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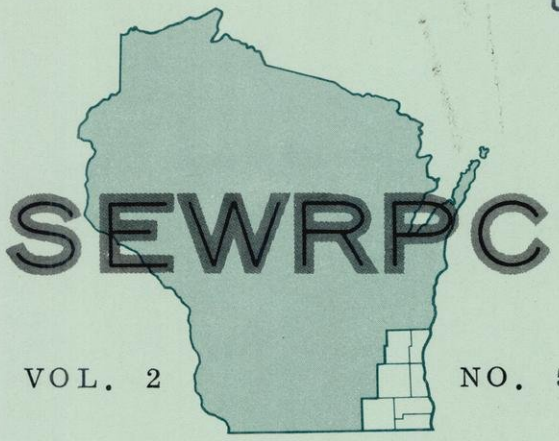
TECHNICAL RECORD



VOL. 2 NO. 5

JUNE - JULY

* * * * * IN THIS ISSUE * * * * *

* * * * SCREEN LINE ADJUSTMENT OF TRIP DATA * * * * * * INVENTORY OF LAND DEVELOPMENT REGULATIONS IN SOUTHEASTERN WISCONSIN * * * * *

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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THE TECHNICAL RECORD

Volume two Number five

June 1965 - July 1965

TABLE OF CONTENTS

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SCREEN LINE ADJUSTMENT OF TRIP DATA

by Richard B. Sheridan, P. E., Chief Transportation Planner

PURPOSE OF SCREEN LINE ADJUSTMENT

During the origin and destination survey conducted in 1963 by the SEWRPC as a part of the regional land use-transportation study, various accuracy checks were made. These compared summaries of certain data derived from the survey with like quantities obtained from independent sources. On the basis of this comparison, previously reported,[1] it was determined that the O & D survey was satisfactory. The trip data developed from expanding the survey sample were within an acceptable percent of difference from observed traffic volumes; however, in comparing survey vehicle trips with observed vehicular traffic crossing various screen lines established to make this comparison, the survey data was found in most of the comparisons to be less than the observed or counted volumes, hereafter called "ground counts." Such differences are a common occurrence in O & D surveys and are attributed primarily to under-reporting of trips by persons interviewed. For example, a person describing all trips made the previous day by members of his household may have forgotten to report some trips that seemed of minor importance or may have been unaware of some trips made by other members of the household.

Whatever the reason, there appeared to be a deficiency of 13 percent in vehicle trips crossing the Milwaukee screen line, which was considered the most reliable screen line comparison; and similar deficiencies were found in the summation of volumes crossing other analysis lines. As already noted, differences of this order of magnitude are common in surveys of this kind and are within established accuracy standards. Having accepted the survey data on the basis of the accuracy checks as a satisfactory sample of average weekday travel within the Region, a decision was then required as to whether or not the reported survey trip data should be adjusted, that is, expanded to match the traffic volumes observed along the screen lines and analysis lines, and if so, how this should be done. The method used by SEWRPC to accomplish such an adjustment is the subject of this article.

DEVELOPMENT OF TRIP TABLES

After the 259,117 O & D trip records obtained by the O & D survey were expanded to represent the statistical population from which they were drawn, they were compiled into various tables of trips between zones. Each such table may be visualized as a matrix with the number of rows and the number of columns each equal to the number of traffic analysis zones within the Region. Since the Region is divided into 619 internal zones, plus 31 external zones (roadside interview stations), this results in a 650 x 650 matrix (tabular array) containing 422,500 possible trip interchanges between zones. Such trip tables, transcribed onto magnetic tape in binary number code, were produced from each of the various O & D survey components; that is, from the home interview survey, postal survey, external or roadside interview survey,

[1] *"O & D Surveys Accuracy Checks," SEWRPC Technical Record, Vol. 2 - No. 2, 1965.*

truck and taxi interview survey, and truck and taxi postal survey. The resulting tables were then combined for assignment purposes into a table of total vehicle trips by an addition of corresponding entries.

The travel interchanges listed in this table represent movements between zones without regard to route traveled. In order to compare these movements with ground counts, these movements must be assigned to the arterial street and highway network. This assignment is made on the basis of the 421,850 minimum time paths through the network from each zone to every other zone. The accumulated volumes on each link of the network resulting from such an assignment can be compared with the ground count traffic volume data for the corresponding streets and highways.

COMPARISON OF ASSIGNED AND COUNTED VOLUMES

Theoretically, the two resulting sets of traffic volumes should be identical. Actually, such a result would be highly improbable due to variances and inaccuracies inherent in the traffic count information itself as well as in the assignment procedure and in the survey data being factored. The traffic counts obtained are considered to be most accurate at screen line locations where classification counts made manually by observers were, as a check, complemented by counts made by recording traffic counters (machines). Even these counts cannot be accepted as completely representative of average weekday volumes because, for example, of day-to-day variations in traffic volumes and the possibility of undetected multiple crossings of the screen line. At locations on the network where traffic counters were the only source of ground counts, machine failure, oblique crossings, simultaneous crossings, and improper setting of counters presented additional possibilities of inaccuracies in the ground counts. Moreover, the recording traffic counters used actually count axle impulses on a pneumatic

Table I

COMPARISON OF TRAFFIC COUNTS WITH ASSIGNMENT OF SURVEY TRIPS BEFORE AND AFTER FACTORING INTERNAL AUTO DRIVER TRIPS BY 1.17

Outer Boundary of	Adjusted Traffic Counts	Assignment - Before		Assignment - After	
		Number	Percent of Count	Number	Percent of Count
Ring 0	434,080	345,501	79	396,914	91
Ring 1	734,200	687,545	80	682,252	93
Ring 2	721,890	603,494	84	714,473	99
Ring 3	491,000	403,091	82	461,363	94
Ring 4	191,300	206,668	108	225,306	118
Ring 6	114,770	122,039	106	131,578	115
Racine Area District 69	59,730	50,309	84	60,616	101
City of Racine	93,090	74,703	80	89,734	96
Kenosha Area District 79	59,520	53,578	90	59,550	100
City of Kenosha	78,300	70,924	91	78,656	100
Milwaukee Screen Line (manual counts)	328,938	306,210	93	344,116	105*

* *This became 97.5 percent after modifying the procedure for factor application, as described at the end of this article.*

tube and record one-half of these as the number of vehicles passing. Even when these counts are factored for the presence of vehicles having three or more axles, some variances are likely to remain.

In addition to these sources of variance in traffic count data, differences in counted and assigned volumes may also be due to sources of error in the assignment procedure. Drivers do not always travel the minimum time path between trip origin and destination. Drivers sometimes miss a turn and circle back or cruise for a few blocks near the destination looking for a parking place. Such traffic movements are described by the term "local circulation." They tend to make observed traffic volumes higher than volumes derived from O & D survey data.

All of the previously cited factors tend to obscure the real difference between counted and assigned volumes attributable to under-reporting of trips in the O & D survey components from which the basic trip tables are prepared. Nevertheless, it is believed that the ground counts are more reliable than the survey data and, therefore, provide the best available basis for factoring of the latter. Comparisons of assigned trip volumes with volumes obtained from ground counts were summarized for those links which crossed the Milwaukee screen line and for those which crossed several ring boundaries by sector. These summaries, shown in Table 1, indicate that assigned volumes from survey data were lower than observed volumes at the outer edge of Rings 0, 1, 2, and 3, in the Racine and Kenosha areas and at the Milwaukee screen line (Figure 1); that is, traffic assignment appears low in the urban areas when compared to ground counts, even after allowance is made for ground count variability. Thus, the need for further expansion by factoring was indicated.

ALTERNATIVE METHODS OF FACTORING

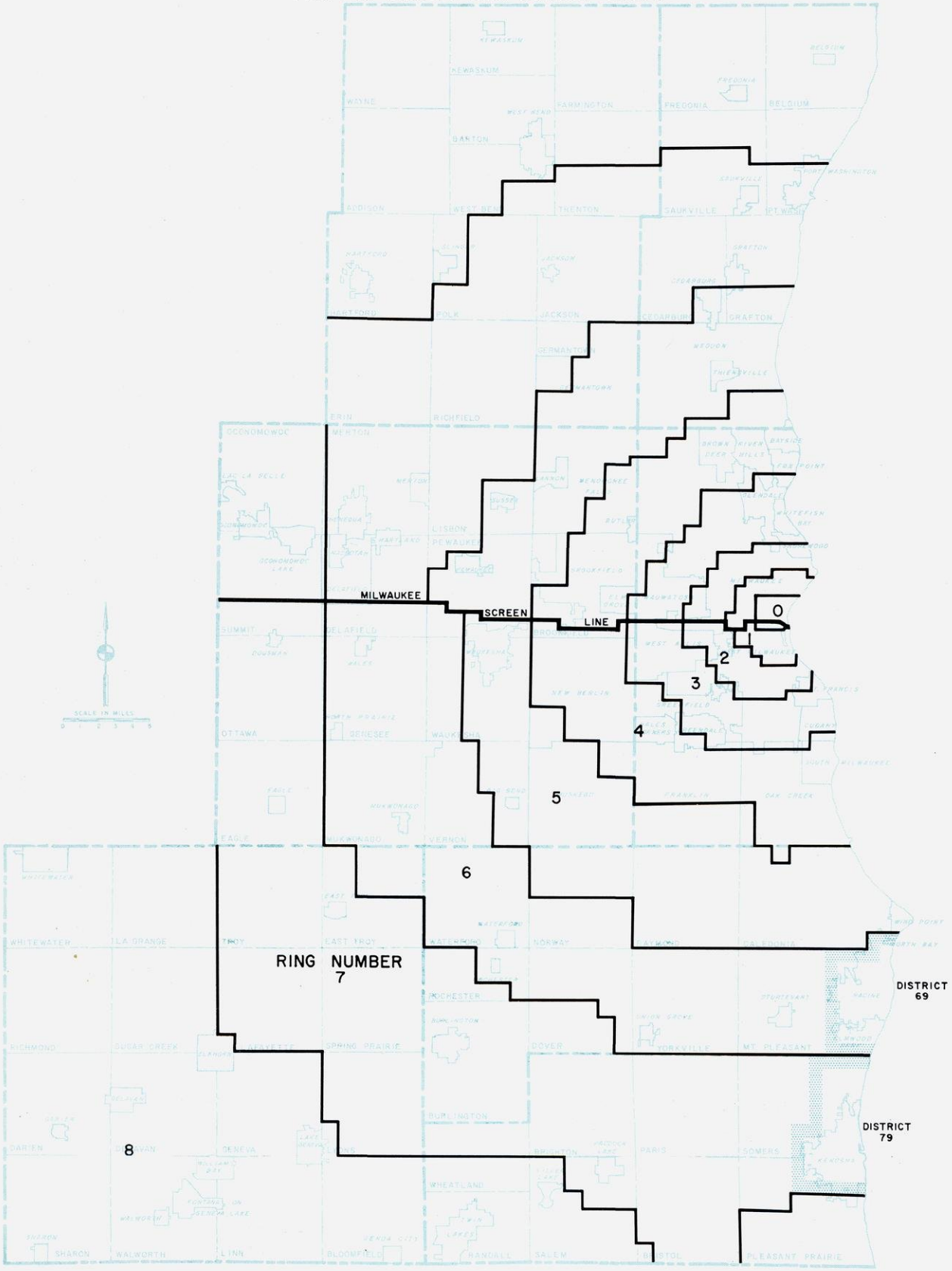
The various possible methods of factoring include the calculation and application of:

1. A uniform factor for all trip interchanges.
2. A uniform factor for a selected group of trip purposes; for example, all non-work trips. Application of such a factor is based on an assumption that the unfactored trip groups, for example, work trips, are more accurately reported than the factored trip groups.
3. A factor for trips by purpose with a different factor calculated and applied for each trip purpose. To do this accurately would require a screen line count of crossings by trip purpose. Such data was not available since interviews were not conducted at the screen line.
4. A factor for all trips into or out of selected zones or between selected zones.
5. A factor for data derived from one or several of the component surveys with a different factor calculated and applied to data derived from different surveys.

A decision was made to use the last method. At the first application of this technique, later modified, all internal trip data for auto driver trips were expanded. This was based on the following considerations:

1. A higher sampling rate was obtained for the roadside interview and truck-taxi surveys.

Figure 1
ANALYSIS SCREEN LINES FOR COMPARISON OF
TRAFFIC COUNTS AND SURVEY TRIPS



2. In those parts of the Region where the roadside interview and truck-taxi surveys have the most influence on total vehicle volumes, that is, the peripheral rural area, there is little or no need for adjustment.
3. The adjustment of vehicle trip data from roadside interviews and truck-taxi surveys would have only a rather marginal effect on total screen line crossings.

As the next step in the treatment of internal auto driver trips, consideration was given to expanding only those trip purposes which constituted the greater percentage of off-peak travel or which might be greater in off-peak hours than in peak hours. When, however, the hourly pattern of trips by purpose was plotted (Figure 2) and analyzed, there appeared to be no category of trip purpose which, when factored, would improve the total trip volume for off-peak hours significantly more than it would distort a peak-hour total. Furthermore, there appeared to be no assurance that the hourly distribution of trips by purpose was the same at the screen line as for the total trips.

In the course of considering methods of factoring, the staff reviewed a preliminary draft copy of a publication entitled Guide Lines for Adjusting Trips Obtained From Interviews Based on Screen Lines and Other Factors, by Humphrey and Fertal, USBPR (unpublished). The authors recommend factoring only non-work trips and present a method of estimating these for each purpose and subsequently adjusting factors until the desired increment of trips or screen line deficiency is reached. The factors thus obtained for some trip purposes which are a small percentage of the total would be quite large and were considered by SEWRPC staff likely to bias trip patterns in favor of such trip purposes as, for example, social and recreation trips. To illustrate the possible exaggeration, a factor was calculated according to method 2 by dividing the needed trip increment by auto driver trips for non-work purposes only. Such trips would have to be increased by 28 percent to obtain the needed increment. Such a large change in non-work purposes with no change in work trips seemed unjustified and likely to bias or exaggerate the trip patterns in favor of these purposes. If only one or two purposes were adjusted, the possible bias would be even greater. Therefore, after due consideration the method recommended by Humphrey and Fertal was not adopted.

SELECTED FACTOR

Instead, it was decided to apply to all internal auto driver trips a factor of 1.17, calculated from Milwaukee screen line crossings.

The degree to which non-work trips are less well reported than work trips is really not known. If such a bias in favor of work trips exists in the data, it is thought to constitute a lesser bias than would be introduced if one or more non-work purposes were expanded by a very large factor.

