Inland lakes renewal and management demonstration project: Lily Lake Forest recreational environ. 1971

Sharkawy, M. Atef; Graaskamp, James A.

Madison, Wisconsin: Environmental Awareness Center, University of Wisconsin, 1971

THE UPPER GREAT LAKES REGIONAL COMMISSION

INLAND LAKES RENEWAL AND MANAGEMENT DEMONSTRATION

LILY LAKE FOREST RECREATIONAL ENVIRON

ENVIRONMENTAL AWARENESS CENTER
COLLEGE OF AGRICULTURAL AND LIFE SCIENCES
SCHOOL OF NATURAL RESOURCES
UNIVERSITY OF WISCONSIN 1971

BY

M. ATEF SHARKAWY & JAMES A. GRAASKAMP

ENVIRONMENTAL AWARENESS CENTER • SCHOOL OF NATURAL RESOURCES
COLLEGE OF AGRICULTURAL AND LIFE SCIENCES • THE UNIVERSITY OF WISCONSIN
1201 WEST DAYTON STREET • MADISON, WISCONSIN 53706 • TELEPHONE 608 262-0366

Dr. Stephen M. Born
Project Leader
Inland Lake Renewal and Management
Demonstration Project
215 North Brook Street
Madison, Wisconsin 53706

January 31, 1971

Dear Steve:

Land development cannot both meet the requirements of human enjoyment and protect recognized landscape values without a well-organized design process.

An enlightened design process that systematically inventories the many variables involved, immediately recognizes the essential requirement of multidisciplinary effort. The soil scientist, the hydrologist, the geologist, the ecologist, the meteorologist, and members of their disciplines are all required in understanding the quality and carrying capacity of the site. The economist, the sociologist, the political scientist, the lawyer, the designer, etc., are required in understanding the desires of people and whether one can provide people their wishes within the social, political, economic, and legal bounds of the 'art of the possible' without destroying important landscape values.

The Environmental Awareness Center, whose major goal is to build such teams for the development of new 'growth strategies' in Mid-America,

is grateful to the Great Lakes Regional Commission and the Inland Lake Renewal and Management Demonstration Project Work Committee for their recognition of a multidisciplinary approach and their support for our 'design process' in the field of recreational housing.

Recognizing that a complete team effort was not possible (a study of the spatial requirements of people from a physiological/psychological viewpoint, etc.), we are gratified that a far superior site design, in contrast to most current practices, is possible through our acceptable design process, and that it is possible within the economic restraints of most large developers.

Complete team efforts of the future may well demand that governmental agencies have completed their inherent responsibilities in providing basic resource inventories to design process teams for proper interpretation. The cost to the private developer of collecting topographic and soil information in one part of the state when the U. S. Geological Survey and the U. S. Soil Conservation Service has provided such information in another part of the state may well be the economic difference of an adequate process team and a wisely-developed state landscape.

On a micro-scale, this study--one of some sixty regional studies completed by the Environmental Awareness Center staff--identifies and recommends that the following steps should be considered to assure the developer and the public necessary tools for adequate design in the future.

1. Establish regional planning and design commissions that blanket the landscape.

2. Identify critical natural and cultural resource data that should be available to all proposing to alter the landscape and townscape.

3. Identify and make available design process teams for the inventory and analysis of regional resources.

4. Capitalize on new remote sensing devices for inventorying and updating resource data quality.

5. Strengthen creative communication techniques between regional planning and design commissions, universities and governmental agencies.

6. Provide hardware and computer data bank capabilities within regional planning and design offices.

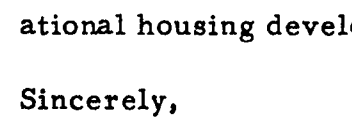
7. Provide simulation lab equipment that will allow the public to see the consequences of proposed development before it takes place.

8. Establish environmental education programs at the regional level that enhance awareness of indigenous resources and new techniques for developing without destroying.

9. Develop 'awareness centers' that broaden the agricultural experimental station concept which demonstrates to the farmer how to grow food and fiber to environmental concepts of developing without destroying.

In conclusion we thank all of the various professionals that have made this multidisciplinary task possible, and at the same time acknowledge that the guidelines set forth by them in this document could serve to stimulate a Great Lakes Basin Awareness Center encompassing wise recreational housing development in our northlands.

Sincerely,



Philip H. Lewis, Jr.
Chairman, Department of
Landscape Architecture
Director, Environmental
Awareness Center

PHL:jg

ACKNOWLEDGEMENTS

First, I would like to acknowledge the efforts of everyone who participated in this study, directly in the technical sense, or indirectly in the administrative sense.

I would like to specially acknowledge the work of Dr. Stephen Born, Project Leader, for initiating the Lily Lake Forest Recreational Environ project, for his help in administration and public relations, and in the original definition of this study, as well as in shaping its path.

I would like to acknowledge the outstanding contributions of Professor Philip H. Lewis, Jr. in shaping the methodology applied in this project.

The assistance provided by Mr. Donald Quick, Land Manager for Kimberlands, Ltd., was of special value to this project.

Finally, I would like to acknowledge the untold contributions of my wife throughout the duration of the project. I would also like to thank Mrs. Joan Gefke for her tireless typing of this report and James Moore for his assistance in technical editing.

PROJECT COORDINATOR
M. ATEF
SHARKAWY

PARTICIPANTS AND BASIC REFERRENCE

PROJECT COORDINATOR: Prof. M. Atef Sharkawy
Environmental Awareness Center, UW

PROJECT STAFF: Mr. Albert Tsao
Mrs. Inas Fahmy
Environmental Awareness Center, UW

ASSISTANTS: Mr. Bill Amblo
Mr. Christian Barlow
Miss Suzanne Farkac
Department of Landscape Architecture, UW

THE NATURAL AND PHYSICAL SCIENCES TEAM

CONSULTANTS:

A. Climatology
Mr. Hans Rosendal
Wisconsin State Climatologist

B. Hydrology, Geology and Topography
Dr. Steve Born
Miss Martha Ketelle
Water Resources Programs, UW Extension

C. Plant Ecology
Dr. Grant Cottam
Botany Department, UW
Mr. Donald Quick
Kimberly Clark Corporation

CONSULTANTS: D. Soils

Soil Conservation Service
U.S. Department of Agriculture

E. Wildlife Ecology

Prof. Orrin Rongstad
Department of Wildlife Ecology, UW

REFERENCES: Soil Conservation Service
"Wisconsin Soils Interpretive Tables"

RESEARCH ASSISTANTS: Mr. Bill Barns
Mr. Stan Nichols
Department of Botany, UW
Mr. Steve Dunn
Remote Sensing Laboratory
IES, UW

THE IMPLEMENTATION AND BEHAVIORAL SCIENCES TEAM

CONSULTANTS: Dr. James Graaskamp
Real Estate Department, UW

REFERENCES: Prof. Douglas Yanggen and Zigurds Zile "Covenants and Restrictions for Ownership Associations." Report under preparation for the Inland Lakes Renewal and Management Demonstration Project.

REFERENCES: Mr. Roger Christiansen
"Mail Survey of Buyer Attitudes and Characteristics for Recent Lake Lot Development in Six Selected Wisconsin Counties," prepared for the Real Estate Department and the Inland Lakes Renewal and Management Demonstration Project.

RESEARCH ASSISTANTS: Mr. Fred Roberto
Mr. Lawrence Gentner
Real Estate Department, UW

THE FORM - GIVING TEAM

CONSULTANTS: Prof. Philip H. Lewis, Jr.
Department of Landscape Architecture, UW
Environmental Awareness Center, UW

REFERENCES: Prof. M. Atef Sharkawy
"Towards an Interdisciplinary Approach---Rationalization in Environmental Design," prepared for the American Institute of Architecture, Department of Architecture, University of Oregon, the Environmental Awareness Center, UW, and the Inland Lakes Renewal and Management Demonstration Project.

REFERENCES: Mr. Thomas Slater
"Lake Use Capacities and Activities," prepared for the Department of Landscape Architecture, UW.

