1. Inventory Findings

2. Alternative and Recommended Plans; and

WHEREAS, the Commission has transmitted certified copies of its resolutions adopting such land use and transportation plans, together with the aforementioned Planning Report No. 25, to the local governmental units; and

WHEREAS, the (Name of Local Governing Body) has supported, participated in the financing of, and generally concurred in the regional planning programs undertaken by the Southeastern Wisconsin Regional Planning Commission and believes that the land use and transportation plans prepared by the Commission will be a valuable guide not only to the development of the Region but of their community, and the adoption of such plans by the (Name of Local Governing Body) will assure a common understanding by the several governmental levels concerned and enable their staffs to program the necessary areawide and local plan implementation work; and

WHEREAS, the County of _____, pursuant to the provisions of Section 27.02 of the Wisconsin Statutes, has created a County Park and Planning Commission; and

WHEREAS, it is the duty and function of the County Park and Planning Commission, pursuant to Section 59.97(3) of the Wisconsin Statutes, to prepare and adopt a county development plan; and

WHEREAS, the (City)(Village)(Town) of _____, pursuant to the provisions of Section 62.23(1) of the Wisconsin Statutes, has created a (City) (Village)(Town) Plan Commission; and

WHEREAS, it is the duty and function of the (City)(Village)(Town) Plan Commission, pursuant to Section 62.23(2) of the Wisconsin Statutes, to make and adopt a master plan for the physical development of the (City)(Village)(Town) of _____.

NOW, THEREFORE, BE IT HEREBY RESOLVED that, pursuant to Section 66.945(12) of the Wisconsin Statutes, the _____ County Park and Planning Commission on this _____day of _____ , 19 __, hereby adopts the regional land use and transportation plans for the year 2000 previously adopted by the Regional Planning Commission as set forth in SEWRPC Planning Report No. 25 as an amendment and extension of the 1990 regional land use and transportation plans previously adopted and as a guide for regional and community development.

BE IT FURTHER HEREBY RESOLVED that, pursuant to Section 59.97(3) of the Wisconsin Statutes, the _____ County Park and Planning Commission hereby adopts as the _____ County Development Plan, all components of the 2000 regional land use and transportation plans as set forth in SEWRPC Planning Report No. 25, applicable to _____ County.

NOW, THEREFORE, BE IT HEREBY RESOLVED that, pursuant to Section 66.945(12) of the Wisconsin Statutes, the (City)(Village)(Town) of _____Plan Commission on this ____ day of _____ , 19 __, hereby adopts the regional land use and transportation plans for the year 2000 previously adopted by the Regional Planning Commission as set forth in SEWRPC Planning Report No. 25 as an amendment and extension of the 1990 regional land use and transportation plans previously adopted and as a guide for regional and community development.

BE IT FURTHER HEREBY RESOLVED THAT, pursuant to Section 62.23(3)(b) of the Wisconsin Statutes, the (City) (Village)(Town) of_____Plan Commission hereby adopts as the (City)(Village)(Town) of _____ master plan all components of the 2000 regional land use and transportation plans, as set forth in SEWRPC Planning Report No. 25, applicable to the (City)(Village)(Town) of _____.

BE IT FURTHER HEREBY RESOLVED that the _____ (Secretary)(Clerk) transmit a certified copy of this resolution to the (_____ County Board of Supervisors)(_____ Common Council)(_____Village Board of Trustees)(_____ Town Board of Supervisors) and to the Southeastern Wisconsin Regional Planning Commission.

_____
(Presiding Officer)

ATTESTATION

_____
(Secretary or Clerk)

LAND USE PLAN 2000

LEGEND

PRIMARY LAND USES

- SUBURBAN RESIDENTIAL (0.2-0.6 DWELLING UNITS PER NET RESIDENTIAL ACRE)
- LOW DENSITY RESIDENTIAL (0.7-2.2 DWELLING UNITS PER NET RESIDENTIAL ACRE)
- MEDIUM DENSITY RESIDENTIAL (2.3-6.9 DWELLING UNITS PER NET RESIDENTIAL ACRE)
- HIGH DENSITY RESIDENTIAL (7.0-17.9 DWELLING UNITS PER NET RESIDENTIAL ACRE)
- MAJOR RETAIL AND SERVICE CENTER
- MAJOR INDUSTRIAL CENTER
- MAJOR PUBLIC OUTDOOR RECREATION CENTER
  - M-MULTI-USE SITE
  - S-SPECIAL PURPOSE SITE
- MAJOR TRANSPORTATION CENTER
  - A-AIRPORT
  - B-BUS TERMINAL
  - R-PASSENGER RAIL TERMINAL
  - S-SEAPORT
- MAJOR UTILITY CENTER
  - S-PUBLIC SEWAGE TREATMENT PLANT
  - E-ELECTRIC POWER GENERATION PLANT
- MAJOR GOVERNMENTAL OR INSTITUTIONAL CENTER
  - G-COUNTY, STATE, OR FEDERAL ADMINISTRATIVE OFFICE
  - M-MEDICAL
  - U-UNIVERSITY
  - T-TECHNICAL/VOCATIONAL
  - L-LIBRARY
  - C-CULTURAL/ENTERTAINMENT
- PRIMARY ENVIRONMENTAL CORRIDOR
- PRIME AGRICULTURAL LAND
- OTHER AGRICULTURAL AND RURAL LAND
- WATER