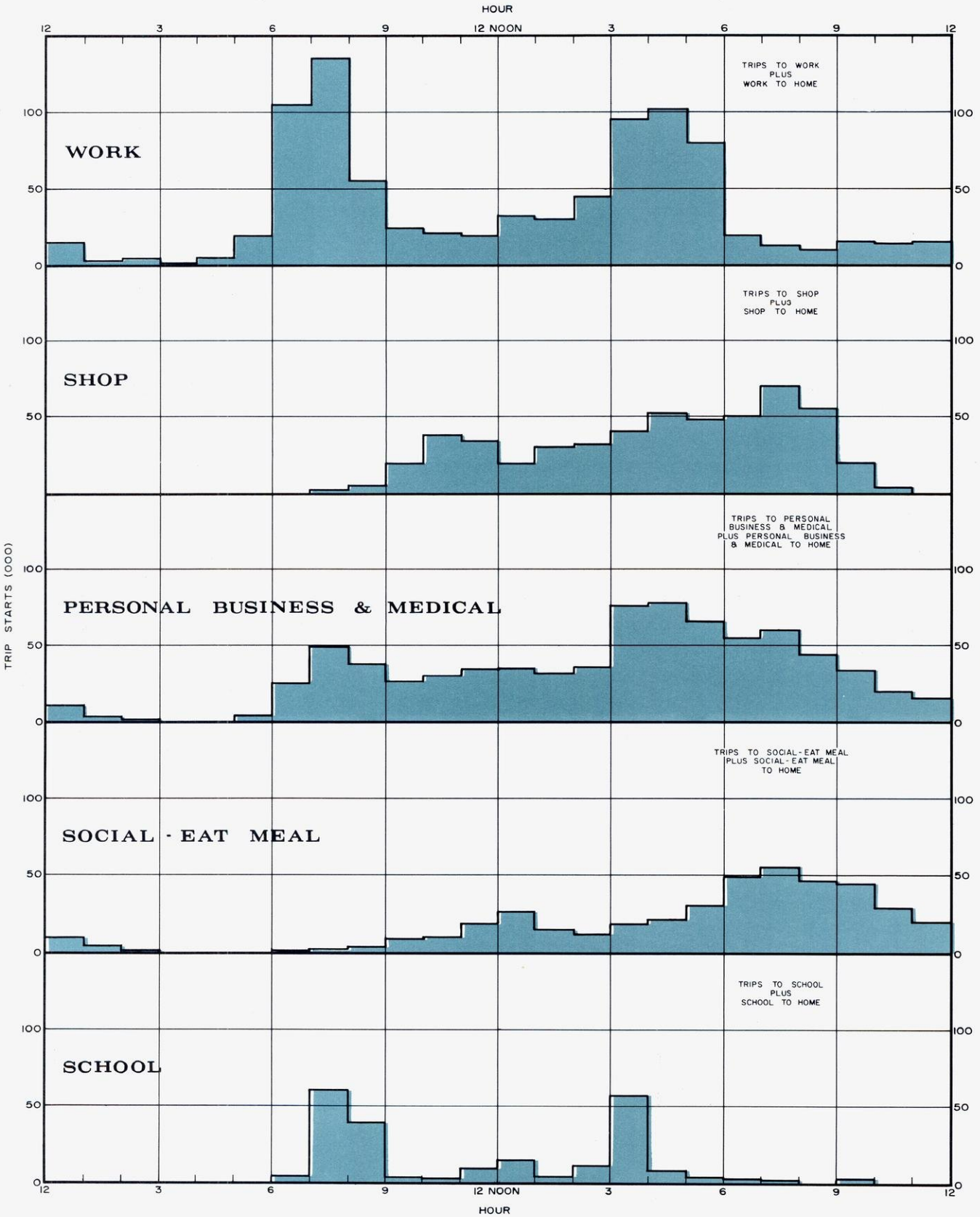
Calculation of the factor was as follows:

286,302 autos counted crossing the Milwaukee screen line.
-247,387 survey auto driver trips crossing the Milwaukee screen line, determined from home interview survey and external survey.
38,915 trip deficiency at screen line.
38,915 trips needed. / 228,310 internal survey auto driver crossings. = .1704 increment

Figure 2

HOURLY DISTRIBUTION OF TRIPS BY PURPOSE

(PERSON TRIPS FROM HOME INTERVIEW SURVEY)



A 17 percent increment of interzonal internal auto driver trips was added to total vehicle trips. The resulting table of interzonal vehicle trips was used in subsequent traffic assignments. A summary of the results of these assignments is shown in Table 1 and indicates that assignments were improved at all lines of comparison except crossings at the outer edges of Rings 4 and 6 where they had initially been greater than 100 percent.

MODIFICATION OF FACTOR APPLICATION

At the time it was initially decided to factor internal trip data by 17 percent, the binary trip tables consisted of a summation of data derived from both the postal and home interview surveys. There is no identification in such a table of the amount from each component survey. Some consideration had been given to not factoring postal survey data, because of the comparison at Rings 4 and 6; but this was judged impractical as it would have required rebuilding all trip tables from survey cards.

Subsequent to obtaining a 17 percent increase in all internal auto trips and as a part of other work in trip generation analysis, however, a decision was made to modify the postal survey trip cards by coding a "purpose from" in each card. Since tables of interzonal trips were then compiled using these modified cards, it was found desirable at this point to factor only home interview data but <u>not</u> postal survey data.

The effect of this modification on the screen line check is as follows:

0.17 x 213,120 trips from home interview survey = 36,230 trips

Added to total passenger car trips, this equals 247,387 + 36,230 = 283,617 survey passenger car trips.

$$\frac{\text{283,617 survey trips}}{\text{286,302 counted auto trips}} = \text{99 percent of total passenger cars crossing Milwaukee screen line.}$$

Added to total trips, this equals 284,598 + 36,230 = 320,828 vehicle trips crossing the Milwaukee screen line.

$$\frac{\text{320,828 survey vehicle trip crossings}}{\text{328,938 counted vehicles crossing}} = \text{97.5 percent of total vehicle trips crossing the Milwaukee screen line.}$$

When transit trips between zones as determined by the O & D survey were assigned to the transit network, comparisons were made with transit company figures on the number of passengers carried past a certain point on the route, usually the highest volume point. Only one or two such counts per route were available. Comparative analysis of these counts versus assignments also indicated a deficiency in trip data of over 15 percent. Therefore, all home interview trip data was increased by 17 percent; but postal survey data was not. The resulting trip data was used to derive trip generation equations.

The procedure is believed to have provided the best representation of 1963 trip data, not only as to relative distribution or pattern of trip movements, but also in total quantity as well.

* * * * * * *

INVENTORY OF LAND DEVELOPMENT REGULATIONS IN SOUTHEASTERN WISCONSIN

by William J. Kockelman, Chief Community Assistance Planner

Many private decisions made by individual land developers, builders, and households, as well as public decisions by units and agencies of government, interact to determine a regional land use pattern. A need, therefore, exists to test the feasibility of any regional land use plan proposals beyond the gross demand tests provided by conventional land use planning techniques. In the regional land use-transportation study, a land use simulation model is being developed to meet this need. This model is intended to simulate the decision-making behavior of land developers, builders, and households, who together form one of the primary influences on the developing land pattern of the Region.

One of the important factors bearing on the decisions of land developers is the cost of residential land development. Development costs vary spatially with the location, topography, and soil characteristics of the site; but they also are affected by the public regulations governing the improvements required for an acceptable subdivision. Differences in development requirements resulting from subdivision regulations can significantly change the per lot development costs incurred. For this reason, a meaningful simulation of land development is possible only if definitive data on topography and soils is supplemented by legal data on subdivision improvement requirements adopted by local units of government pursuant to state enabling legislation. An inventory of these regulations within the Region was, therefore, required for the development and application of the land use simulation model. In addition to providing data necessary to the development and application of the land use simulation model, the land development regulation inventory provided an overview of the status of such regulations within the Region useful to public officials in considering the adequacy of local ordinances and in preparing amendments thereto.

This article reviews the inventory procedures applied and summarizes the salient findings. The inventory revealed certain areas in which local subdivision ordinances could be improved. Seven appendices are, therefore, included containing suggested regulations which may be used by local officials desiring to improve existing local ordinances as guides in the preparation of amendments.[1]

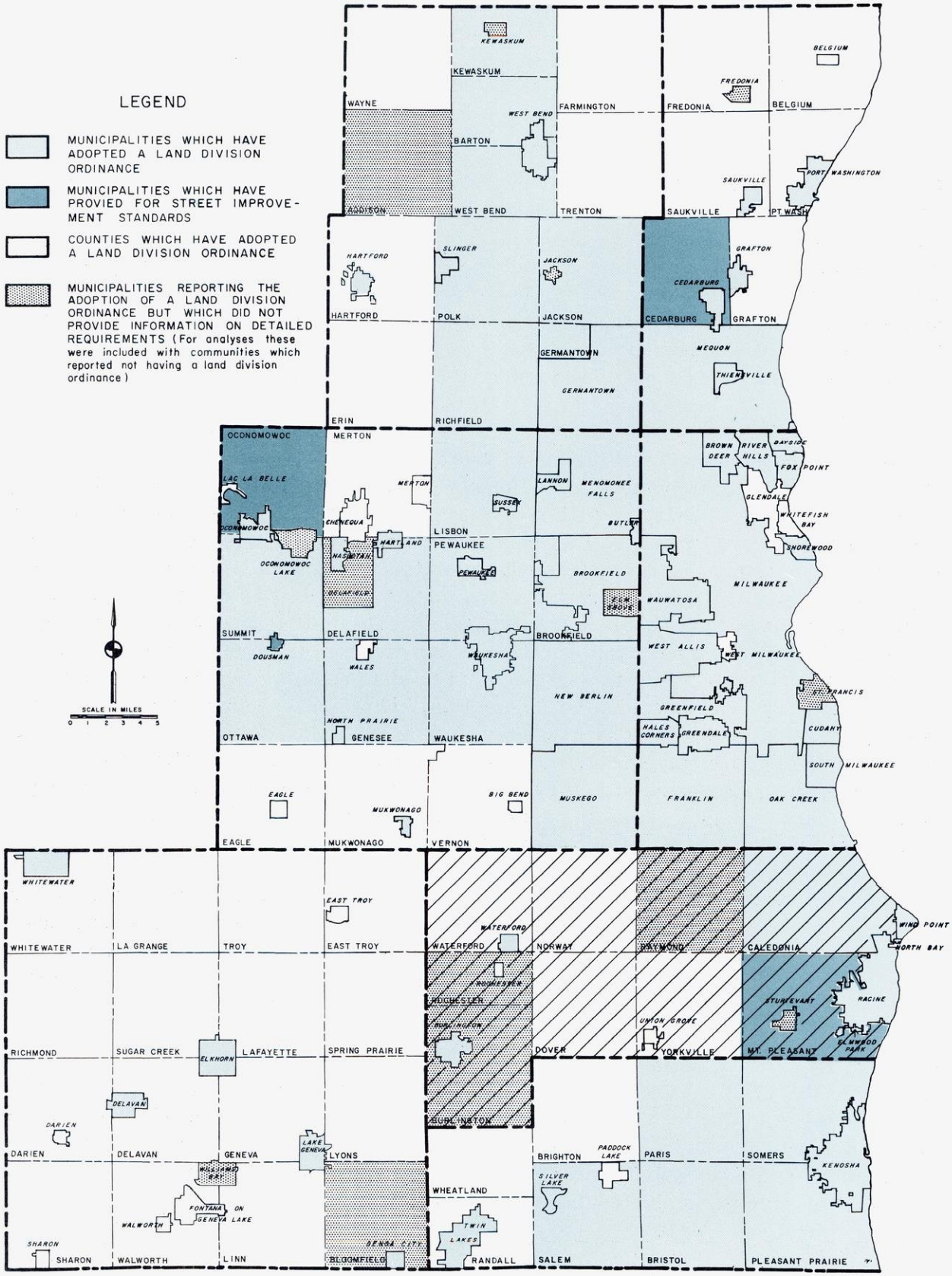
INVENTORY PROCEDURE

In 1964 the SEWRPC, as a part of its community assistance program, conducted a survey of the status of local planning within the Region. As a part of this survey, all available local plan and plan implementation documents were assembled, including all existing land development regulations for the 7 counties, 28 cities, 53 villages, and 65 towns comprising the Southeastern Wisconsin Region. Wherever possible, all

[1] *A complete model land division ordinance has been prepared by the Commission and published in SEWRPC Planning Guide No. 1, Land Development Guide, November 1963.*

Figure 1

STATUS OF LAND DEVELOPMENT REGULATIONS



contacts necessary to collect the documents were made through personal interviews with responsible local public officials. The personal contacts, in addition to assuring prompt collection of the necessary legal documents, permitted unstructured interviews to be held with the responsible public officials concerning administration of the regulations. Such personal interviews proved impractical for certain municipalities whose public offices were held on only a part-time basis; and in these cases the survey was completed by telephone contact and in a few cases, where this too proved impractical, by mail.

The initial inventory, completed in June 1964, provided all of the information necessary for the land use simulation model improvement requirements input. It was decided, however, to update the land development regulation information to November 1965. This was done by recontacting those municipalities within the Region which had not previously adopted and submitted such regulations. This contact was made by telephone so as to obtain copies of all land development regulations legally adopted since the initial survey. All of the collected regulations were then reviewed by the Commission staff and abstracted and summarized as shown in Tables 1, 2, and 3. In addition to the data on 14 improvement requirements and the land dedication requirements essential to meet the land use simulation model needs, information was tabulated for selected items of interest to local governing bodies and municipal planners, engineers, and attorneys within the Region.

INVENTORY FINDINGS

The results of the inventory indicated that of the 153 local units of government within the Region, 78 (51 percent) had provided for some type of formal land development regulation either through a land division (subdivision control) ordinance or through local street improvement regulations. One of the 7 counties (14 percent), 25 of the 28 cities (89 percent), 28 of the 53 villages (53 percent), and 24 of the 65 towns within the Region (37 percent) had, as of November 1965, formally provided for the regulation of land development. In addition, land development in all of the 9 towns in Racine County was regulated by the Racine County Subdivision Control Ordinance. Figure 1 indicates in summary form the status of county and municipal land development regulations within the Region as of November 1965.