REPORT

AUTHOR: Prof. M. Atef Sharkawy
Environmental Awareness Center, UW

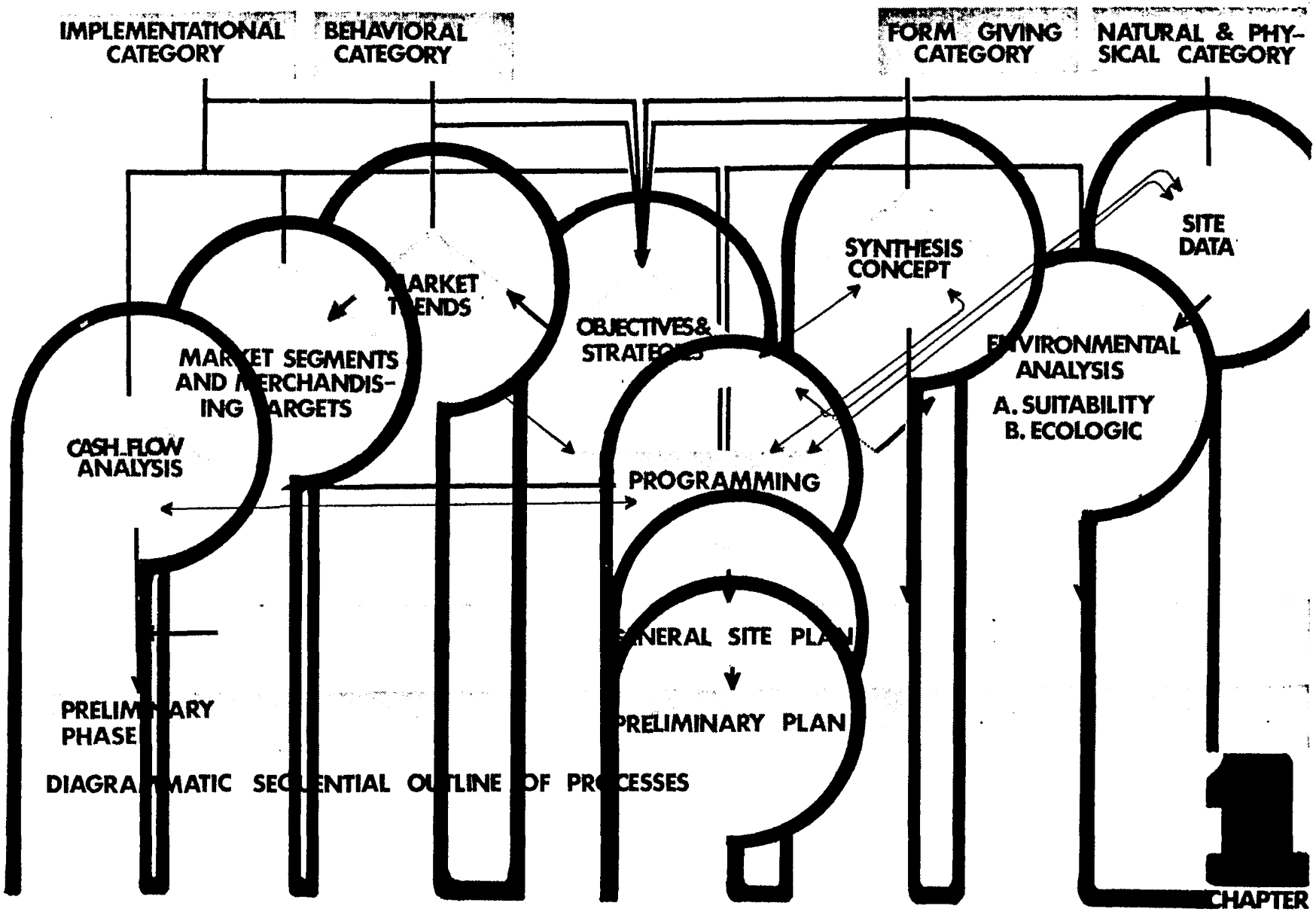
CO-AUTHOR: Dr. James Graaskamp
Real Estate Department, UW

EDITOR: Prof. James Moore
Environmental Awareness Center, UW

TYPIST: Mrs. Joan Gefke
Environmental Awareness Center, UW

TABLE OF CONTENTS

A MULTI-DISCIPLINARY APPROACH TO DESIGN



INTRODUCTION 1

1.1 BACKGROUND

In May, 1968, the contract for the Inland Lake Renewal and Management Demonstration project was signed between the Upper Great Lakes Regional Commission, the Wisconsin Department of Natural Resources, and the University of Wisconsin. As the title of the project indicates, the emphasis was on site demonstration.

The project includes two major sections: "Shoreland Development" and "In-Lake Renewal and Management." This report describes the demonstration effort for the Shoreland Development section of the project. The project is intended to show alternatives to present developments that could ". . . minimize man's adverse impact on inland lakes and at the same time realize the economic potential for development that shorelands represent."[1]

The site selected by the project work committee for this demonstration study is located in the southern portion of Forest County in northern Wisconsin. Owned by Kimberly Clark Corp., it is proposed for development by Kimberlands, Ltd., a subsidiary of K-C. The 3,600-acre tract includes two lakes with natural shoreland, and an attractive meandering stretch of the Lily River. The vegetation of the site ranges from aquatic and wetland communities to deciduous and coniferous communities. The topography is undulating with a variety of glaciation associated landforms. With

---

[1] Upper Great Lakes Regional Commission, "Inland Lake Renewal and Management Demonstration Contract," May, 1968, p. 2.

such diversity of natural features, the site offered an unusual opportunity to demonstrate development through proper planning and design. An explanation of proper design and planning is necessary before describing the demonstration project--the Lily Lake Forest Recreational Environ.

1.2 DESIGN, A PROCESS

Bertrand Russell declared that the great discovery of the twentieth century has been the "technique of the suspended judgment." Following such a technique in developing his environment, man should not only create a development that would meet human needs and technical requirements, but should also anticipate the effects of such a development on his environment and offset such effects before they happen.

In the Environmental Awareness Center we do not consider design an intuitive "eurica," or an art-craft to create desired effects. We think about design as a decision-making process that should follow Russell's suspended judgment concept. Design should fulfill human needs and requirements by proper analysis of the cultural or human milieu, and should avoid the undesirable environmental consequences through a thorough understanding of the natural milieu. To systematically incorporate that environmental understanding into the design process, a methodology has been developed at the Environmental Awareness Center. It has been outlined in a separate document entitled "Toward an Interdisciplinary Approach--Rationalization in Environmental Design," by this

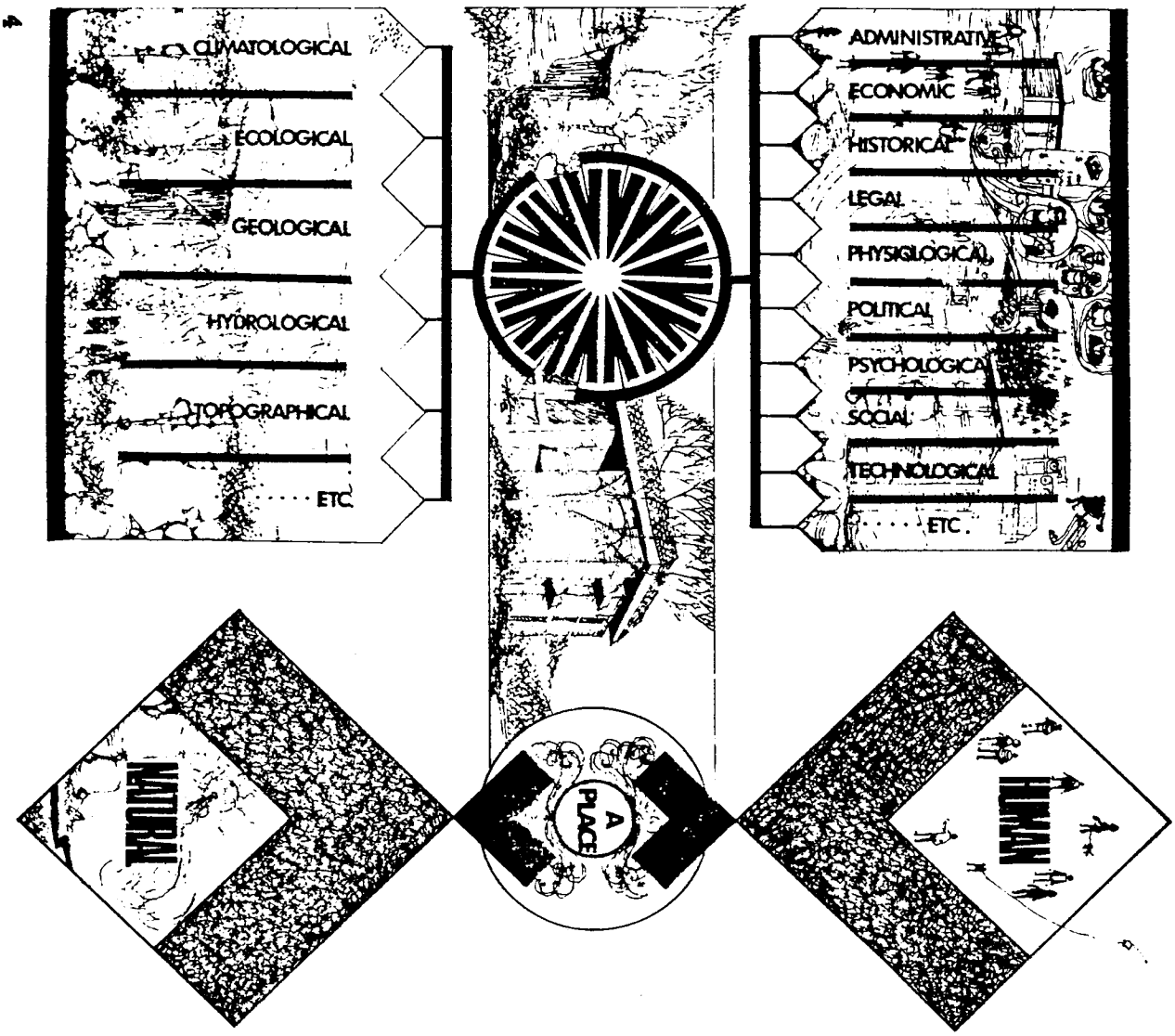
author. This methodology was applied in the design effort of the Lily Lake Forest Recreational Environ with some modifications in the areas of marketing, merchandising and cash-flow made by Professor James Graaskamp.