BASE MAP SYMBOLS

- FREEWAY AND EXPRESSWAY - 1975
- STREET AND HIGHWAY
- RAILWAY
- AIR FIELD (PAVED)
- AIR FIELD (UNPAVED)
- LAKE AND RIVER SHORELINE
- PERENNIAL STREAM OR DRAINAGE CHANNEL
- INTERMITTENT STREAM OR DRAINAGE CHANNEL
- MARSH
- BREAKWATER
- MAJOR WATERSHED BOUNDARY
- MAJOR PUBLIC LAND HOLDING - 1973
- STATE BOUNDARY
- COUNTY BOUNDARY
- CITY OR VILLAGE CORPORATE LIMITS LINE - 1975
- TOWNSHIP BOUNDARY (CIVIL)
- TOWN AND RANGE LINE
- SECTION LINE
- STATE PLANE COORDINATE SYSTEM GRID TICK

GRID NORTH

SCALE 1:96,000

0 1 2 3 4 MILES

0 10,000 20,000 30,000 FEET

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

George C. Berteau, Chairman

K. W. Bauer, P.E., Executive Director

The preparation of this map was financed in part through a joint planning grant from the Wisconsin Department of Transportation; the U. S. Department of Transportation, Federal Highway Administration and Urban Mass Transportation Administration; and the U. S. Department of Housing and Urban Development.

LAND USE PLAN FOR THE SOUTHEASTERN WISCONSIN REGION - 2000

Compiled by the Southeastern Wisconsin Regional Planning Commission from U.S.G.S. Topographic Maps, Wisconsin Department of Transportation Maps, Wisconsin Department of Natural Resources Information, and Southeastern Wisconsin Regional Planning Commission Ratioed and Rectified Aerial Photography. Map Compiled on Wisconsin State Plane Coordinate System Grid, South Zone, Based Upon Lambert Conformal Conic Projection.

LAND USE—
TRANSPORTATION
STUDY

TRANSPORTATION PLAN - 2000

LEGEND

ARTERIAL STREET AND HIGHWAY SYSTEM

JURISDICTIONAL CLASSIFICATION

- STATE TRUNK-FREEWAY
- STATE TRUNK-NONFREEWAY
- COUNTY TRUNK
- LOCAL TRUNK
- FREEWAY-NONFREEWAY INTERCHANGE
- 4 NUMBER OF TRAFFIC LANES (TWO LANES WHERE UNNUMBERED)
- 4|6 CHANGE IN NUMBER OF TRAFFIC LANES

URBAN MASS TRANSIT SYSTEM

- SERVICE AREA
- TRANSIT STATION
  - P-WITH PARKING
- PARK AND POOL LOT

AIRPORT SYSTEM CLASSIFICATION

- ST-SCHEDULED AIR TRANSPORT
- BT-BASIC TRANSPORT
- GU-GENERAL UTILITY
- BU-BASIC UTILITY

BASE MAP SYMBOLS

- FREEWAY AND EXPRESSWAY - 1975
- STREET AND HIGHWAY
- RAILWAY
- AIR FIELD (PAVED)
- AIR FIELD (UNPAVED)
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- PERENNIAL STREAM OR DRAINAGE CHANNEL
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- SECTION LINE
- STATE PLANE COORDINATE SYSTEM GRID TICK

GRID NORTH

SCALE 1:96,000

0 1 2 3 4 MILES

0 10,000 20,000 30,000 FEET

INSET

SEE INSET

JUNEAU PARK

INSET GRAPHIC SCALE

0 1/2 1 MILE

0 2000 4000 6000 8000 FEET

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

George C. Berteau, Chairman

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TRANSPORTATION PLAN FOR THE SOUTHEASTERN WISCONSIN REGION - 2000

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LAND USE—
TRANSPORTATION
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