Adoption of State Platting Statutes

The Wisconsin Statutes require that any division of land which results in a subdivision[2] shall be surveyed and a plat thereof approved and recorded.[3] In addition, reviewing and approving procedures and surveying and mapping requirements are specified in considerable detail. The only physical improvement required by the Wisconsin Statutes, however, are survey monuments.[4]

The only design standards specified by the State Statutes relate to minimum lot width and area, street width, lake and stream access, and the inclusion of unplatted lands

[2] *A subdivision is defined as a division of a lot, parcel, or tract of land by the owner thereof or his agent for the purpose of sale or building development where the act of division creates five or more parcels or building sites of 1½ acres each or less in area or these sites are created by successive divisions within a period of five years. Section 236.02(8), Wis. Stats.*

[3] *Section 236.03(1).*

[4] *Section 236.15(1).*

Table 1

INVENTORY OF LAND DEVELOPMENT REGULATIONS IN SOUTHEASTERN WISCONSIN

(cities)

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

NO.	UNIT OF GOVERNMENT	TYPE OF REGULATION			JURISDICTION			PLATTING PROCEDURES								
		Street Improvement Regulations	Land Division Ordinances	Adopt. Date	Extra-territorial	Subdivision as Defined by Wis. Stats.	Other Land Divisions	Pre-Application	Preliminary Plat Review Body		Preliminary Plat Approval Body		Building Restrictions	Modifications		Land Suitability
									Planning Agency	Municipal Engineer	Plan Commission	Governing Body		Planning Agency	Governing Body	
	KENOSHA COUNTY															
1	Kenosha		X	'57			X	X	X		X			X		
	MILWAUKEE COUNTY															
2	Cudahy		X	'57		X	X	X	X		X			X	X	
3	Franklin		X	'65	X	X	X	X	X	X		X	X		X	X
4	Greenfield		X	'58	X		X	X	X		X			X	X	
5	Milwaukee		X	'60	X	X			X		X		X	X		X
6	Oak Creek		X	'59	X	X	X	X	X	X	X		X		X	
7	South Milwaukee		X	'61			X		X		X			X		
8	Wauwatosa		X	'54		X						X				
9	West Allis		X	'54		X						X				
	OZAUKEE COUNTY															
10	Cedarburg		X	'59	X	X	X	X	X	X	X		X		X	X
11	Mequon		X	'59	X	X	X	X	X	X	X			X	X	
12	Port Washington		X	'60	X	X	X	X	X	X	X			X	X	
	RACINE COUNTY															
13	Burlington		X	'61	X	X	X	X	X	X		X	X		X	
14	Racine		X	'64	X	X	X	X	X	X	X		X	X		X
	WALWORTH COUNTY															
15	Delavan		X	'58	X	X	X	X			X			X	X	
16	Elkhorn		X	'58	X	X	X					X			X	
17	Lake Geneva		X	'62	X	X		X	X		X		X		X	
18	Whitewater		X	'63			X					X				
	WASHINGTON COUNTY															
19	Hartford		X		X	X	X	X	X		X			X	X	X
20	West Bend		X		X	X	X		X		X					
	WAUKESHA COUNTY															
21	Brookfield		X	'60		X	X	X	X		X		X		X	
22	Muskego		X	'60		X	X	X	X	X	X				X	
23	New Berlin		X			X	X		X			X	X		X	X
24	Oconomowoc		X	'57	X	X	X	X		X	X			X		
25	Waukesha		X	'59	X	X			X	X	X			X		X

Table 1 (continued)

NOVEMBER 1965

NO.	UNIT OF GOVERNMENT	IMPROVEMENTS REQUIRED														IMPROVEMENT GUARANTEES	
		Monu-ments	Street Grading	Lot Grading	Water Mains	Fire Cisterns	Sanitary Sewers	Adequate Storm & Water Drainage System	Roadway Surfacing	Curb & Gutter	Side-walks	Culvert & End Walls	Street Lights	Street Signs	Tree Planting	Construction Prior to Acceptance	Financial
	KENOSHA COUNTY																
1	Kenosha	X	X		X		X		X						X		
	MILWAUKEE COUNTY																
2	Cudahy	X	X	X	X		X	X	X	X	X		X				X
3	Franklin	X	X	X	X		X	X	X	X	X	X	X	X	X		X
4	Greenfield	X	X		X		X	X	X			X					X
5	Milwaukee	X	X		X		X	X	X	X	X						X
6	Oak Creek	X	X		X		X	X	X	X	X	X					X
7	South Milwaukee	X	X	X	X		X	X	X	X					X		X
8	Wauwatosa	X	X		X		X	X	X								X
9	West Allis	X	X		X		X		X			X					X
	OZAUKEE COUNTY																
10	Cedarburg	X	X		X	X	X	X	X	X	X		X	X	X		X
11	Mequon	X	X		X	X	X	X	X				X	X	X		X
12	Port Washington	X	X		X		X	X	X	X	X	X			X		X
	RACINE COUNTY																
13	Burlington	X	X		X		X		X	X	X						X
14	Racine	X	X		X		X		X								X
	WALWORTH COUNTY																
15	Delavan	X	X		X		X	X	X	X	X	X					X
16	Elkhorn	X	X		X		X	X	X			X					
17	Lake Geneva	X	X		X		X	X	X	X	X		X				X
18	Whitewater	X			X		X		X								
	WASHINGTON COUNTY																
19	Hartford	X	X		X		X	X	X	X	X	X					X
20	West Bend	X	X		X		X		X	X	X				X		X
	WAUKESHA COUNTY																
21	Brookfield	X	X		X		X	X	X			X		X			X
22	Muskego	X	X		X		X	X	X	X				X			X
23	New Berlin	X	X	X	X		X	X	X	X	X	X		X			X
24	Oconomowoc	X	X		X		X	X	X								X
25	Waukesha	X	X		X		X	X	X	X	X						X

Table I (continued)

NO.	UNIT OF GOVERNMENT	MAPPING DOCUMENTS						DESIGN STANDARDS				PUBLIC SITES		FEES		
		Preliminary Plat		Final Plat		Certified Survey Map	State Plane Coordinate System	Streets	Road-ways	Lots & Blocks	Ease-ments	Reservation and/or Dedication	Fee Per Lot	Preliminary Plat	Final Plat	Engineering & Inspection
		Scale	Vertical Control Interval	Specified	Additional Information											
	KENOSHA COUNTY															
1	Kenosha		03'	X				X	X	X	X	05%		$1/lot		
	MILWAUKEE COUNTY															
2	Cudahy	100'	05'	X		X		X	X	X	X	Consideration must be given.				10% of inprovements.
3	Franklin	100'	02'	X	X	X	X	X	X	X	X	Per master plan.		$25+$2/lot.	$25+50¢/lot.	1% of improvements.
4	Greenfield	100'	05'	X		X		X	X	X	X	10%				
5	Milwaukee	100'		X	X			X	X	X					$50/plat.	
6	Oak Creek	100'	02'	X		X		X	X	X	X	Per governing body.		$25+$2/lot.		To be determined by governing body.
7	South Milwaukee	100'	02'	X		X		X	X	X	X					5% sewer & water; 3% street paving.
8	Wauwatosa			X												
9	West Allis			X												
	OZAUKEE COUNTY															
10	Cedarburg	100'	02'	X	X	X		X	X	X	X	10%	$200.			Actual cost.
11	Mequon	200'	02'	X		X		X	X	X	X		$200.			
12	Port Washington	200'	02'	X		X		X	X	X	X	3-year reservation per master plan.	$50.			
	RACINE COUNTY															
13	Burlington		02'	X		X		X	X	X	X	Per master plan or 5%.		$1/plat.		Actual cost.
14	Racine	100'	02'	X		X		X	X	X	X	Per master plan.				
	WALWORTH COUNTY															
15	Delavan	100'	05'	X		X		X	X	X	X	Consideration must be given.				
16	Elkhorn	100'		X				X	X	X	X	Consideration must be given.				
17	Lake Geneva	100'	02'	X	X			X	X	X	X			$1/lot, min. $25.		
18	Whitewater	200'	05'	X				X								
	WASHINGTON COUNTY															
19	Hartford	100'	05'	X		X		X	X	X	X	05% dedication.				20¢/ft. sewer; 10¢/ft. roads & water.
20	West Bend	100'	05'	X		X		X	X	X	X	05% dedication.				
	WAUKESHA COUNTY															
21	Brookfield	100'	02'	X				X	X	X	X	Per master plan.			$25-200/plat.	1% of improvements.
22	Muskego	200'	02'	X		X		X	X	X	X					Actual cost.
23	New Berlin	100'	02'	X	X	X		X	X	X	X	Per master plan.		$15-110/plat.		
24	Oconomowoc	50'	02'	X	X			X	X	X	X	05% dedication.				
25	Waukesha	100'	02'	X	X			X	X	X	X					

Table 2
INVENTORY OF LAND DEVELOPMENT REGULATIONS IN SOUTHEASTERN WISCONSIN
(villages)

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

NO.	UNIT OF GOVERNMENT	TYPE OF REGULATION			JURISDICTION			PLATTING PROCEDURES								
		Street Improvement Regulations	Land Division Ordinances	Adoption Date	Extra-territorial	Subdivision as Defined by Wis. Stats.	Other Land Divisions	Pre-application	Preliminary Plat Review Body		Preliminary Plat Approval Body		Building Restrictions	Modifications		Land Suitability
									Planning Agency	Municipal Engineer	Plan Commission	Governing Body		Planning Agency	Governing Body	
	KENOSHA COUNTY															
1	Silver Lake		X	'52		X	X		X		X		X		X	
2	Twin Lakes		X	'54		X						X	X			
	MILWAUKEE COUNTY															
3	Bayside		X	'57	X	X	X	X	X		X			X	X	
4	Brown Deer		X	'56		X	X		X			X			X	X
5	Fox Point		X	'57		X	X	X	X	X		X	X		X	
6	Greendale		X	'65		X										
7	Hales Corners		X	'56		X		X	X	X		X				
8	River Hills		X	'57		X	X	X	X			X			X	X
9	Shorewood		X	'56		X						X				
	OZAUKEE COUNTY															
10	Grafton		X	'58	X	X	X	X	X		X			X	X	
11	Saukville		X	'61		X						X				
12	Thiensville		X	'60	X	X	X	X	X			X			X	
	RACINE COUNTY															
13	Elmwood Park		X	'62	X		X					X	X	X	X	
14	Waterford		X	'57	X		X		X	X	X			X		
15	Wind Point		X	'64	X	X						X	X			
	WALWORTH COUNTY															
16	Genoa City		X	'65	X		X	X	X	X	X			X	X	
	WASHINGTON COUNTY															
17	Germantown		X	'58	X	X	X					X			X	X
18	Slinger		X			X	X	X	X		X		X	X	X	X
	WAUKESHA COUNTY															
19	Butler		X			X		X				X	X			
20	Dousman	X		'56												
21	Hartland		X	'55	X		X					X			X	
22	Lannon		X	'64	X	X	X					X			X	X
23	Menomonee Falls		X	'63	X	X	X	X	X		X			X	X	
24	Mukwonago		X		X	X	X		X	X	X			X		X
25	Nashotah		X	'57		X						X			X	
26	North Prairie		X	'57		X			X		X			X		
27	Pewaukee		X	'61	X	X	X	X	X		X		X		X	
28	Sussex		X	'59	X	X	X	X	X		X			X	X	

Table 2 (continued)

NOVEMBER 1965

NO.	UNIT OF GOVERNMENT	IMPROVEMENTS REQUIRED														IMPROVEMENT GUARANTEES	
		Monuments	Street Grading	Lot Grading	Water Mains	Fire Cisterns	Sanitary Sewers	Adequate Storm & Water Drainage System	Roadway Surfacing	Curb & Gutter	Sidewalks	Culvert & End Walls	Street Lights	Street Signs	Tree Planting	Construction Prior to Acceptance	Financial
	KENOSHA COUNTY																
1	Silver Lake	X	X					X	X	X		X					X
2	Twin Lakes	X							X			X					
	MILWAUKEE COUNTY																
3	Bayside	X	X				X	X	X			X					X
4	Brown Deer	X	X		X		X		X	X							X
5	Fox Point	X															
6	Greendale	X	X		X		X	X	X	X	X	X	X	X			X
7	Hales Corners	X	X		X		X		X			X					X
8	River Hills	X	X				X	X	X								X
9	Shorewood	X							X								
	OZAUKEE COUNTY																
10	Grafton	X	X		X		X	X	X	X	X	X			X		X
11	Saukville	X	X		X		X	X	X	X	X	X					X
12	Thiensville	X	X		X		X	X	X	X	X	X	X		X		X
	RACINE COUNTY																
13	Elmwood Park	X	X		X		X		X						X		X
14	Waterford	X	X		X		X	X	X	X	X						X
15	Wind Point	X															
	WALWORTH COUNTY																
16	Genoa City	X	X		X		X		X	X			X				X
	WASHINGTON COUNTY																
17	Germantown	X	X		X		X	X	X	X		X					X
18	Slinger	X	X		X		X	X	X	X	X	X					X
	WAUKESHA COUNTY																
19	Butler	X	X				X	X	X			X					X
20	Dousman		X						X			X		X		X	
21	Hartland	X	X		X		X		X		X	X					X
22	Lannon	X	X					X	X			X		X			X
23	Menomonee Falls	X	X		X	X	X	X	X	X	X	X		X	X		X
24	Mukwonago	X	X	X	X		X	X or $500/ac.	X		X	X			X		X
25	Nashotah	X	X					X	X								
26	North Prairie	X	X						X			X					X
27	Pewaukee	X	X		X		X	X	X	X		X	X	X			
28	Sussex	X	X		X	X	X	X	X	X	X			X	X		X

Table 2 (continued)

NO.	UNIT OF GOVERNMENT	MAPPING DOCUMENTS						DESIGN STANDARDS				PUBLIC SITES		FEES		
		Preliminary Plat		Final Plat		Certified Survey Map	State Plane Coordinate System	Streets	Road-ways	Lots & Blocks	Ease-ments	Reservation and/or Dedication	Fee Per Lot	Preliminary Plat	Final Plat	Engineering & Inspection
		Scale	Vertical Control Interval	Specified	Additional Information											
	KENOSHA COUNTY															
1	Silver Lake	100'	05'	X	X			X	X	X	X	5-15% dedication.				
2	Twin Lakes			X								10% dedication.			$25/plat.	
	MILWAUKEE COUNTY															
3	Bayside	100'	02'	X		X		X	X	X	X	Consideration must be given.				
4	Brown Deer	100'	05'	X		X		X	X	X	X				Actual costs.	
5	Fox Point	100'	05'	X	X	X		X		X						
6	Greendale			X												
7	Hales Corners	100'		X										$25/plat.		
8	River Hills	100'	05'	X		X		X	X	X	X					
9	Shorewood	100'		X				X	X	X		Consideration must be given.				
	OZAUKEE COUNTY															
10	Grafton	100'	05'	X		X		X	X	X	X	Per master plan.				
11	Saukville			X	X			X			X	Dedication per master plan.	$100			
12	Thiensville	100'	05'	X		X		X	X	X	X	Per governing body.				
	RACINE COUNTY															
13	Elmwood Park		01'	X				X	X	X	X	Per governing body.				
14	Waterford	100'	05'	X	X			X	X	X	X					
15	Wind Point			X						X						
	WALWORTH COUNTY															
16	Genoa City	100'	02'	X				X		X		Consideration must be given.				
	WASHINGTON COUNTY															
17	Germantown	100'	02'	X		X		X	X	X	X	05% dedication.				10¢/ft.water; 20¢/ft. sewer; 2½¢/ft.roads.
18	Slinger	100'		X		X		X	X	X	X	Per master plan		$15+$1/lot.		
	WAUKESHA COUNTY															
19	Butler			X	X											
20	Dousman								X							
21	Hartland	200'	02'	X				X	X	X	X	Consideration must be given.				
22	Lannon	100'	02'	X	X	X		X		X	X					Actual costs.
23	Menomonee Falls	200'	05'	X		X		X	X	X	X		$200			Actual costs.
24	Mukwonago	100'	02'	X	X	X		X	X	X	X	05% reservation.		Actual costs.		
25	Nashotah	100'		X				X		X	X					
26	North Prairie	100'		X	X			X	X	X	X	Consideration must be given.				
27	Pewaukee	100'	02'	X		X		X	X	X	X	Dedication per master plan.		$25-100/plat.		Actual costs.
28	Sussex	200'	05'	X		X		X	X	X	X	Consideration must be given.				25¢/ft.water; 50¢/ft. sewer & roads.