An explanation of the skeletal structure of the method and a detailed description of the design effort follow.

1.3 THE LANDSCAPE, CULTURAL AND NATURAL

A place--any landscape at any scale--is the product of integration of human needs and requirements within a natural resource or the cultural milieu within the natural milieu in more general terms. The diagram on the following page explains this idea showing some of the many elements of the cultural (human) and natural milieus.

Every design effort should consider both milieus. It should consider the entire question of demand and the resolution of demand relative to supply, including the capacity of the society or institution to realize its objectives. Simultaneously, it should consider the entire question of manipulation of opportunities offered and constraints imposed by the natural resource relative to undesirable ecological consequences. Such a diversity of considerations necessitates a systematic methodology to analyze the cultural and natural milieus as well as their interrelationships.


CLIMATOLOGICAL
ECOLOGICAL
GEOLOGICAL
HYDROLOGICAL
TOPOGRAPHICAL
ETC.
ADMINISTRATIVE
ECONOMIC
HISTORICAL
LEGAL
PHYSIOLOGICAL
POLITICAL
PSYCHOLOGICAL
SOCIAL
TECHNOLOGICAL
ETC.
NATURAL
A PLACE
HUMAN

1.4 DESIGN AND DESIGN INPUTS

The design approach developed in this study divides the inputs necessary in a design effort into four categories which are further divided into subcategories as shown in the figure on page 6. This breakdown is taken from Philip H. Lewis' multidisciplinary concept[2] for the functional structure of the Environmental Awareness Center. The design team in this study--Lily Lake Forest Recreational Environ--was structured along the same lines as the list of participants on pages and indicates.

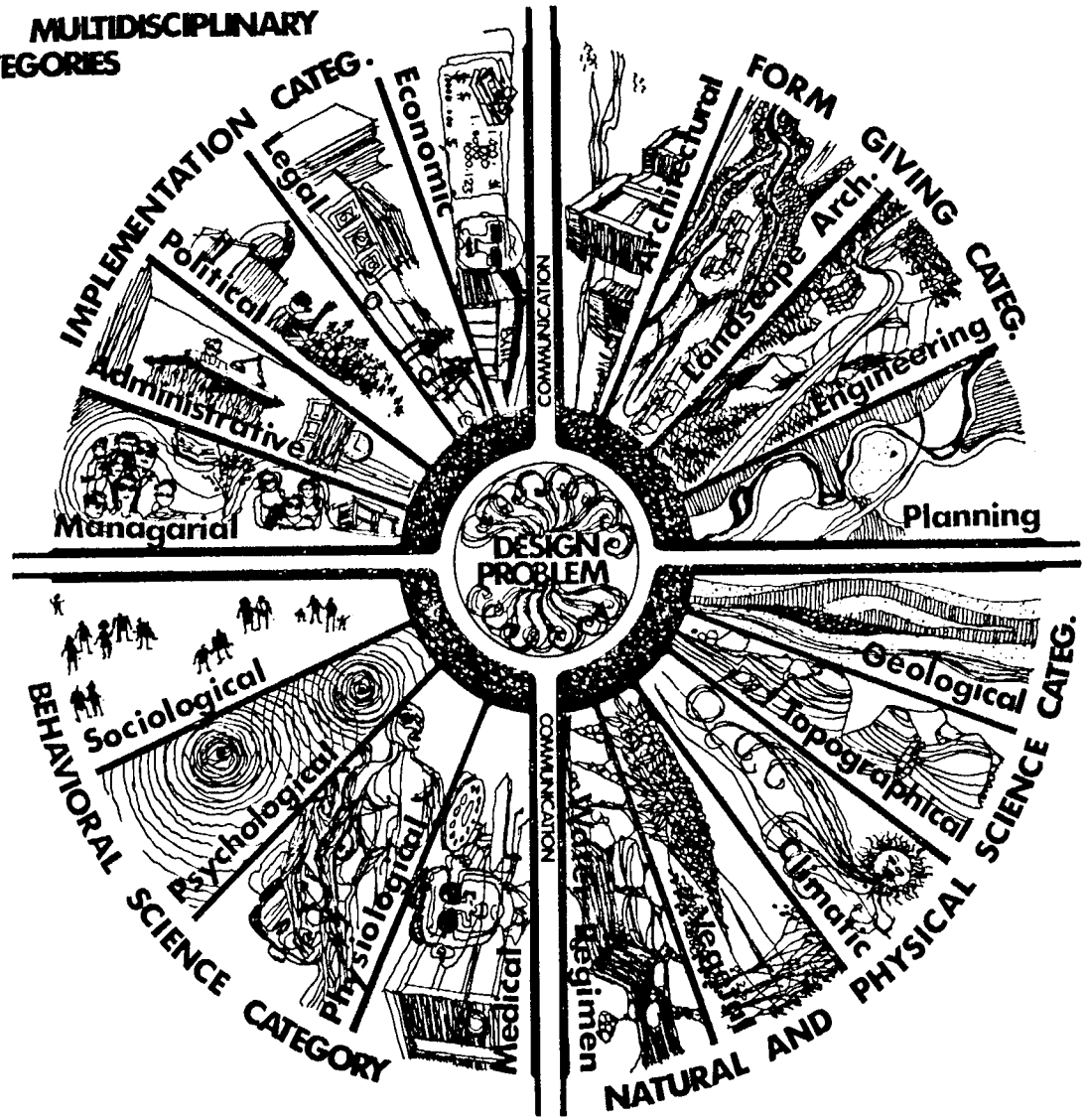
The structuring of a team does not, of course, solve the problem or create a product. The processes involved in solving the problem and creating the design should be abstracted and then arranged in sequence. These processes are indicated on the next page. The degree of participation of the different multidisciplinary groups in the team is also expressed in the diagram on page 7 . The sequence of these processes is shown on page 8 in a diagrammatic format.

Since this entire project was conducted in accordance with the diagrammed methodology, the rest of the report serves the dual task of explaining the methodology as well as the demonstration project through describing the specific processes and products in

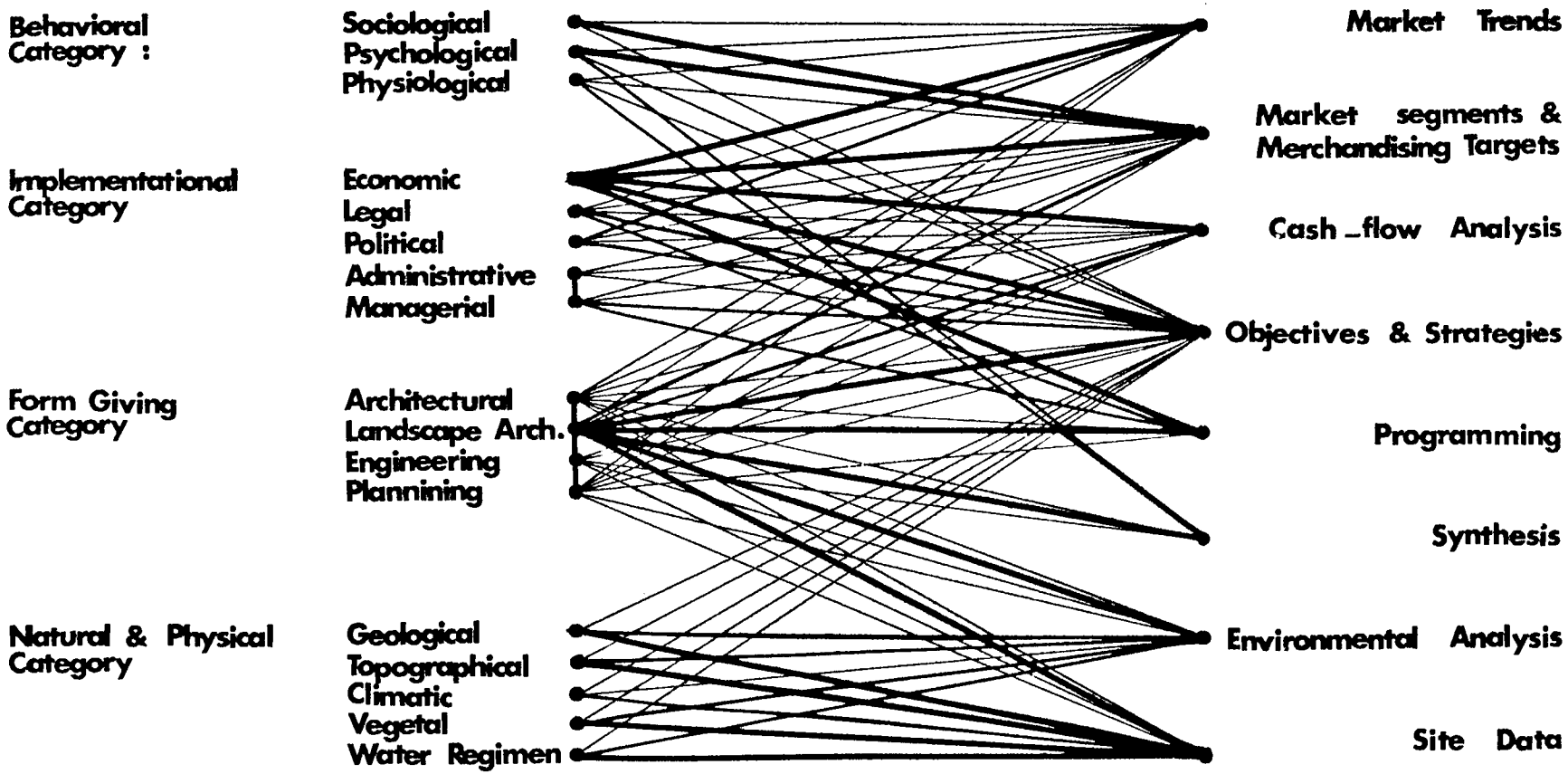
---

[2]Philip H. Lewis, Jr., "The Environmental Awareness Center Program" School of Natural Resources, University of Wisconsin, Madison. Unpublished Report, 1969, pp. 13-14.

THE MULTIDISCIPLINARY CATEGORIES



THE MULTI.DISCIPLINARY TEAM AND THE PROCESSES IN THE PRELIMINARY PHASE OF DESIGN



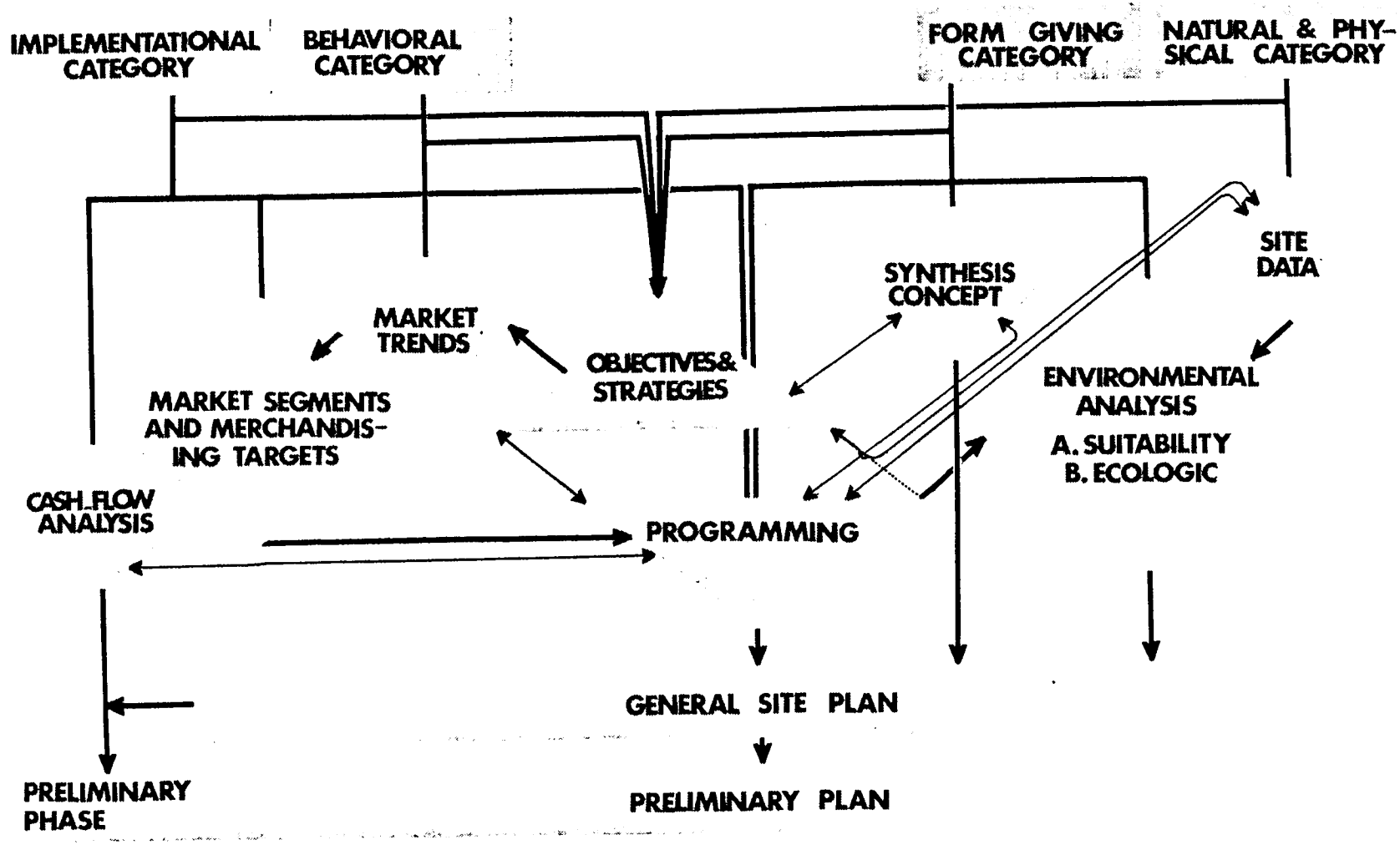
Notation

Third second , and first order relationships

Note :

The processes (on the right hand) are not arranged in sequentional order

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

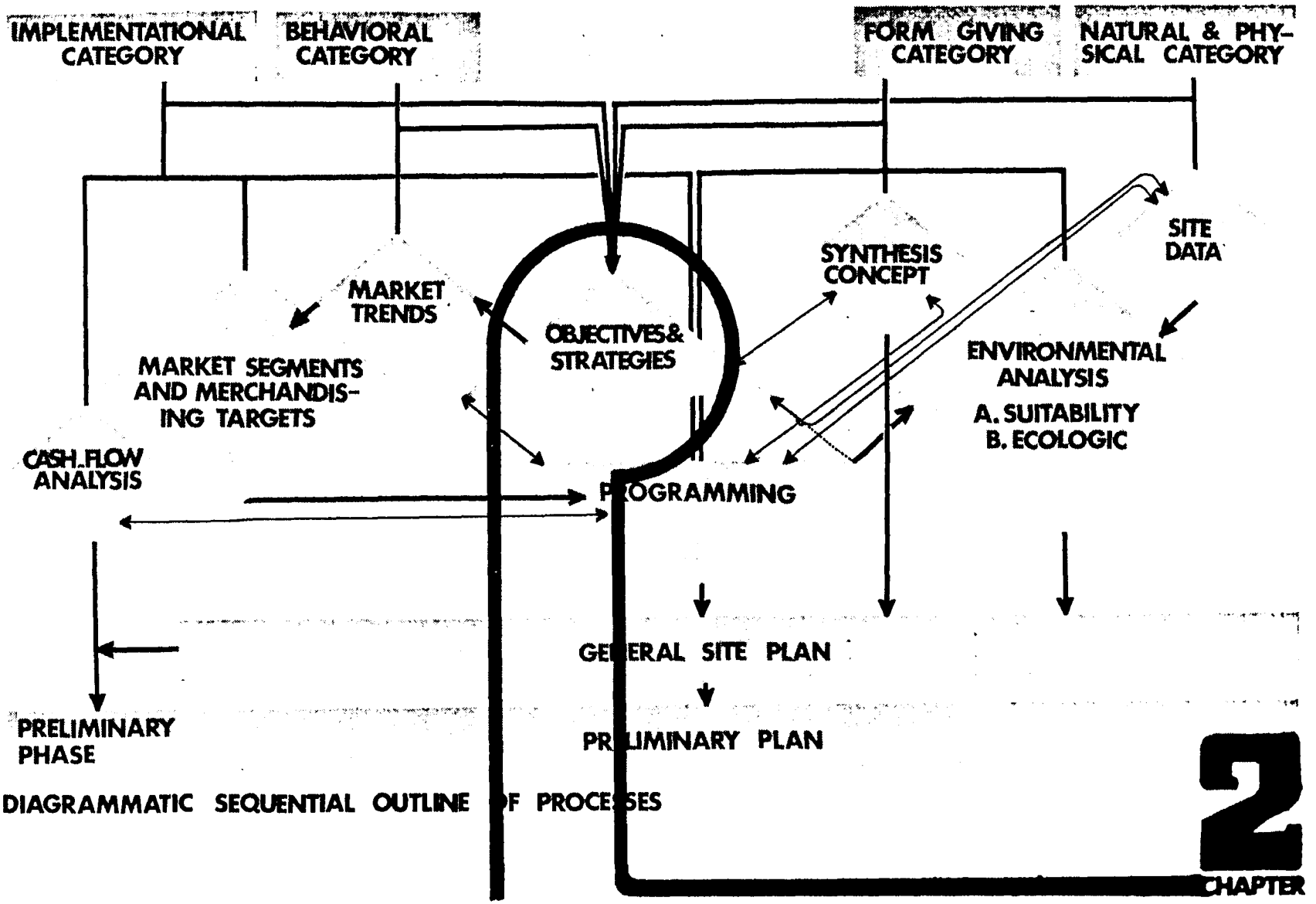
the design effort. Each chapter discusses one of the processes and the product of this process in the Lily Lake Forest Recreational Environ. The report is organized in a hierarchy of detail from the very general to the very specific. The second chapter, Objectives and Strategies, sketches the strategic objectives for the project and functions as a set of rules for choice among possibilities,[3] while the third chapter, Market Trends, defines marketing opportunity areas. The fourth chapter, Market Segments and Merchandising Targets, focuses on constructing a profile for the defined segments of the market, and subsequent specific groups of consumer attitudes and buying power. The sixth chapter, Programming, is more specific in defining the project's physical components, e.g., ecologic trail, clubhouse, etc., which will meet the consumer requirements. The seventh chapter, Environmental Analysis, studies the natural resource--the limitations it imposes and the opportunities it offers--in a systematic way that leads to the General Site Plan, discussed in the ninth chapter. The eighth chapter, Synthesis Concept, provides the framework for this general site plan. Finally, in order to determine the number and cost of the project's physical components, a Cash Flow Analysis is discussed in the tenth chapter. The last chapter discusses the specific location and characteristics of the project's physical components in a partial preliminary plan.