Table 3
INVENTORY OF LAND DEVELOPMENT REGULATIONS IN SOUTHEASTERN WISCONSIN
(towns)

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

NO.	UNIT OF GOVERNMENT	TYPE OF REGULATION			JURISDICTION			PLATTING PROCEDURES								
		Street Improvement Regulations	Land Division Ordinances	Adoption Date	Extra-territorial	Subdivision as Defined by Wis. Stats.	Other Land Divisions	Pre-application	Preliminary Plat Review Body		Preliminary Plat Approval Body		Building Restrictions	Modifications		Land Suitability
									Planning Agency	Municipal Engineer	Plan Commission	Governing Body		Planning Agency	Governing Body	
	KENOSHA COUNTY															
1	Bristol		X	'64			X	X	X		X			X		
2	Paris		X	'62		X	X	X	X		X					
3	Pleasant Prairie		X	'63		X	X	X	X			X		X	X	
4	Salem		X	'58		X						X	X			
5	Somers		X	'64			X	X	X		X			X		
	OZAUKEE COUNTY															
6	Cedarburg	X		'60												
	RACINE COUNTY		X *	'56			X *		X *		X *			X *		
7	Burlington		*													
8	Caledonia		X *	'63		X						X				
9	Dover		*													
10	Mount Pleasant	X	*	'56												
11	Norway		*													
12	Raymond		*													
13	Rochester		*													
14	Waterford		*													
15	Yorkville		*													
	WASHINGTON COUNTY															
16	Barton		X	'63		X						X				
17	Germantown		X	'56		X			X	X		X	X			
18	Jackson		X	'61		X						X				
19	Kewaskum		X	'61		X						X				
20	Polk		X	'61		X				X	X		X			
21	Richfield		X	'61		X			X	X		X	X			
22	West Bend		X	'56		X						X				
	WAUKESHA COUNTY															
23	Brookfield		X	'59		X		X	X	X	X			X	X	
24	Delafield		X	'61			X		X	X	X				X	
25	Genesee		X	'61		X		X	X		X			X	X	
26	Lisbon		X			X			X	X	X					
27	Oconomowoc	X		'58												
28	Ottawa		X	'65		X	X	X	X	X	X			X	X	
29	Pewaukee		X	'60		X	X	X		X	X			X	X	
30	Summit		X	'59		X	X	X	X		X			X	X	
31	Waukesha		X			X						X				

* *Racine County Subdivision Control Ordinance is also applicable to all nine towns in Racine County.*

Table 3 (continued)

NOVEMBER 1965

NO.	UNIT OF GOVERNMENT	IMPROVEMENTS REQUIRED														IMPROVEMENT GUARANTEES	
		Monuments	Street Grading	Lot Grading	Water Mains	Fire Cisterns	Sanitary Sewers	Adequate Storm & Water Drainage System	Roadway Surfacing	Curb & Gutter	Sidewalks	Culvert & End Walls	Street Lights	Street Signs	Tree Planting	Construction Prior to Acceptance	Financial
	KENOSHA COUNTY																
1	Bristol	X	X		X		X		X								X
2	Paris	X	X		X		X	X	X			X					X
3	Pleasant Prairie	X	X		X		X		X		X						
4	Salem	X							X			X					
5	Somers	X	X		X		X		X								X
	OZAUKEE COUNTY																
6	Cedarburg	X	X					X	X			X					
	RACINE COUNTY	X *															
7	Burlington																
8	Caledonia	X	X		X		X		X			X					X
9	Dover																
10	Mount Pleasant								X			X					X
11	Norway																
12	Raymond																
13	Rochester																
14	Waterford																
15	Yorkville																
	WASHINGTON COUNTY																
16	Barton	X	X						X			X		X		X	
17	Germantown	X							X								
18	Jackson	X	X						X			X		X		X	
19	Kewaskum	X	X						X			X					
20	Polk	X	X						X			X		X by home-owner		X	
21	Richfield	X	X						X			X		X by home-owner		X	
22	West Bend	X	X						X								
	WAUKESHA COUNTY																
23	Brookfield	X	X		X	X	X	X	X			X		X			X
24	Delafield	X	X						X			X					X
25	Genesee	X	X						X			X					X
26	Lisbon	X	X						X			X		X			X
27	Oconomowoc		X						X			X		X		X	
28	Ottawa	X	X		X	X	X					X		X			X
29	Pewaukee	X	X		X		X		X	X	X	X		X			X
30	Summit	X	X			X			X			X		X	X		X
31	Waukesha	X	X						X			X		X			

* *Racine County Subdivision Control Ordinance is also applicable to all nine towns in Racine County.*

Table 3 (continued)

NO.	UNIT OF GOVERNMENT	MAPPING DOCUMENTS						DESIGN STANDARDS				PUBLIC SITES		FEES		
		Preliminary Plat		Final Plat		Certified Survey Map	State Plane Coordinate System	Streets	Road-ways	Lots & Blocks	Ease-ments	Reservation and/or Dedication	Fee Per Lot	Preliminary Plat	Final Plat	Engineering & Inspection
		Scale	Vertical Control Interval	Specified	Additional Information											
	KENOSHA COUNTY															
1	Bristol	100'		X		X		X	X	X	X					
2	Paris	100'		X		X		X	X	X	X					
3	Pleasant Prairie	100'		X		X		X		X	X					
4	Salem			X					X							$50/plat.
5	Somers	100'		X		X		X	X	X	X					
	OZAUKEE COUNTY															
6	Cedarburg							X	X		X					
	RACINE COUNTY	100'*	05*	X*	X*			X*	X*	X*	X*					
7	Burlington															
8	Caledonia			X				X	X		X					
9	Dover															
10	Mount Pleasant							X	X							
11	Norway															
12	Raymond															
13	Rochester															
14	Waterford															
15	Yorkville															
	WASHINGTON COUNTY															
16	Barton		to be shown	X				X	X							
17	Germantown	100'	02'	X				X	X					$15/acre.		10¢/ft. roads.
18	Jackson		to be shown	X				X	X							
19	Kewaskum		to be shown	X												
20	Polk	100'	02'	X					X					$15/acre		10¢/ft. roads.
21	Richfield	100'	02'	X				X	X					$15/acre.		
22	West Bend		to be shown	X				X								
	WAUKESHA COUNTY															
23	Brookfield	100'	02'	X				X		X	X	Per governing body.				
24	Delafield	100'	02'	X	X			X		X	X	Per master plan.		$3/lot, min. $25.		
25	Genesee	100'	02'	X				X	X	X	X					
26	Lisbon	100'	02'	X				X	X	X	X				Actual cost.	
27	Oconomowoc							X	X							
28	Ottawa	100'		X		X		X	X	X	X					
29	Pewaukee	200'	05'	X		X		X	X	X	X	Per master plan.	$200			
30	Summit	200'	02'	X	X	X		X	X	X	X	Per master plan.	$200			
31	Waukesha			X												

* *Racine County Subdivision Control Ordinance is also applicable to all nine towns in Racine County.*

abutting the waters edge.[5] These provisions of the State Statutes apply to all local units of government within the Region which have not adopted more restrictive local ordinances. The results of the inventory indicated that none of the local units of government which have adopted local land development regulations have done so by simply adopting the State Statutes by reference without providing additional design, survey, plat data, or improvement requirements.

Street Improvement Regulations

Section 236.13(2)(b) of the Wisconsin Statutes provides that any city or village[6] may require, as a condition for accepting the dedication of public streets, alleys, and other ways, that the street, alley, or way shall have been improved at no cost to the city or village through the construction of designated facilities in accordance with municipal specifications and subject to municipal inspection and approval. Four of the 78 (5 percent) local units of government inventoried which have adopted land development regulations have formally provided for such improvement before acceptance of street dedications by their governing body. The required improvements include survey monuments, grading of the right-of-way, construction of surface water drainage facilities, surfacing of roadways, and in some cases erection of street signs.

Land Division Ordinances

Section 236.45 of the Wisconsin Statutes provides that any city, village, county, or town which has established a planning agency may adopt ordinances governing the subdivision or other division of land which are more restrictive than the State Statutes and which may provide for other surveying, monumenting, mapping, and approving requirements. Seventy-four of the 78 (95 percent) local units of government which have adopted land development regulations had adopted land division ordinances. These 74 included 25 of the 28 cities (89 percent), 27 of the 53 villages (51 percent), 21 of the 65 towns (32 percent), and one of the 7 counties (14 percent). It should also be noted that the 9 towns in Racine County are also regulated by the Racine County Subdivision Control Ordinance. In addition, two counties within the Region had prepared proposed land division ordinances which are presently under consideration for adoption.

Date of Adoption

Of the 74 land division ordinances inventoried, 33 (44 percent) had been adopted in 1960 or later, 29 (39 percent) had been adopted during the period from 1955 to 1959 inclusive, and only 4 (5 percent) had been adopted prior to 1955. Adoption dates were not available for the remaining 8 (12 percent) ordinances.

JURISDICTION

Section 236.45(3) of the Wisconsin Statutes provides that cities and villages may regulate the division or subdivision of land within their extraterritorial plat approval jurisdiction[7] if the municipality has adopted a subdivision ordinance or an official map.

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[5] *Section 236.16.*

[6] *This power undoubtedly extends to those towns adopting village powers under Section 60.18(12) of the Wisconsin Statutes.*

[7] *Defined as the unincorporated area within three miles of the corporate limits of a first, second, or third class city, or 1½ miles of a fourth class city or a village. Section 236.02(2), Wis. Stats.*

Of the 52 cities and villages with land division ordinances, 16 of the 25 cities (64 percent) and 14 of the 27 villages (52 percent) have provided that the local land division ordinance should be operative in the extraterritorial plat approval area.

Section 236.45(2) of the Wisconsin Statutes provides that any city, village, town, or county which has established a planning agency may adopt ordinances governing the division of lands other than subdivisions and that these ordinances may include provisions regulating divisions of land into parcels larger than 1 1/2 acres or divisions of land into less than five parcels. Of the 74 local units of government which have adopted land division ordinances, 20 of the 25 cities (80 percent), 18 of the 27 villages (67 percent), and 8 of the 21 towns (38 percent), and Racine County have elected to regulate divisions of land other than the subdivision as defined by the Wisconsin Statutes.[8]

PLATTING PROCEDURES

Prior to submission of a preliminary draft for a proposed land division, it is desirable that the subdivider meet with the planning staff to discuss the proposed division. This meeting gives the planning agency an opportunity to advise the subdivider as to the detailed platting procedures and regulations governing plats in the community and to provide him with pertinent information concerning the long-range plans of the community as they might affect the proposed development. This step is usually an informal one and is intended to save the developer, as well as the municipality, much time and trouble in the subsequent steps. Thirty-seven (50 percent) of the local units of government with land division ordinances have provided for this preapplication procedure. Appendix A provides a suggested procedural clause that may be added to existing land division ordinances to ensure that this important procedure is followed.

Plat Review Bodies

It is desirable to have all preliminary plats, final plats, and certified survey maps reviewed by the local planning agency, municipal engineer, local utility companies, and other affected governmental bodies. Twenty (27 percent) of the land division ordinances inventoried had provided for review by both the planning agency and the municipal engineer, while 31 (42 percent) had provided for review of the preliminary plat by either the planning agency or the engineer.

Preliminary Plat Approval

Section 236.10(3) of the Wisconsin Statutes provides that the authority to approve or object to a preliminary plat may be delegated to a local plan commission or committee. Forty-one (55 percent) of the local units of government with land division ordinances have delegated such power to the plan commission, while the remaining 33 (45 percent) have retained such approval power in the hands of the governing body.

Building Restrictions

It is usually desirable to prohibit the issuance of all building or zoning permits for the erection of structures on any lot not of record until all of the requirements of the land division ordinance have been met. Twenty-one (28 percent) of the local ordinances inventoried contain such a restriction.

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[8] *Ibid, see footnote 2.*

Modifications

Often it is inappropriate to apply literally all of the design or improvement requirements of a land division ordinance. For example, there may be unique problems connected with a proposed division or such a division may lie outside the municipality's corporate limits; in which case it becomes particularly impractical to apply all the improvement requirements. In such cases a modification section similar to that suggested in Appendix B should be included in the local land division ordinance, thereby permitting the governing body or the local planning agency to modify or vary the requirements of the land division ordinance. Fifty-one (69 percent) of the land division ordinances inventoried contained such a clause; and of these, 12 (24 percent) had given such modification power to the planning agency, 20 (39 percent) to the governing body, and 19 (37 percent) to both. Only 3 (6 percent) of these ordinances prescribed a vote greater than a majority of the granting body for authorizing such modifications.

Land Suitability

Section 236.45(2)(a) of the Wisconsin Statutes provides that any city, village, town, or county which has established a planning agency may adopt an ordinance that prohibits the division of land in areas where such division would not promote the public health, safety, or welfare of the community. Seven cities (9 percent) and 6 villages (8 percent) with land division ordinances have made use of a land suitability clause. An important basis for suitability determination is the susceptibility of the site under consideration to flooding. Restrictions based upon flooding become increasingly important as hydrologic and hydraulic engineering studies, which accurately delineate flood overflow lines, become available within the Region.[9] Appendix C provides a suggested land suitability clause that may be used by local units of government.

Soil Restrictions

Restriction of development on the basis of soil suitability ratings becomes feasible as the results of the detailed regional soil survey and analysis become available to the local planning agencies and governing bodies. The detailed soil survey identifies and delineates on aerial photographs the type, slope, degree of erosion, and boundaries of each soil occurring within the Region. Some of these soil types because of flooding, inadequate drainage, shallow bedrock, high water tables, low bearing capacity, slow permeability, or unfavorable topography have severe limitations for certain types of residential, commercial, and industrial development, thereby making them either unsuitable or uneconomic for such uses. None of the ordinances inventoried contained land development restrictions based specifically upon soil characteristics, although such restrictions may be implied from the usual land suitability clause. Appendix D provides a suggested soil restriction clause that maybe used by local units of government to prevent the division and development of land covered by soils having severe and very severe limitations for certain types of development.

MAPPING DOCUMENTS

It is extremely important that land divisions be properly documented by means of a

[9] *The flood plain information report on the Des Plaines River, prepared at the request of the SEWRPC by the U.S. Army Corps of Engineers, contains flood hazard maps at a scale of 1" 2000' showing overflow lines for the maximum flood of record and the greater probable flood. The SEWRPC Root River Watershed Study has prepared flood hazard maps at a scale of 1" 2000' and for selected reaches of the stream channels at a scale of 1" 200' showing overflow lines for the 10- and 100-year recurrence interval floods.*

final plat or a certified survey map that is recorded with the county register of deeds. These documents ensure adequate legal description, give notice to all subsequent purchasers, and provide a graphic record of such division and any accompanying public dedications so as to facilitate their retracement or relocation in the field and thereby stabilize the location of private and public property boundary lines.

Preliminary Plat

Although the Wisconsin Statutes do not require submission of a preliminary plat prior to the submission of a final plat, Section 236.11(1)(a) grants an approving authority power to require submission of a preliminary plat. Considering the time, work, and expense necessary to prepare a satisfactory final plat, it is highly desirable that a preliminary plat be submitted for review and approval prior to the preparation of the final plat. Sixty-four (86 percent) of the land division ordinances inventoried, including Racine County, required a preliminary plat with the following scale or vertical contour intervals as specified in Table 4.

Table 4

SCALE AND CONTOUR INTERVAL REQUIREMENTS FOR PRELIMINARY PLATS - 1965

Scale	V.C.I.	Number	Percent
1" = 50'	2'	1	2
1" = 100'	2'	22	33
1" = 100'	Not specified	12	17
1" = 100'	5'	13	20
1" = 200'	2'	5	8
1" = 200'	5'	4	7
Not specified	3'	1	2
Not specified	2'	1	2
Not specified	1'	1	2
Not specified	Required but not specified	4	7
Total		64	100

Final Plat and Certified Survey Map

The Wisconsin Statutes require a final plat for all subdivisions; and Sections 236.20 and 236.21 specify the size and material of the plat and the certificates and survey data to be shown thereon in great detail. In addition to the statutory requirements, certain additional information and certificates are desirable; and these are listed in Appendix E. As might be expected, all 74 (100 percent) of the land division ordinances inventoried required a final plat. Eighteen (24 percent), including Racine County, required additional information not required by Statute to be shown on the final plat.

Cities, villages, towns, and counties which have planning agencies are authorized to adopt ordinances governing the division of land which are more restrictive than the statutes,[10] including requiring a final plat for divisions of land that are more restrictive than the statutory definition of a subdivision. Twelve (16 percent) of the land division ordinances inventoried, including Racine County, required a final plat for subdivision that are defined more restrictively than the Statutes.

[10] *Section 236.45(2), Wis. Stats.*

Table 5
STREET RIGHT-OF-WAY
WIDTH STANDARDS - 1965

Street Type	Width	Number	Percent
Major & Arterials	60'	3	4
	66'	11	15
	80' to 100'	31	41
	100' to 120'	12	16
	Determined by governing body	2	3
	Per master plan[a]	10	14
	Not specified	5	7
Total		74	100
Secondary & Collectors	60'	14	19
	66'	18	24
	70'	2	3
	80'	16	22
	90'	8	11
	Determined by governing body	2	3
	Per master plan[a]	6	8
	Not specified	8	10
Total		74	100
Marginal Access & Frontage	30'	6	8
	40'	4	5
	50'	10	14
	60'	7	9
	66'	5	7
	Determined by governing body	1	1
	Per master plan[a]	5	7
	Not specified	36	49
Total		74	100
Minor	50'	11	15
	60'	33	45
	66'	17	23
	Determined by governing body	1	1
	Per master plan[a]	5	7
	Not specified	7	9
Total		74	100
Alleys	15'	1	1
	16'	1	1
	20'	16	22
	24'	15	21
	30'	9	12
	Determined by governing body	1	1
	Per master plan[a]	3	4
	Not specified	28	38
Total		74	100

[a] *Includes Official Map.*

Section 236.34 of the Wisconsin Statutes provides that a certified survey map may be utilized to record the survey, monumentation, and dedications involved in divisions of lands into not more than four parcels; and this is the more economical document to use for such minor subdivisions. Thirty-five (47 percent) of the land division ordinances inventoried contain provisions for use of the certified survey map. Appendix F contains suggested provisions for the use of a certified survey map, which may be added to local land division ordinances.

State Plane Coordinate System

The Wisconsin Legislature has provided for the use of the state plane coordinate system on maps, surveys, and other documents.[11] Only one of the land division ordinances

Table 6

ROADWAY WIDTH STANDARDS - 1965

Street Type	Width	Number	Percent
Major & Arterials	Less than 30'	11	15
	30' to 40'	4	5
	Greater than 40'	9	12
	Dual 22' to 26'	5	7
	Dual 36'	3	4
	Determined by governing body	4	5
	Per master plan[a]	21	29
	Not specified	17	23
Total		74	100
Secondary & Collectors	Less than 30'	12	16
	30' to 40'	13	18
	Greater than 40'	7	9
	Determined by governing body	3	4
	Per master plan[a]	18	24
	Not specified	21	29
Total		74	100
Marginal Access & Frontage	Less than 30'	6	8
	30' to 40'	7	9
	Greater than 40'	1	1
	Determined by governing body	2	3
	Per master plan[a]	15	21
	Not specified	43	58
Total		74	100
Minor	Less than 30'	18	25
	30' to 40'	6	8
	36'	4	5
	38'	1	1
	40' and greater	5	7
	Determined by governing body	3	4
	Per master plan[a]	18	25
	Not specified	19	25
Total		74	100

[a] *Includes Official Map.*

[11] *Section 236.18, Wis. Stats.*

inventoried, however, had provided for the use of this system, although several municipalities within the Region have survey control systems underway or completed which would facilitate such use. Appendix G contains a suggested clause that may be added to both the final plat and certified survey map requirements of local land division ordinances so as to ensure the appropriate use of the state plane coordinate system.

DESIGN STANDARDS

The inventory indicated that a wide variety of design standards were being utilized by local units of government within the Region. Sixty-three (85 percent) of the land division ordinances inventoried provide for street design standards governing such items as street arrangement, grades, and intersection configuration; 55 (74 percent) of the ordinances inventoried provide street cross section design standards; 56 (76 percent), lot and block design standards; and 53 (72 percent), drainage and utility easement design standards.

Tables 5 and 6 contain a summary of the street right-of-way and roadway width standards respectively to be found in the ordinances inventoried.

Public Sites

Thirty-eight (51 percent) of the 74 ordinances inventoried required that some provision be made during the land development process for the provision of necessary public sites. Six (17 percent) of the 38 ordinances required from 5 to 10 percent of the proposed land division to be dedicated for public sites, while 4 (11 percent) required either a dedication or a reservation of 5 to 10 percent of the tract being developed. Eleven (35 percent) of the ordinances required reservation of, and 2 (5 percent) required dedication of, the public sites shown on the community master plan, while 13 (37 percent) left such determination to the consideration and judgment of the planning agency or governing body. Two (5 percent) of the ordinances specified a public site fee, ranging from $50 to $200 per lot, while five permitted such a fee in lieu of dedication.

Table 7

SUBDIVISION IMPROVEMENT REQUIREMENTS - 1965

Type	Number	Percent
Survey Monuments[a]	74	100
Street Grading	66	89
Lot Grading	5	7
Water Mains	49	66
Fire Cisterns	7	9
Sanitary Sewer Mains	52	70
Storm Water Drainage System	38	51
Roadway Surface	70	95
Curb & Gutter	29	39
Sidewalk	25	34
Culverts & End Walls	43	58
Street Lights	9	12
Street Signs	21	28
Street Trees	14	19

[a] *Section 236.15(1) of the Wisconsin Statutes requires monuments for all subdivisions.*

IMPROVEMENTS REQUIRED

The 74 local land division ordinances inventoried required various types of improvements as indicated in Table 7.

IMPROVEMENT GUARANTEES

Cities and villages[12] within which the subdivision lies are empowered to require the subdivider to make and install any public improvements reasonably necessary or to execute a surety bond to ensure that such improvements are installed within a reasonable time.[13] Four (5 percent) of the local land division ordinances inventoried have provided that the required improvements shall be installed prior to plat approval, and 54 (73 percent) of the ordinances provided for financial guarantees in lieu of installation. Guarantees specified were in the form of surety bonds, performance bonds, escrow, cash, and/or certified checks.

FEES

There are many costs incurred by the local governing body in processing preliminary plats, final plats, and certified survey maps. Such costs include the cost of review-

[12] *Ibid, see footnote 6.*

[13] *Section 236.13(2)(a), Wis. Stats.*

Table 8

REQUIRED FEES - 1965

Type	Amount	Number	Percent
Preliminary Plat Fee	Actual cost	1	7
	$1/lot	1	7
	$1 to $3/lot	2	14
	$15 + $1/lot	1	7
	$25 + $2/lot	2	14
	$1/plat	1	7
	$25/plat	1	7
	$15 to $110/plat	2	14
	$15/acre	3	23
Total		14	100
Final Plat Fee	Actual cost	2	32
	$25 + 50¢/lot	1	17
	$25/plat	1	17
	$50/plat	1	17
	$25 to $200/plat	1	17
Total		6	100
Engineering & Inspection Fee	Actual cost	6	35
	$50/plat	1	6
	1% of improvements	2	12
	10% of improvements	1	6
	Per foot of improvements	5	29
	Percent of sewer & street improvements	1	6
	Determined by governing body	1	6
Total		17	100

ing the preliminary plat layout, reviewing the improvement plans and specifications, field inspections, preparation of estimates of the financial guarantee required, approval of sureties, and the drafting of contracts. Twenty-nine (39 percent) of the land division ordinances inventoried had provided for some type of fee to offset these costs. Table 8 contains a summary of the type and amount of fees that were required by those ordinances.

CONCLUSIONS

Although only 78 (51 percent) of the 153 local units of government within the Region have provided for some type of formal land development regulation, 33 (84 percent) of the 39 units lying within the three urbanized areas of the Region as defined and delineated by the U. S. Bureau of the Census and 13 (93 percent) of the 14 local units which had increased over 100 percent in population between 1950 and 1960 had adopted land development regulations. In addition, 62 (83 percent) of the local units with ordinances had adopted such ordinance within the past 10 years.

Therefore, it may be concluded that many of those communities which are experiencing extensive subdivision activity and land development problems because of rapid urbanization have provided in recent years for one of the regulatory tools so necessary for orderly and economical community growth and development. However, 75 (49 percent) of the local units of government, including 14 (32 percent) of the 44 local units which had increased over 50 percent in population between 1950 and 1960, remain without some type of local land development regulation.

Town Road Standards

The Wisconsin platting statutes require that minimum right-of-way widths for town roads platted after January 1, 1966, comply with the minimum town road standards specified in Section 86.26 of the Wisconsin Statutes.[14] However, the platting statutes do not specify surface widths or maximum grades for such town roads, or for any streets to be dedicated by subdivision plat. Section 86.21[15] of the Wisconsin Statutes requires county highway committees to annually certify that all amounts expended or obligated for improvement or construction on town roads have been expended only on facilities meeting statutory minimum design standards for such roads. These standards include, in addition to specific right-of-way widths: surface widths and maximum grades as set forth in Table 9.

Therefore, the 41 (63 percent) of the 65 towns without local land development regulations and those towns with design and improvement standards less than the statutory town road standards may accept street dedications and improvements that are not in conformance with the statutory town road standards.

Improvements or construction on these substandard roads result in 20 percent of the final payment of the allotment for local highway aid being withheld from the town until the standards are complied with. This would result in reduced revenue for the town or the incurring of unnecessary costs in reducing grades and laying a surface, all of which could have been provided during land development at no cost to the town.