---

[3]Kevin Lynch, "Quality in City Design," Who Designs America? (Garden City: Anchor Books, 1966).

A schematic diagram at the beginning of each chapter designates the position of that chapter in the hierarchy.

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

2 CHAPTER

OBJECTIVES & STRATEGIES 2

CLIENT OBJECTIVES AND STRATEGIES

The form and execution of a land development project must not only fit the constraints of the natural resource and the people who will use the finished project, but also must fit the constraints of corporate enterprise for profit. Real estate development is a trade or a business, for the most part, and like any other business is a cash cycle: cash-to-raw-material-to-goods-in-process-to-inventory-to-sales-to-accounts-receivable-to-cash. Real estate is a manufactured product and even the decision to conserve a portion of our landscape in a relatively natural state has an economic dimension in the nature of an opportunity cost, a maintenance cost, and a marginal return on capital invested. The drive gear of the cash cycle must be unit sales and the ultimate goal is recapture of capital and a profit which justifies the corporate effort. But there are many other objectives to be served, as corporate enterprise is no less complex in motivation than individuals who operate through the corporate method, expressing their values in terms of the objectives, criteria, and policies which shape business strategy and tactics.

Economic feasibility is, therefore, constrained to fit a variety of form giving factors other than the physical-technical-esthetic limitations in the planners' vocabulary. At the preliminary stage of economic analysis for the Lily Lake Forest Recreation Environ, the economic analyst must provide some input for the following factors:

1. Objectives of the parties at interest and for whom the feasibility study is done.

   a. Strategic objectives and priorities.
   b. Acceptable tactical alternatives.

2. Market trends and opportunity areas.

   a. Aggregate data on local population, employment, income, etc.
   b. National economic and political policies affecting incentive, timing, risk, etc.
   c. Industry trends relevant to the client.
   d. Significant popular attitudes and trends.

3. Alternative merchandising targets or market segments.

   a. Special micro-markets with space needs.
   b. Product and price specifications.
   c. Effective demand for the product at a price.
   d. Preferred merchandising methods.

4. Legal-political constraints and alternatives.

   a. Regulatory constraints on the parties at interest.
   b. Regulatory controls on site and space development.
   c. Exogenous political structure influencing alternatives available.

5. Financial constraints and alternatives.

   a. Time line or assumed calendar of events for financial assumptions.
   b. Capital budget required and sources.
   c. Operating budgets and revenue sources.
   d. Direct cash profit expectations.
   e. Indirect benefits and returns.
   f. Measurement of risks and yields.[1]

The input for these factors at a preliminary state of analysis is a combination of premises based on previous research and experience, intuitive merchandising instincts and primary research of critical assumptions. It is the purpose of this chapter to sketch strategic objectives and tactical alternatives of the corporate client. The following chapter will briefly treat market trends and opportunity areas which led to definition of a consumer profile and selection of merchandising targets in Chapter 4. With a definition of product mix, price, and pace of development it is possible to construct a forecast or model of cash receipts. The form giving team can also provide a basis for an initial estimate of capital budgeting and a calendar of capital and operating outlay. These forecasts can then be processed in computer model of land development cash flows in Chapter 10 to test the shape and magnitude of the cash flows, the equity and financing requirements, the

---

[1]James Graaskamp, "A Guide to Feasibility Analysis," Society of Real Estate Appriasers, Chicago, Illinois, 1970.

implications of variance in critical economic assumptions such as staging values of these outlays and receipts.

The first strategic consideration of the client lay in the fact that his tree farm operations in the north central part of the United States totaled more than 400,000 acres and could produce far more pulp wood than his north central manufacturing facilities could foreseeably require each year for the balance of the century. At the same time modern corporate thinking had identified its forestry division not just as a custodian of raw material but as a profit-making center within the divisional framework of the corporate network. The board of directors judged the performance of the forestry division by its net revenue in terms of pennies per acre. The initial tactic of division management was to generate profits by disposal of surplus fragments of land via its corporate real estate marketing subsidiary, Kimberlands, Ltd. As a correlary to sales of surplus parcels, Kimberland decided on a second tactic made famous by the Astors of buying land by the acre (from its parent) and selling by the lot to the consumer, i.e., retailing a well-packaged cake instead of wholesaling flour by the sack. It had already decided to "subdivide" the Lily Lake tract before the subject study was initiated and so the strategic issues for study were confined to finding retail customers for this site. The study did not begin with the basic issue of planning, i.e., selection of the best sites in the corporate land inventory in terms of physical suitability, proximity to markets, and scale appropriate to a first-time venture. Therefore, previous corporate decisions meant a truncated pyramid of values, objectives, and program content.

A previous consultant had suggested that the parent company move carefully into real estate utilizing credit power rather than internal equity capital as much as possible. Since the paper industry was providing a 12 percent return on capital after taxes, a new capital investment by the firm would need to do as well, and if the investment were a new line where the firm lacked experience and momentum, the capital should produce a correspondingly higher return. The criterion established by the company for the internal rate of return for capital employed was 20 percent and to control the scale of development, financial officers of the parent corporation suggested a transfer of no more than $250,000 cash to the development entity. In addition the entity would pay top dollar for acreage to be developed so that some profit would go directly to the parent corporation forestry division as a capital gain. As preliminary plans might be developed, tax questions would become more significant as the liquidation of surplus lands by a manufacturing firm enjoys capital gain treatment while the typical developer is classified as a dealer and taxed at full income tax rates. The parent corporation would need to avoid any risk of becoming a dealer as this would jeopardize the capital gains treatment of all stumpage sales of its forestry division.

Financing of a land development entity could be most easily accomplished by having the parent company establish a credit line with its banking source guaranteed by the parent for an endorsement fee. Fees for such a cosignature run 3 to 5 percent of the outstanding credit per year and anticipating interest rates for the construction-marketing period 1973-1979 of 9 percent, construction money was costed at 12 percent per annum or 1 percent per month. In addition, the treasury of the parent company could be

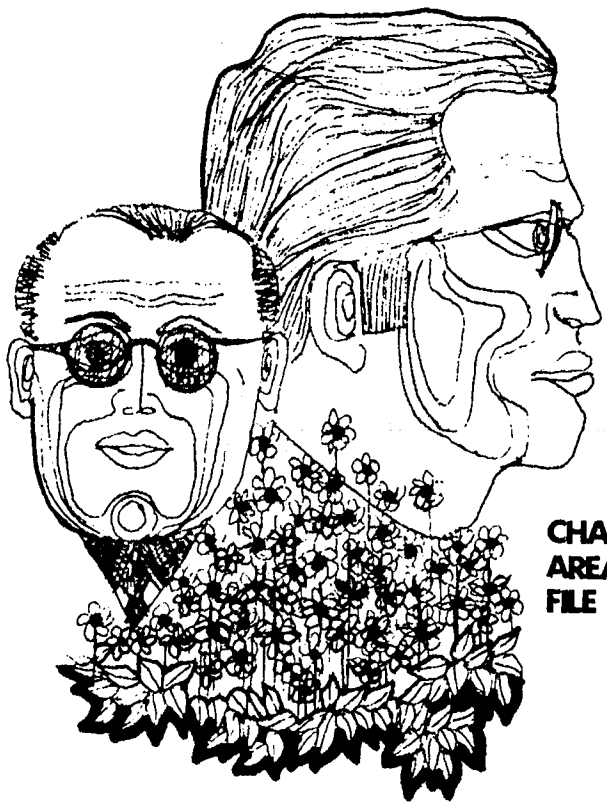
used for very short term cash advances for regulating development float and operating accruals at a cost of 1.25 percent per month.