[14] *Section 236.16(2), Wis. Stats; Chapter 110, Laws of 1965.*
[15] *Chapter 3, Laws of 1965.*

Table 9

TOWN ROAD STANDARDS[a] - 1965

Annual Average 24-Hour Traffic (ADT)	Minimum Design Standards
Local Service, Intermittent Traffic	
Right of way	3 rods
Roadway width	20 feet
Surface width	16 feet
Under 100 ADT	
Right of way	3 rods
Roadway width	24 feet
Surface width	18 feet
Maximum grades	9% to 11%
100 to 250 ADT	
Right of way	4 rods
Roadway width	26 feet
Surface width	20 feet
Maximum grades	8% to 11%
251 to 400 ADT	
Right of way	4 rods
Roadway width	32 feet
Surface width	22 feet
Maximum grades	6% to 8%
Curvature	6° to 12.5°
401 to 1,000 ADT	
Right of way	4 rods
Roadway width	34 feet
Surface width	22 feet
Maximum grade	5% to 8%
Curvature	5° to 12.5°
1,001 to 2,400 ADT	
Right of way	4 rods
Roadway width	44 feet
Surface width	24 feet
Maximum grades	5% to 7%
Curvature	4.5° to 7.5°
Over 2,400	State trunk standards

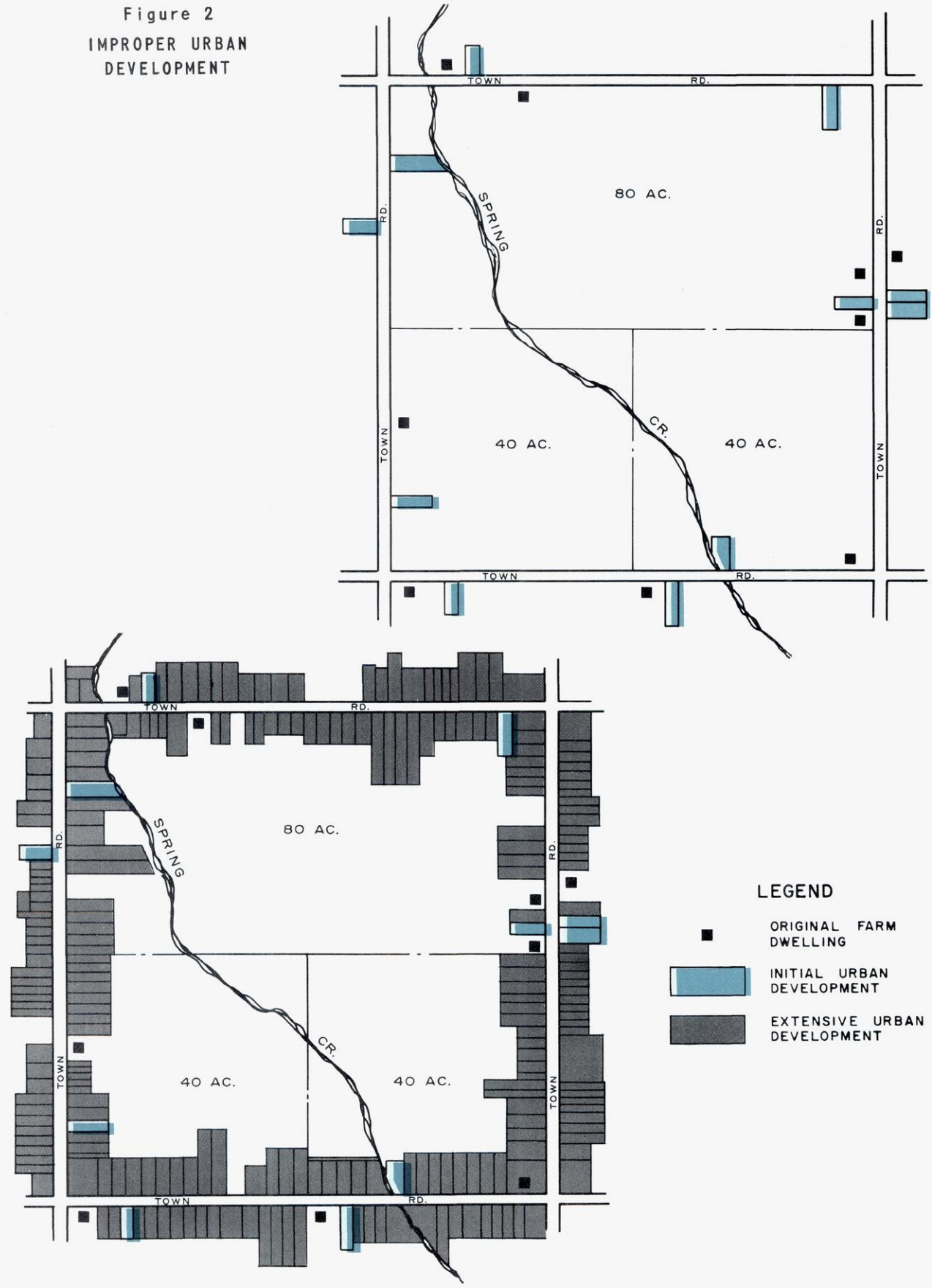
[a] *Excerpted from Section 86.26 of the Wisconsin Statutes, 1963.*

Land Suitability

The Wisconsin platting statutes do not provide for any restrictions on the division and development of unsuitable land; however, the local units of government are authorized by Statute to prohibit division of land in areas where such prohibition would promote the public health, safety, and general welfare of the community.

Only 13 (8 percent) of the 153 local units of government have specifically prohibited the division and development of residential building sites on lands that by reason of

Figure 2
IMPROPER URBAN
DEVELOPMENT



flooding, inadequate drainage, shallow bedrock, fluctuating or high water tables, slow permeability, or unfavorable topography would have severe or very severe limitations for such proposed development. Therefore, 140 (92 percent) of the local units within the Region have no adopted regulations prohibiting land division and home construction in areas subject to periodic inundation, in marsh or swamp areas, nor on soils where septic systems would be inoperative.

Some of these proposed limitations can be overcome, but often only by very expensive corrective measures, such as the construction of flood control, drainage, and public sewerage facilities or the excavation of bedrock. When one considers that over 17 percent of the Southeastern Wisconsin Region is covered by soils unsuitable for urban development and another 31 percent is covered by soils not suitable for such development utilizing on-site soil absorption sewage disposal facilities,[16] land suitability and soil restriction clauses in local subdivision control ordinances, such as those suggested in Appendices B and C, become extremely important.

Unregulated Land Divisions

The Wisconsin platting statutes are not applicable to divisions of land resulting in parcels larger than 1 1/2 acres or resulting in less than 5 parcels of any size. Although local units of government are authorized by statute to regulate division into larger parcels and divisions into less than 5 parcels, only 47 (31 percent) of the 153 local units of government in the Region have provided for any type of regulation over land divisions not regulated by the State Statutes. In the communities that have not acted to regulate divisions of land other than subdivisions as defined by State Statutes, no survey or design standards nor improvement requirements are in effect for those land divisions that result in one, two, three, or four parcels nor where the resulting tracts are 1.51 acres in size or larger. This omission of land divisions regulated in communities having land division ordinances, coupled with the fact that only 51 percent of the local units of government within the Region have enacted land division ordinances, still leaves sizeable areas of the Region without adequate regulation of land development in the public interest.

This lack of regulation has and, unless corrected, will continue to encourage land division and land development resulting in poor survey and title document records, inadequate reservation of street rights-of-way, misuse of soils, and inadequate provision for utility and drainage easements and community facility sites. This type of unguided and unregulated development results in real property ownership litigation, traffic congestion, health hazards, blight, need for expensive public corrective measures, and overall uneconomical and inefficient community development patterns, such as those illustrated in Figure 2.

The most conservative type forecasts indicate that within the next 10 years the population of the Region will continue to grow at the rate of over 31,000 persons per year. This rate of growth will generate a need for the creation of almost 94,000 new housing units which in turn will require the division and development of over 42,930 acres in the next decade. If the location and development of these sites and their necessary

[16] *SEWRPC Planning Report No. 7, Inventory Findings - 1963, Volume 1, 1965.*

transportation, utility, and community facility services are to contribute to and promote the health, safety, prosperity, aesthetics, and general welfare of the Region and of the local communities concerned, careful consideration of land division ordinances and land development practices by the local units of government will be necessary.

* * * * * * *

Appendix A

SUGGESTED PREAPPLICATION CLAUSE

Preapplication
It is recommended that, prior to the filing of an application for the approval of a preliminary plat or certified survey map, the subdivider consult with the local planning agency and/or its staff in order to obtain their advice and assistance. This consultation is neither formal nor mandatory but is intended to inform the subdivider of the purpose and objectives of these regulations, the comprehensive plan, comprehensive plan components, and duly adopted plan implementation devices of the community and to otherwise assist the subdivider in planning his development. In so doing, both the subdivider and planning agency may reach mutual conclusions regarding the general program and objectives of the proposed development and its possible effects on the neighborhood and community. The subdivider will gain a better understanding of the subsequently required procedures.

Appendix B

SUGGESTED MODIFICATION SECTION

Modifications
Where, in the judgment of the local planning agency, it would be inappropriate to apply literally the design and improvement provisions of this Ordinance because of the proposed division being located outside of the corporate limits or because exceptional or undue hardship would result, the local planning agency may waive or modify any requirement to the extent deemed just and proper.

Such Relief Shall Be Granted without detriment to the public good and without impairing the intent and purpose of this Ordinance or the desirable general development of the community in accordance with its comprehensive plan or comprehensive plan component. A three-fourths (3/4) vote of the entire membership of the local planning agency shall be required to grant any modification of this Ordinance, and the reasons shall be entered in their minutes.

The Governing Body may waive the placing of monuments, required under Section 236.15(1)(b), (c), and (d), for a reasonable time on condition that the subdivider execute a surety bond to ensure the placing of such monuments within the time required.

Appendix C

SUGGESTED LAND SUITABILITY CLAUSE

Land Suitability
No land shall be divided for any use where the local planning agency finds that the land has severe or very severe limitations for such use by reason of flooding, con-

centrated runoff, inadequate drainage, adverse soil or rock formation, unfavorable topography, low bearing strength, slow permeability, erosion susceptibility, or any other feature likely to be harmful to the health, safety, prosperity, aesthetics, and general welfare of the future residents or users of the proposed subdivision or of this community.

The Local Planning Agency, in applying the provisions of this section, shall in writing recite the particular facts upon which it bases its conclusions that the land is not suitable for certain uses.

Lands Lying within, or at less than two (2) feet above the level of, the 10-, 25-, or 100-year recurrence interval flood (the greatest flood of record) shall not be divided for residential, commercial, or industrial uses.

The Subdivider shall have an opportunity to present evidence contesting such finding if he so desires. Thereafter the local planning agency may affirm, modify, or withdraw its determination that the land is not suitable for certain uses.

Appendix D

SUGGESTED SOIL RESTRICTIONS SECTION

Soil Restriction

Certain soil types lying in this community, as shown on the operational soil survey maps prepared by the U. S. Department of Agriculture, Soil Conservation Service, in cooperation with the Southeastern Wisconsin Regional Planning Commission, have severe or very severe limitations for residential development because of one or more of the following reasons; high or fluctuating water table, flooding, ground water contamination, silting, slow permeability, steep slopes, or proximity to bedrock. Therefore, the local planning agency finds the following:

Soils With Very Severe Limitations. No parcel of land containing the following soil types[17] shall be divided for residential use:

2	5	10	217	416	451	455	458
3	7	11	218	417	452	456	459
4	9	13	302	450	453	457	460

No parcel of land containing the following soil types shall be divided for residential use with on-site soil absorption sewage disposal facilities:

26	35	41	46	60	116	212	345
27	36	42	47	76	126	298	387
28	37	45	48	80	144	323	501

[17] *Soil types selected in this appendix are illustrative only and do not include all soils having such limitations.*

Soils With Severe Limitations. No land containing the following soil types nor containing any soils whose slopes exceed twelve (12) percent shall be divided for residential use with on-site soil absorption sewage disposal facilities unless their severe limitations are overcome by such corrective measures as elimination or avoidance of bedrock, provision of larger absorption areas, or the terracing and reduction of steep slopes:

21	39	100	139	293	318	336
24	40	101	140	294	325	363Z
31	44	110	151	295	331	397

The Subdivider desiring to divide land for residential purposes on the above soils having very severe limitations shall have an opportunity to present evidence contesting such finding if he so desires. Thereafter the local planning agency may affirm, modify, or withdraw its findings.

A subdivider desiring to divide land for residential use with on-site soil absorption sewage disposal facilities on the above soils having severe limitations shall: have additional on-site investigations made, including percolation tests; obtain the certification of a soils scientist or soils engineer that specific areas lying within these soils are suitable for the proposed soil absorption sewage disposal facility; and meet the State Board of Health regulations. In addition, the municipal engineer and local planning agency shall find that the proposed corrective measures have overcome the severe soil limitations.

The Local Planning Agency may request the County Soil and Water Conservation District to provide expert assistance from regional, state, or federal agencies which are assisting such District under a "Memorandum of Understanding."

Appendix E

SUGGESTED FINAL PLAT DATA SECTION

General

A Final Plat prepared by a registered land surveyor shall be required for all subdivisions.[18] It shall comply in all respects with the requirements of Section 236.20 of the Wisconsin Statutes.

Additional Information

The Plat shall show correctly on its face, in addition to the information required by Section 236.20 of the Wisconsin Statutes, the following:

[18] *A subdivision may be defined as the division of a lot, parcel, or tract of land by the owners thereof, or their agents, for the purpose of transfer of ownership or building development where the act of division creates three or more parcels or building sites of four acres each or less in area; or where the act of division creates three or more parcels or building sites of four acres each or less in area by successive division within a period of five years.*

Exact Length and Bearing of the centerline of all streets, including the curve data required for street lines.

Exact Street Width along the line of any obliquely intersecting street.

Length of Chord subtending the arc on a curved street line across any intersecting street.

Railroad Rights-of-Way within and abutting the Plat.

Setbacks or Building Lines required by the local planning agency.

All Lands Reserved for future public acquisition or reserved for the common use of property owners within the Plat.

Special Restrictions required by the local planning agency relating to access control along public ways or to the provision of planting strips.

Deed Restrictions

The local planning agency may require that deed restrictions be filed with the Final Plat.

Certificates

All Final Plats shall provide all the certificates required by Section 236.21 of the Wisconsin Statutes; and, in addition, the surveyor shall certify that he has fully complied with all the provisions of this Ordinance.

Appendix F

SUGGESTED CERTIFIED SURVEY MAP SECTION

General

A Certified Survey Map prepared by a registered land surveyor shall be required for all minor subdivisions.[19] It shall comply in all respects with the requirements of Section 236.34 of the Wisconsin Statutes. The minor subdivision shall meet all the improvement requirements of this Ordinance.

Additional Information

The Map shall show correctly on its face, in addition to the information required by Section 236.34 of the Wisconsin Statutes, the following:

All Existing Buildings, watercourses, drainage ditches, and other features pertinent to proper division.

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[19] *A minor subdivision may be defined as the division of land by the owner or subdivider resulting in the creation of two parcels or building sites, any one of which is four acres in size or less, or the division of a block, lot, or outlot within a recorded subdivision plat into not more than four parcels or building sites without changing the exterior boundaries of said block, lot, or outlot.*

Setbacks or Building Lines required by the local planning agency.

All Lands Reserved for future acquisition.

Date of the Map.

Graphic Scale.

Name and Address of the owner, subdivider, and surveyor.

Location of the minor subdivision by government lot, recorded subdivision, quarter section, section, township, range, county, and state.

Names of adjoining streets, highways, parks, cemeteries, and subdivisions.

Location and Width of adjoining streets and highways, including rights-of-way and roadways.

Any Additional Information required by the local planning agency or governing body.

Certificates

The surveyor shall certify on the face of the Map that he has fully complied with all the provisions of this Ordinance. The governing body, after a recommendation by the reviewing agencies, shall certify its approval on the face of the Map.

Dedication of streets and other public areas shall require the owner's certificate and the mortgagee's certificate in substantially the same form as required by Section 236.21(a) of the Wisconsin Statutes.

Recordation

The Certified Survey Map shall be recorded with the county register of deeds only after the certificates of the governing body and the surveyor are placed on the face of the Map.