Potential profit strategies for the parent corporation and its subsidiaries could include both financial services and production credits as well as development gains:

1. Capital gain on bulk land sales
2. Gross profit on lot sales
3. Contracting profits on cottage and condominium sales
4. Net commissions on modular or mobile home sales
5. Home association property management annual fees
6. Credit line endorsement fee
7. Short term working capital loan fees
8. Warehousing of installment sales paper
9. Sales of construction-related company product lines

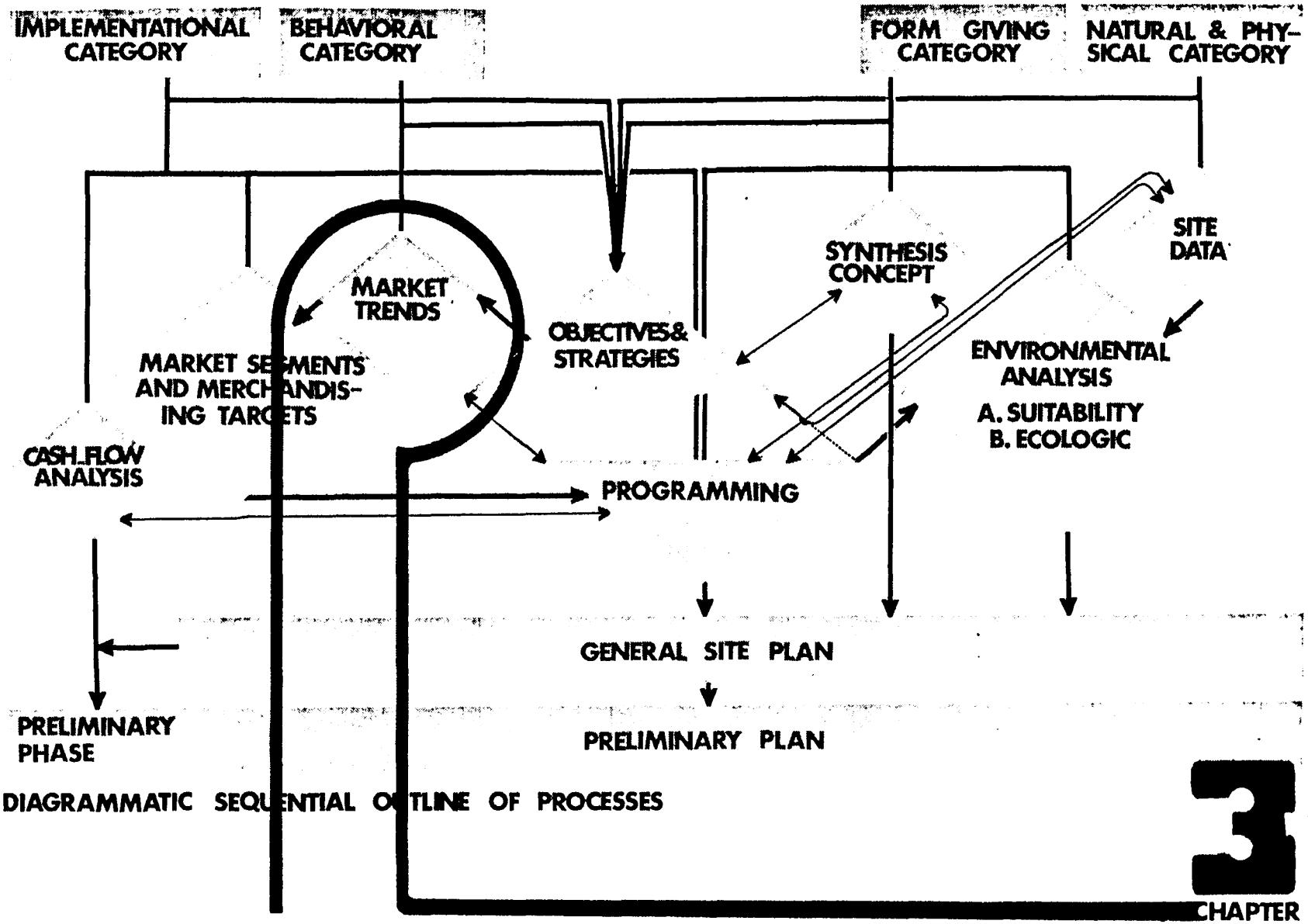
The tactical alternatives for implementing any development program did not include the use of an established developer as a joint venturer. The company felt such an arrangement would allow the developer to directly exploit or to inadvertently harm the consumer image of the company. A joint venture would require a division of profits which in turn would necessitate a higher price or lower value amenity package to provide an adequate growth profit share to each partner. Since the industry in the Midwest has been a high silhouette target of ecologists, and particularly sensitive on water resource problems, it was felt imperative that the company should avoid any development plans which brutalized woodland and water resources. Indeed, a sensitive and contemporary treatment

of a recreational land project might serve as a demonstration of the environmental awareness of management. In Wisconsin, resource land development and platting is within the responsibility of the Department of Natural Resources, a consolidated agency dominated by conservation and river pollution control interests. A further strategic review of company policy makers on the Wisconsin political scene and relative greater marketability of development sites in other states eventually led to a decision to postpone execution of the Lily Lake plan generated by this study even though the forecasted financial results were acceptable and the physical plan most compatible with site suitabilities. Thus the legal-political constraints can be seen to be more influential in strategic policy than the simplistic profit maximization theory of corporate enterprise.



CHAPTER 3 BRIEFLY TREATS MARKET TRENDS AND OPPORTUNITY AREAS WHICH LEADS TO A DEFINITION OF A CONSUMER PRO. FILE , AND SELECTION OF MERCHANDISING TARGETS IN CHAPTER 4

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

MARKET TRENDS 3

MARKET TRENDS AND OPPORTUNITY AREAS

Recreational land development for the vacation home has received much editorial attention and recognition as the "quiet" growth market of the 1970's.[1] It is not necessary to extensively document the size of the national market of opportunity once research must focus on a specific site as there is substantial evidence that the majority of buyers of second home sites in Wisconsin live within 2 hours driving time (and not more than 4-1/2 hours' distant) of their vacation home.[2] Further, it is clear that market penetration among households who can afford a second home rises sharply with the degree of urban density[3] which characterizes the neighborhood of the principle home address. In the Wisconsin and the Illinois markets particularly, developers have sold proximity to home and the investment implications of the future scarcity of water recreation resources near major urban centers at the expense of the natural or man-made amenities.

---

[1]Richard L. Ragatz and Gabriel M. Gelb, "The Quiet Boom in the Vacation Home Market," California Management Review Vol. XII, No. 3 (Apring, 1970).

[2]Roger Christianson, "Mail Survey of Buyer Attitudes and Characteristics for Recent Lake Lot Development in Six Selected Wisconsin Counties," The Real Estate Department, University of Wisconsin, 1969.

[3]U. S. Special Census of Second Homes, U. S. Bureau of Census, 1967.

We have written elsewhere that:[4]

> A characteristic of aggregate demand and supply data is that it generally represents factors that are beyond the control of the real estate entrepreneur. Except for the largest projects, the individual developer will have little influence on general levels of demand and supply although he must understand their nature and prepare his own programs with capacity to meet the surprise potentials inherent in these uncontrollable variables. On the other hand the entrepreneur can adapt his real estate product, price and merchandising appeal to attract a smaller group of users with a particular behavior and preference pattern. Aggregate data may help to understand the effective demand characteristics of a particular user group, but seldom do aggregate data provide the decisive identification of marketing opportunity.

Aggregate data on the second home and recreational land demand and supply factors are not so precise as to be appropriate to economic modeling. A review of some basic information does permit a pragmatic identification of market patterns which do permit a logical statement that "if" the pattern appears thusly, "then" it is useful to premise marketing efforts as "such and such."