Appendix G

SUGGESTED STATE PLANE COORDINATE CLAUSE

State Plane Coordinate System

Where the Plat or Map is located within a quarter section, the corners of which have been relocated, monumented, and coordinated, the Plat or Map shall be tied directly to one of the section or quarter corners so relocated, monumented, and coordinated. The exact distance and grid bearing of such tie shall be determined by field measurements, and the material and Wisconsin state plane coordinates of the monument marking the relocated section or quarter corner to which the Plat or Map is tied shall be indicated on the Plat or Map. All distances and bearings shall be referenced to the Wisconsin Coordinate System, South Zone, and adjusted to the community's control survey.

A BACKWARD GLANCE

by Jean C. Meier, Librarian - Research Assistant

HIGHWAY DEVELOPMENT IN SOUTHEASTERN WISCONSIN

Part I - Early Wisconsin Roads 1829-1900

The transition in overland transportation from the "Red Man's Trails" in the early decades of the nineteenth century through the period of the ox-cart and wagon road to the modern system of highways represents an interesting panorama of the physical, economic, and social development of the Region. A comparison of the historic highway maps of the Region, reproduced herein, with an existing arterial street and highway system map will indicate that, once established, the basic road network becomes an extremely permanent future of the regional landscape. The road network changes only very slowly over time, and its elements remain through several cycles of land use in its service area. Indeed, the permanence of the road network in the Region is exceeded only by the permanence of certain elements of the natural resource base.

The Heritage of Indian Trails

All of southeastern Wisconsin was considered uninhabitable wilderness known only to the French traders until the Black Hawk War of 1832, when adventurers pushed overland westward from Lake Michigan to the Mississippi River. The beauty and potential of the Region was so impressive that by 1835 rumors of the fertile prairies and forests had attracted thousands of pioneers, who soon began to move in with their families, clearing the first roadways before them.

For two centuries after the native Potawatomis first shared their beautiful wilderness of southeastern Wisconsin with the white intruders, the only roads were the Indian trails, worn deep by centuries of travel. With the irregularities peculiar to a footpath, they were an extensive network winding through the forest and parklike "oak openings," connecting the many Indian villages located within the Region. Many of the cities and villages existing within the Region today are located on the original sites of earlier Indian villages.

The early Indian trails, however, were helpful only as guides for the ox team and wagon, which carried the household goods of the settlers into the wilderness. The first comers encountered some of their greatest hardships for want of roads and in the first building of them: felling timbers, crossing marshes and ravines, and building bridges with only the most primitive means of construction at hand.

LOCATION OF THE MAJOR INDIAN TRAILS

In 1819 French trader Jacques Vieau, with his Ottawa wife and son-in-law, Solomon Juneau, established the first permanent white settlement in the Region, high on the banks of the Milwaukee River adjacent to an Indian village, on what is now downtown Milwaukee. There were at that time about seven major and

well-worn Indian trails leading radially out of the settlement. One led southward toward Chicago, one southwest toward the Fox River, one a little more westward to Muskego Lake, one leading toward what is now Janesville, one westward to what is now Waukesha and Watertown, one led northward to the west side of Green Bay, and one proceeded up the peninsula along the lake through what is now Port Washington. The principal roads to the interior were first established very nearly on these same trails and were really little more than clearings through the forests, with no real grading or surfacing.

EARLY U. S. AND MILITARY ROADS (See Map 1, page 42)

In 1824 while Wisconsin was still a part of the Michigan territory, the Eighteenth Congress passed what can be viewed as an effort to institute "at the national level" planning of a system of internal improvements. The East was developing fast when the General Survey Act of 1824 was passed and President Monroe created the Board of Engineers for Internal Improvement. The Board was to determine a system of essential improvements, designated to encourage the development of the still young nation and to be secured by federal construction and federal aid. A proposed plan, which had been outlined in 1824 by then Secretary of War Calhoun, promoted a scheme of roads and canals to guide the economic and political development of the nation along the desired lines. The scheme had military as well as civil and cultural benefits.

Three major U. S. forts had been established in Wisconsin between 1816 and 1828 for frontier defense, and it was out of the difficulty of transporting supplies between these forts, particularly through the winter months, that the U. S. Government found it expedient to develop, in accordance with the scheme advanced by Calhoun, a system of military roads to facilitate such communication. Fort Howard at what is now Green Bay and Fort Crawford at what is now Prairie du Chien had been established in 1816, while Fort Winnebago was established in 1828 at the portage between the Fox and Wisconsin rivers, near what is now Portage. The location survey for the Chicago-Green Bay Military Road was made in 1830, but there was no appropriation by Congress for construction. It was not until 1838 that Congress made an appropriation of $15,000 for construction of this military road from Fort Howard at Green Bay, by way of Milwaukee and Racine, to the northern boundary of the State of Illinois in the direction of Chicago (now approximated by STH 32 within the Region and locally named in various places "Chicago Road" or "Green Bay Road"). At this same time $10,000 was approximated for construction of a military road west from Milwaukee by way of Madison to Dubuque, Iowa (now approximated by the Bluemound Road within the Region). These first military roads were surveyed and constructed by soldiers stationed at the forts and were of a crude type, cleared two rods wide, roughly graded but not surfaced, with corduroy (log) construction over marshy and low areas and with timber bridges constructed over the many streams encountered. Because of their importance as a medium of frontier defense, there were repeated requests by the Quartermaster General and Army

Engineers for additional appropriations in order to improve the quality of construction. However, until Wisconsin became a territory in 1836, roads in southeastern Wisconsin were far less than adequate for the influx of settlers, who began pouring into the Region when the Black Hawk War of 1832 took the white man farther inland than he had ever been, into the "uninhabitable wilderness."

Table 1

U.S. AND MILITARY ROADS
IN SOUTHEASTERN WISCONSIN REGION
1835 - 1870 *

1. From Fort Howard (Green Bay) south by Milwaukee and Racine to the northern boundary line of the State of Illinois.

2. From Sauk Harbor (Port Washington) west to Dekorree on the Wisconsin River.

3. From Town of Milwaukee on Lake Michigan west by way of Madison to a point opposite the Town of Dubuque on the Mississippi River.

4. From Racine west by Janesville to Sinipee on the Mississippi River.

5. From Southport (Kenosha) by way of Geneva to the Town of Beloit.

* *See Map 1.*

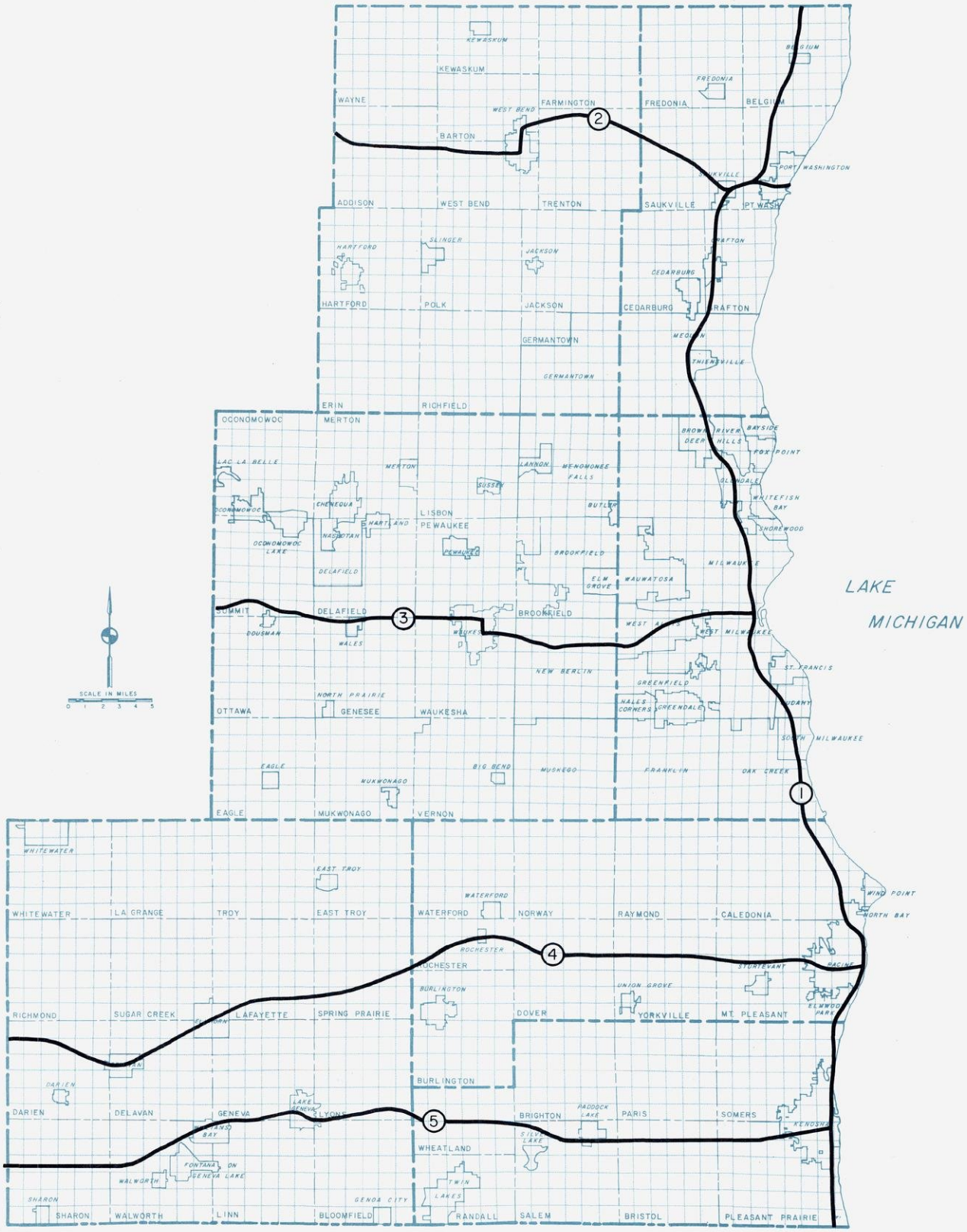
TERRITORIAL ROADS (See Map 2, page 45)
One of the first acts of the first Territorial Legislature was to establish a system of territorial roads. Three such acts were passed in the first session, with an additional 243 territorial roads authorized from 1837 to 1848. Under each act the Legislature appointed separate commissions to determine the location of the road authorized. A typical act provided that a plat of the road as established be filed with the clerk of the district court in each county which the road traversed and that mileposts were to be established along the road.

It further provided for the employment of a surveyor and chain carriers and stipulated that commissioners were to receive $2 per day and the surveyor $3. All other labor necessary to establish the road was to be paid at the rate of $1.50 per day. The commissioners were directed to make estimates of the cost of the bridges and other requirements, and the County Board of Commissioners was directed to settle all accounts for the road.

The Legislature of 1836 specifically directed that no funds for the laying out, surveying, opening, or constructing of any road authorized should be paid out

Map 1

U.S. AND MILITARY ROADS IN THE SOUTHEASTERN WISCONSIN REGION 1835 - 1870



of the territorial treasury. In subsequent years during the territorial period, some of the acts passed provided that, for the road authorized to be established, no part of the cost so incurred could be charged to either the territorial or county treasuries. In all such cases, the burden of expense connected therewith had to be assumed by the towns or depend upon local private support.

In order to finance the construction of territorial roads, road taxes were levied and paid in labor at the rate of $1.25 per day as early as 1833. In 1837 and 1838, the rate was increased to $2 per day. In addition to tax levied on real estate, there was a poll tax of two days' labor for which all able-bodied men, except clergymen, were liable. No person could be taxed a greater amount than could be commuted by 20 days' labor, including the poll tax; and as there was scant population, road improvement was meager. Sec. 37, Laws of 1838, provided in part:

> Every person who shall, at the request of the supervisor, furnish a plow, or a wagon with a team of horses or oxen and driver, and perform one or more days work with the same, shall receive credit of three days work for each days work with them.

During the years from 1839 to 1848, when Wisconsin became a state, there was little modification in the tax legislation. This method of financing road building had obvious shortcomings; and as a consequence, the territorial roads in existence within the Region in about 1840 were very poor.

Loads of any size could not be hauled except by using two, three, or even four teams of oxen; horses were used very little in the pioneer days. The settlers a few miles inland found it a discouraging task to get their crops to market. It took two days to move goods from Milwaukee to Pewaukee in 1837. In an effort to provide better surfaced roads and in the belief that privately owned plank roads were a practical answer to the problem of transporting agricultural products to market, the plank roads were constructed within the Region as toll roads.

Table 2

TERRITORIAL ROADS BUILT
IN SOUTHEASTERN WISCONSIN REGION
1838 - 1848 *

	Approximate Miles	Year Opened
1. Milwaukee to Madison via Watertown	87.6	1838
2. Milwaukee to Janesville via Mukwonago	65.5	1838
3. Prairieville (Waukesha) to Illinois State Line	45.9	1839

4.	Madison to Rochester (Racine County)	59.6	1839
5.	Milwaukee to Watertown via Hatches Mill	49.8	1839
6.	Milwaukee to Burlington	33.7	1840
7.	Mukwonago to Fort Atkinson	29.5	1840
8.	Racine to Prairieville (Waukesha)	31.5	1841
9.	Prairieville (Waukesha) to Fort Atkinson	37.0	1842
10.	Milwaukee to Prairieville (Waukesha	18.5	1842
11.	Prairieville (Waukesha) to Military Road (West Bend)	29.0	1843
12.	Prairieville (Waukesha) to Concord	28.8	1846
13.	Milwaukee to Fond du Lac	67.3	1846
14.	Racine to Burlington	26.5	1846
15.	Milwaukee to Port Washington	27.5	1846
16.	Delafield to Hustisford	21.0	1847
17.	Watertown to Delavan	52.5	1847
18.	Milwaukee to Beloit	72.8	1847
19.	Mayville to Merton	22.5	1848
20.	Waterford to Southport (Kenosha)	25.5	1848
21.	Milwaukee to Hustisford	46.5	1848
22.	Summit (Waukesha County) to Fond du Lac	49.0	1848