It is useful to relate the second home market to population projections among age groups which form the basis of current life insurance marketing.[5]

---

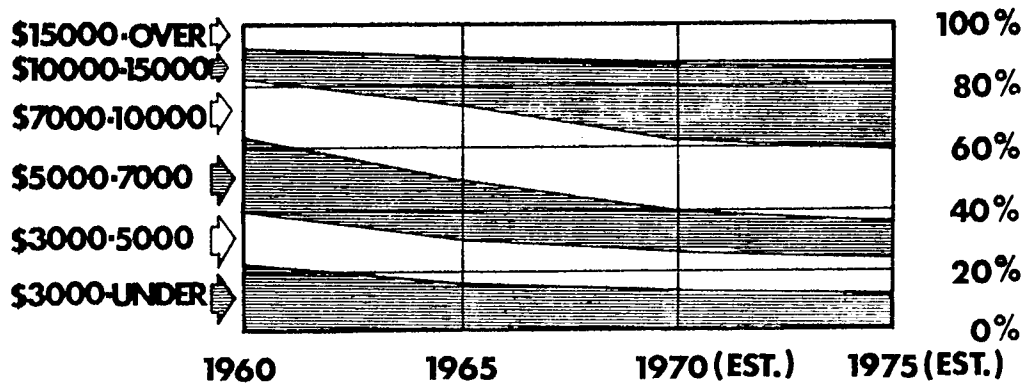
[4]James Graaskamp, "A Guide to Feasibility Analysis," Society of Real Estate Appraisers, Chicago, Illinois, 1970.

[5]Source: North Western Mutual Life Insurance Company.

A POPULATION PROJECTION BY AGE GROUPS
(PERCENTAGE CHANGE FROM 1965)

	AGE GROUP	1970	1975	1980	1985
JUVENILES	(UNDER 10	8.7%	23.2%	38.9%	52.7%
	(10 - 19	9.9	16.7	26.7	43.5
PRIME INSURABLE AGES	(20 - 29	23.9	45.6	59.6	69.3
	(30 - 39	-2.4	9.9	35.4	58.5
ESTATE PLANNING	(40 - 49	.9	-5.1	-7.2	4.4
	(50 - 59	7.2	13.5	14.6	8.0

B RISING FAMILY INCOME
1960 - 1975



Since juveniles are not in the second home market and the 50-59 age group represents a relatively saturated market for second homes, the real growth market for recreational home ownership, between 1970 and 1980, lies in the fastest growing segments of the population in the age spans 20-29 and 30-39 for the Lily Lake project. These ages are somewhat lower than the age groups which predominate in the present second home market, but if ways can be found to both simplify and economize ownership of a recreation site and vacation shelter, the 20-39 age groups are the growth market of the mid-70's.[6]

In 1967 the U. S. Bureau of the Census compiled data on second home buyers which suggested that families under the age of 35 were least likely to buy a second home in terms of number of households.[7]

Head of Household	Households w/ Second Homes	Households wo/ Second Homes
Age: Under 35	8.4%	24.0%
35-64	70.8%	56.7%
64+	20.8%	19.3%

[6]Ragatz, "Quiet Boom."

[7]Special Census, 1967.

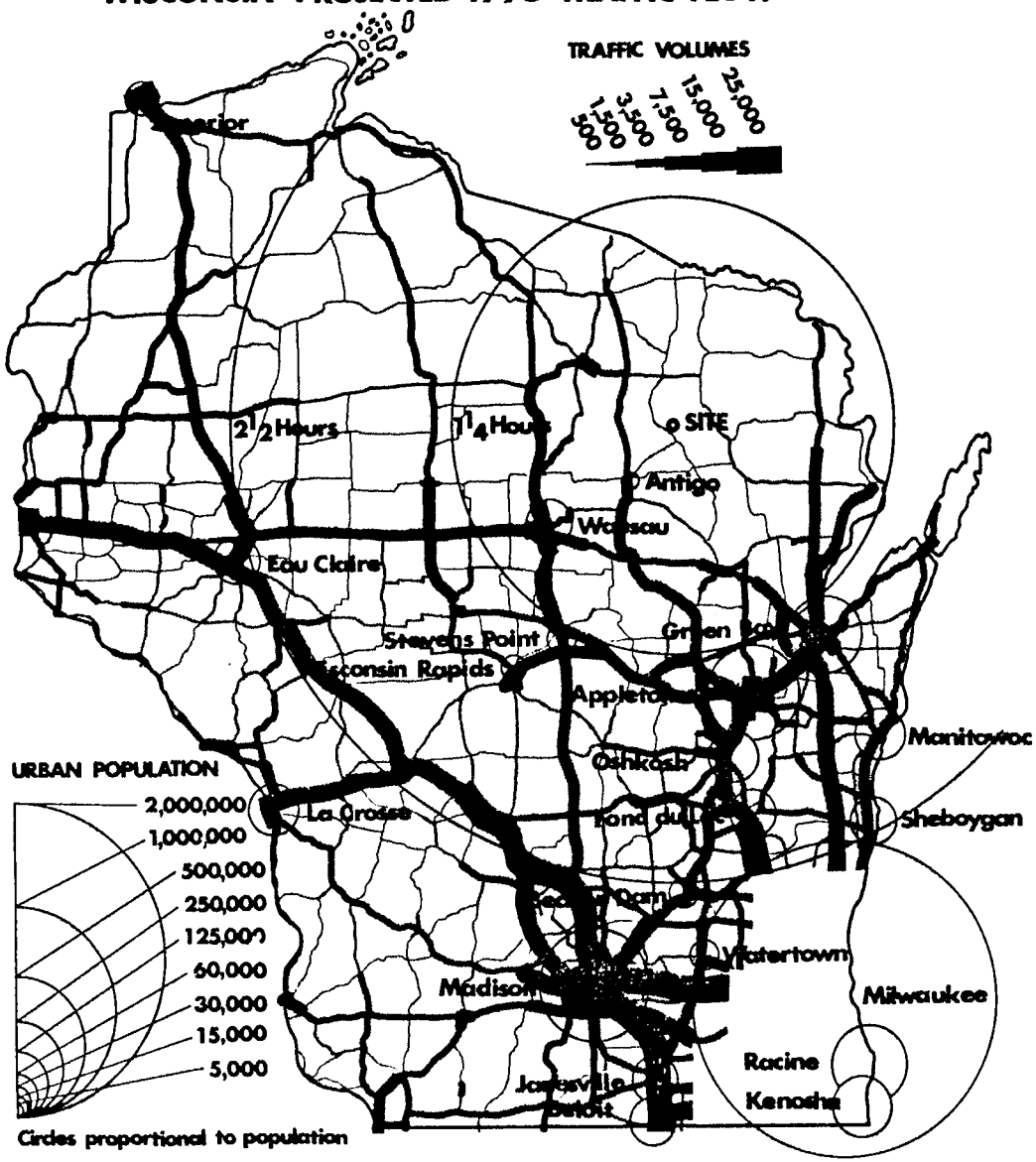
One might conclude that those under 35 are not likely to buy but if one presumes that ownership should remain roughly proportional to all households by age groups, this is the market which is least saturated. The same Census Study suggested that 45 percent of the families with a second home had no children and 30 percent had no more than two children under 15. Large families cannot afford luxuries like cabins. It should be remembered that families in the 30 year age bracket at the time census data was collected in 1967 represented the trough in family formations and births which occurred from 1929-1935. In addition, young families with young children have not been able to afford more than one mortgage. However, the shift in family income as well as the maturing of the post-1945 baby crop suggests that the younger families will be more receptive to purchase of a vacation site and this trend is born out by a 1968 study "Mail Survey of Buyer Attitudes and Characteristics for Recent Lake Lot Developments in Six Selected Wisconsin Counties."[8]

The rising trend in family income suggested for 1970-75, the projected marketing period for the Lily Lake project, indicates those families in the $10,000-$15,000 bracket will grow from less than 20 percent to nearly 30 percent of the market while those above $15,000 will not grow beyond their present proportion of population, as portrayed in Diagram B on page 21 . The Magazine Wall Street reported on June 20, 1970, that in those families with more than $15,000 a year income, 15 percent owned second homes while only 5 percent of the families in the $7,500-$10,000 bracket actually owned second homes. Considering that the Department of

---

[8]Christianson, 1969.

STATE HIGHWAY PLAN
WISCONSIN PROJECTED 1990 TRAFFIC FLOW



URBAN POPULATION PROJECTION FOR PLACES 5,000 AND OVER : 1990

AVERAGE DAILY TRAFFIC ANNUAL 24-HOUR AVERAGE TRAFFIC BY ALL VEHICLE TYPES

Labor suggested that a minimum of $9,500 was needed to barely survive in a suburban metropolitan area, the second home market must be found among families with more than $10,000 income and these families during the 1970's are most likely to be under the age of 40.

The 1967 Special Census Study of Second Homes in the United States projected the following relationship between incomes and household ownership of the vacation home.