STATE ROADS BUILT IN REGION
1848 - 1886 *

23.	Cedarburg to West Bend	15.3	1849
24.	Burlington to East Troy	15.0	1855
25.	Milwaukee to Port Washington	25.5	1886

* *See Map 2.*

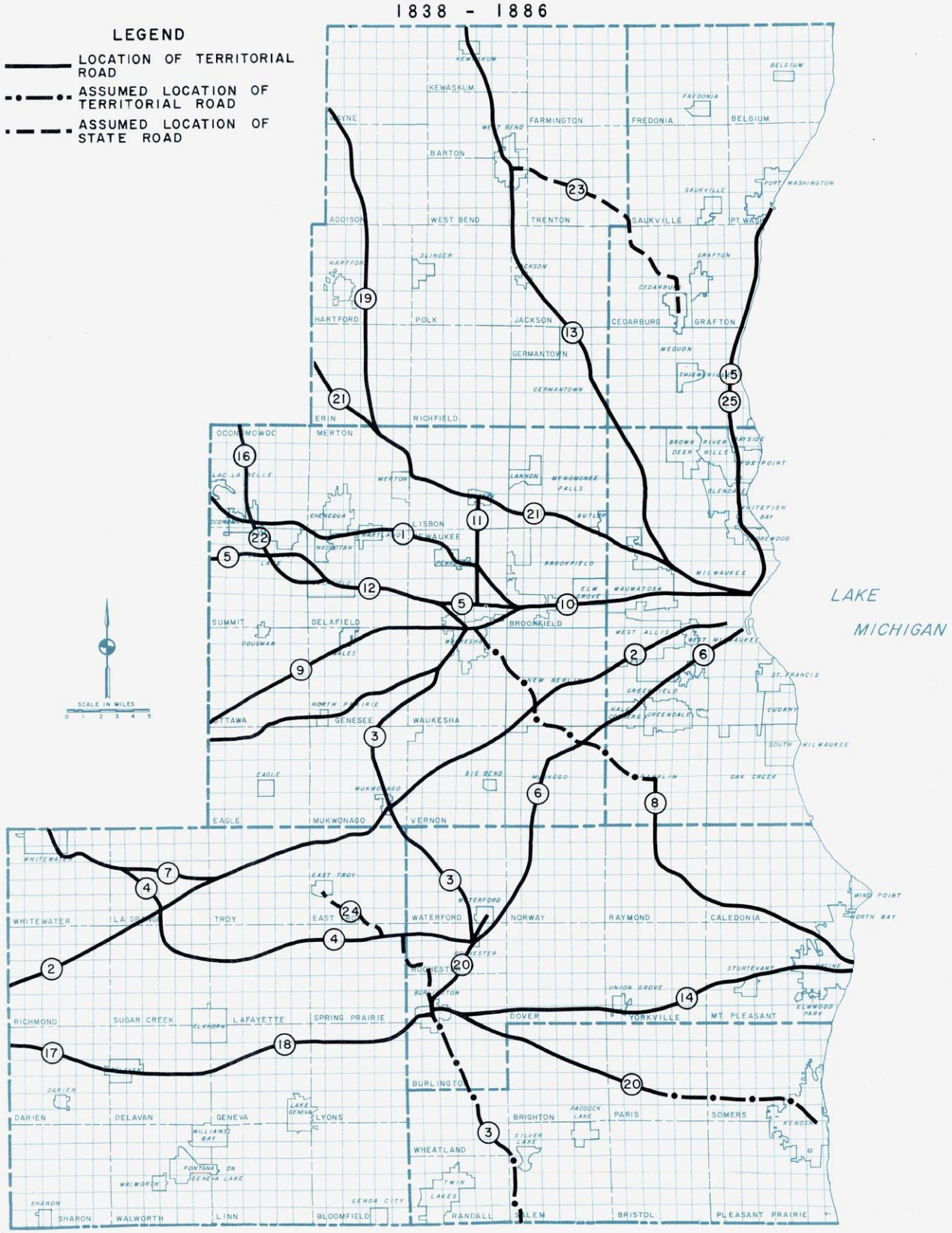
THE PLANK ROAD ERA (See Map 3, page 47)
Agitation for plank roads reached its height in 1848. They seemed logically adapted to the times, in that their construction would be undertaken by private enterprise and did not require an exceedingly large outlay of capital, as timber was plentiful within the Region.

The first of the 135 turnpike and plank roads to be chartered and established in Wisconsin was the Lisbon-Milwaukee Plank Road in 1846. In 1847 the Milwaukee-Watertown Plank Road was constructed at a cost of $119,000. This famous plank road (part of the same route still carries the same name) was extremely successful and profitable at first, and continued to serve a large volume of traffic to Milwaukee until completion of the Milwaukee-Watertown railroad in 1855.

Receipts from tolls were expected to keep these roads in repair, pay a profit to the company that built the road, and eventually pay off the cost of construction. Most of the plank roads had tollgates at each end.

Map 2

STATE AND TERRITORIAL ROADS BUILT IN THE SOUTHEASTERN WISCONSIN REGION 1838 - 1886



The total length of the seven plank roads leading out of Milwaukee was only about 150 miles. No more mileage was ever constructed because in most instances the plank roads established did not prove as profitable as expected. The oak planks used to surface the roads, which had been expected to last for a long time, were found to be badly decayed within 5-6 years, making them hazardous to travel. In many instances, owners, after several years of unprofitable operation, abandoned the roads to avoid necessary reconstruction. And then there was the new competitor, the railroad.

By 1852* the following plank roads were built and in use in the SEWRPC Region (See Map 3, page 47):

1. Milwaukee to Watertown, 45 miles, started in 1848 and completed in 1854, highly successful.

2. Milwaukee to Janesville Road, begun in 1848 but completed only to Mukwonago for 25 miles with a 12-mile branch from Muskego Center to Waterford.

3. Milwaukee and Lisbon Road, chartered in 1850 and completed for about 22 miles out of Milwaukee with a branch of 4 miles to Hartland.

4. The Milwaukee and Fond du Lac Road, chartered in 1850 and planked as far as Cedarburg, 20 miles.

5. The Milwaukee-Waukesha Road, organized in 1850, very successful.

6. The Milwaukee and Wauwatosa Road, six miles long, completed in 1854.

7. The Milwaukee and Green Bay Road, planked only 5 miles.

8. Racine and Rock River Plank Road via Elkhorn, completed to Delavan with branch to Burlington.

9. Racine to Raymond.

10. Southport to Fox River.

* *See Map 3.*

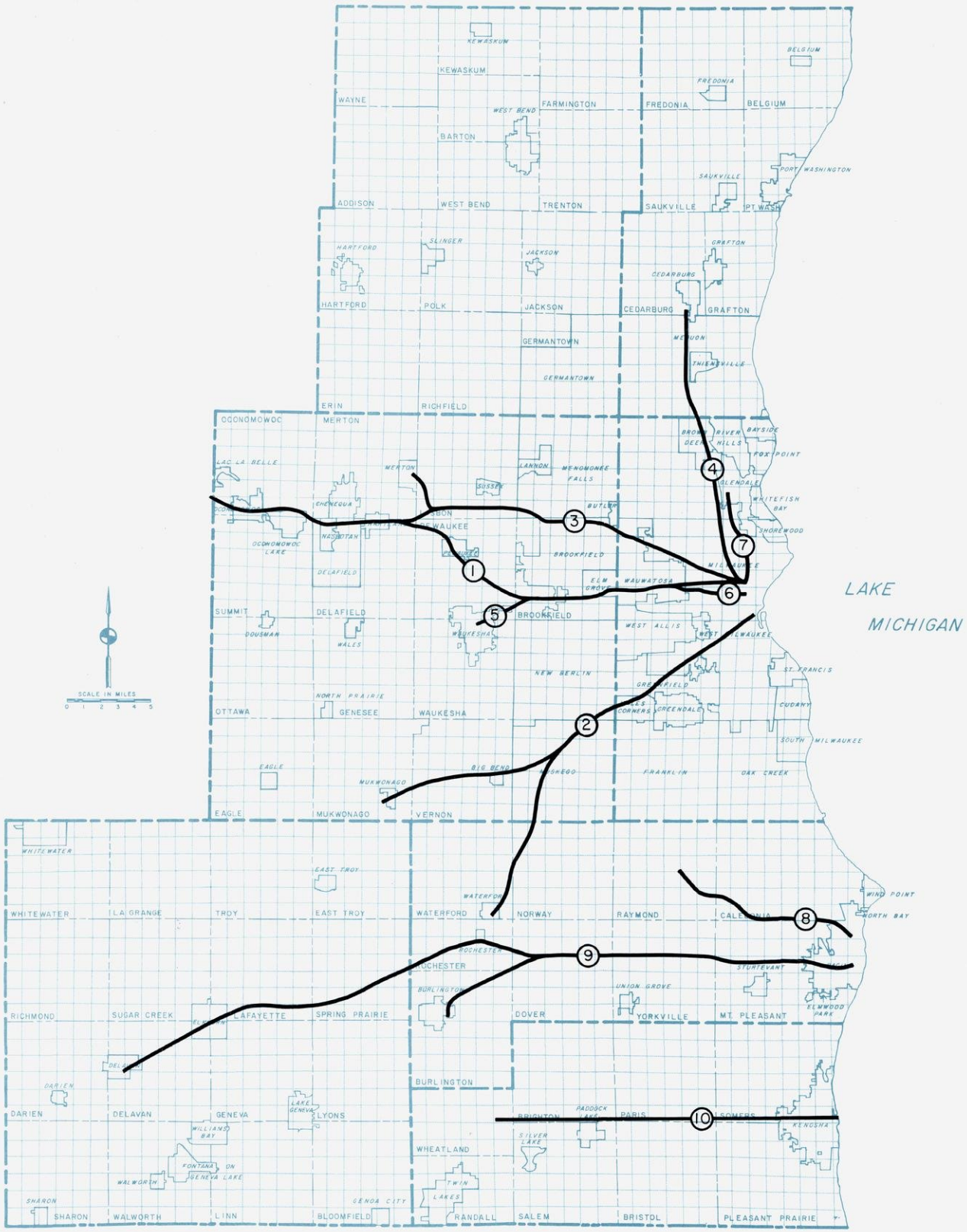
The abandonment and disrepair of a large number of roads and lack of public interest resulted in the Legislature of 1869 authorizing and directing the town supervisors to declare such roads a public highway to be kept thenceforth in good repair when the owners neglected to make repairs and collect tolls for the same for a period of 60 days or more. Many of these plank roads in this way became a part of the regional public street and highway network.

Map 3

PLANK ROADS BUILT

IN THE SOUTHEASTERN WISCONSIN REGION

1846 - 1854



STATE ROADS (See Map 2, page 45)
After Wisconsin became a state in 1848, all roads laid out and opened by authorization of the Legislature were designated as state roads, however, only three such authorizations were made in the SEWRPC Region between 1848 and 1886, as the homesteaders pushed westward and northward in Wisconsin.

The commissioners appointed by the Legislature to establish such roads were authorized to adopt any part of previously established town, county, or territorial roads as a state road. State roads so laid out and opened were a direct charge to the counties, towns, and villages through which the roads traversed because of the constitutional provision, until 1908, prohibiting the state government from participating in works of internal improvement. In extension of the territorial road legislation, the statutes required that all state roads be established to a width of four rods (66 feet). Similar to territorial and state roads, all county roads were required by statute to be laid out to a width of not less than four rods. The maintenance of the state, county, and town roads were a responsibility of the towns.

Chapter 284 of the Laws of 1893 abolished the road overseers system and permitted the appointment of men qualified to execute the specific improvements directed by the supervisors. The same statute provided that all highway taxes were to be paid in currency unless expressly authorized after petition by 25 electors and freeholders of the town, at the preceding town meeting, to be paid in statutory labor, which was generally recognized as both a waste of private time and public funds. It was not until 1911 that payment of highway taxes in statutory labor was abolished in practice, with the passage of the State Aid Law, even though the statutory labor provision was not removed from the highway laws until 1919.

THE DARK AGES OF HIGHWAY TRANSPORTATION
The phenomenal success of railroads by 1870 caused highways to become of secondary importance with the exception of those sections of highways connecting the market centers with the railroads. Private road building companies passed out of existence. The state could give no aid nor encouragement to road construction because of the constitutional provision prohibiting state aid. The town was the unit of road administration, and practically all road improvement was done under town supervision in the form of statutory labor. In this era the public thought of transportation in terms of the railroad. The range of the horse-drawn vehicle was limited to the local meeting places, market, and mill. Consequently, very little effort or thought was given to connecting urban centers in a system of improved highways.

It was this condition, then, that set the stage for the "better highway movement"; and finally in 1896, the "Wisconsin League for Good Roads" was organized in Milwaukee as part of a national League of American Wheelman, which projected a national campaign of education for better roads.

Sources:

A History of Wisconsin Highway Development 1835-1945, The Highway Planning Survey, State Highway Commission of Wisconsin and the Public Roads Administration Federal Works Agency, Madison (1947); Bulletin No. 58, Wisconsin Geological and Natural History Survey, Madison (1921); John B. Gregory, Ed., Southeastern Wisconsin-Old Milwaukee County Vol. II, the S.J. Clarke Publishing Co., Chicago (1932); W. Jackson, Wagon Roads West, University of California Press, California (1952); Document 175, Twenty-fifth Congress, Third Session, House of Representatives (1932); House Executive Document, Thirty-third Congress, Second Session (1954-55); Laws of Wisconsin (Territory) - 1836-38; Laws of Wisconsin (Territory) - 1836-40; Laws of Wisconsin (Territory) - 1840-43; and Increase A. Lapham's Sectional Pocket Map of Wisconsin (1852).

(NEXT ISSUE: HIGHWAY DEVELOPMENT IN SOUTHEASTERN WISCONSIN PART II, HIGHWAYS COME OF AGE - 1900-1965).

THIS IS SOUTHEASTERN WISCONSIN

Important vital statistics on the Region and percent of totals for the State of Wisconsin.

Land and Water Area (sq. mi.)	2,688	5%
Population (1960)	1,573,620	40%
Resident Employment (1960)	612,723	42%
Resident Unemployment (1960)	24,174	41%
Resident Labor Force (1960)	636,897	42%
Resident Man'f. Employment (1960)	253,292	52%
Resident Non-Man'f. Employment (1960)	359,431	37%
Disposable Personal Income (1960)	$3,572,000,000	46%
Retail Establishments (1958)	15,780	33%
Retail Sales (1960)	$2,045,000,000	42%
Property Value (1960)	$8,726,000,000	46%
Total Shared Tax (1960)	$62,777,000	54%
Total State Aids (1960)	$35,474,000	26%
Total Property Tax Levy	$239,380,000	50%
Total Long Term Public Debt	$378,592,000	55%
Total Highway (miles) (1960)	8,740.45	8.9%
Value of Mineral & Non-Metal Production (1961)	$15,494,487	20.08%
Total Vehicle Registration (1962-1963)	633,540	36.8%
Auto Vehicle Registration (1962-1963)	551,188	40%
Truck Registration (1962-1963)	55,950	23%
State Parks & Forest Areas (acres) (1963)	12,546	3.02%


KENOSHA · MILWAUKEE · OZAUKEE ·
WAUKESHA · WASHINGTON · WALWORTH · RACINE ·
SOUTHEASTERN
WISCONSIN
REGIONAL
PLANNING
COMMISSION