Second Homes in the U. S.	Households w/ Second Homes	Households wo/ Second Homes
Income: $3,999	8.5%	24.4%
4,000-4,999	10.8%	17.4%
5,000-7,499	16.8%	23.6%
7,500-9,999	16.6%	14.8%
10,000+	47.3%	19.8%
Median family income	$9,600	$5,900

Since skilled workers such as carpenters, teachers, policemen, etc., will be well above $10,000 per year through the 70's, there is a broad consumer base in the $12,000-$20,000 family income group.

The vast majority of vacation homes are in the state where the owner has his permanent residence--at least 65 percent of all

cottages in Wisconsin[9]--and that ratio continues to hold in the newest lake lot developments.[10] This is related to the fact that most people will not travel very far to reach their vacation site as they like to make frequent and short visits. The 1967 Census Study suggested the following relationship in terms of travel distance and family income.

		Family Income in Thousands of Dollars				
Travel Distance from Home	Total	Less Than $5.0	$5.0 thru $9.9	$10.0 thru $14.9	$15.0 thru $19.9	$20.0+
50 miles	31	39	29	39	13	19
50-100 miles	29	31	30	17	31	28
100-200 miles	20	16	26	13	33	15
200-500 miles	12	12	8	19	4	16
500-3500 miles	9	3	7	12	19	22
Location in same state	63	80	52	57	64	54

[9]I. V. Fine and E. E. Werner, Private Cottages in Wisconsin, University of Wisconsin, School of Commerce, Bureau of Business, Research and Service, Wisconsin Vacation-Recreation Papers, Vol. I, No. 4, University of Wisconsin, Madison, 1960.

[10]Christianson, 1969.

Not only are the majority of potential customers within 200 miles, but in addition they are concentrated in the standard metropolitan areas, with 35 percent in the central cities and an equal number in central city suburbs. There is a feeling among developers that increased urbanization and urban frictions have recently been a significant cause of demand. Moreover, the rising proportion of families in multi-family units and the increasing number of married couples without children where both adults work both suggest a desire to escape from relatively high density urban areas is also coupled with purchasing power. If more young couples defer home ownership, there is reason to suspect that the second home may be the first home purchased by many buyers.

Reference to the map on page 24 indicates that Green Bay, the cities on the Fox River Valley and Lake Winnebago, and the Milwaukee metropolitan areas are therefore the prime sources of customers. The same map shows that the subject site is not immediately convenient to existing or planned vacation traffic arteries leading to Chicago and Minneapolis markets which are significant markets for other parts of Wisconsin.[11] A four hour maximum preferred driving time with no benefit of four-lane highways north of Oshkosh places the subject property at the extreme range of acceptable driving time for Chicago area customers. It might be concluded that the proportion of potential customers will therefore be closer to 85 percent Wisconsinites, indeed urbanites on the eastern edge of the state.

---

[11] Ibid.

Thus our opportunity area is in the age groups 20-40, among families with more than $12,000 income but less than $20,000, who can be found on the eastern shores of the State of Wisconsin. This younger market is beginning to evolve somewhat different life-style patterns than those which characterized cottage owners in the mid-60's. Recognizing the danger of lumping people into over-generalized groups there are certain qualities of the youth culture which may be expected to survive beyond college age fads and these were recently synthesized by Thomas Griffith in Life magazine.[12]

1. Honesty about all the discredited cant that an older generation finds harder to throw off. Outrage over violations of morality in business, advertising and personal conduct which have so often been defended or amiably shrugged off by others in the same trade as to tarnish them along with the offenders.

2. Resistance to the notion that all growth is progress. A belief that materialistic values hold too much sway in society and are an inadequate and often erroneous measure of an individual's real worth. A feeling that corporations must be made answerable for social as well as profit responsibilities.

3. An easier relationship between blacks and whites of the same age.

---

[12]Thomas Griffith, "Putting It Back Together," Life, January 8, 1971.

4. A somewhat romantic but nonetheless healthy attachment to being in tune with nature instead of being determined to "conquer" it.

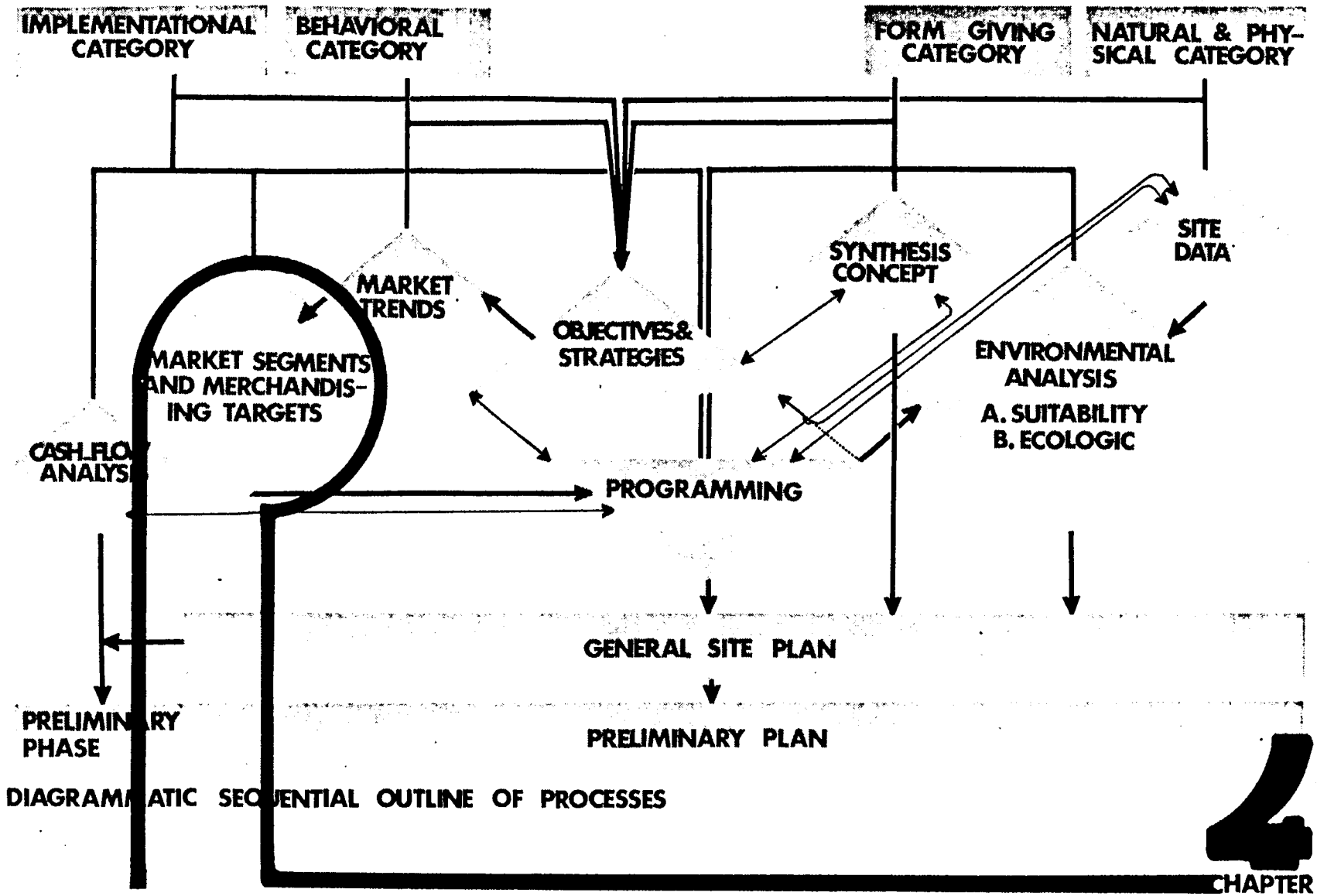
5. A desire to live life in such a way that its humanity is evident throughout the day, and not just after-hours. This leads to a scorn of routine or spiritually stifling jobs, a dislike of competitiveness and a feeling that while commitment to a profession or craft may be important, loyalty to a specific firm is not. With this goes a reluctance to excel in a personally ambitious way, whether as the new celebrated architect or most successful lawyer, and a preference instead to use legal talents in the service of Ralph Nader reforms, or poverty law; to use architecture to improve the urban environment rather than to erect personal monuments to one's own, or a corporation's, vanity; to enter medicine not to set up a Park Avenue practice but to bring medical assistance to the poor and neglected.

6. The economic expression of this ethical stance shows up not only in the widespread antibusiness attitude but contentment with a Volkswagen, a good sound-system and a bare apartment, rather than in a competitive emphasis on living in a good neighborhood and outdoing others. Though there is a slob side to this, simplicity in living, as a kind of moral imperative, is an attractive quality.

The fit of product to consumer is found in the ethic above as well as the methods chosen with which to market basic consumer motivations.

This broad-brush sketch of the analysis for identifying marketing opportunity areas makes it more feasible to construct a profile for various sub-sectors of the market defined. By fitting the product to specific sub-groups of consumer attitudes and buying power, it is possible to create a new variation of recreation land development which offers a competitive edge to the modern merchandiser. Simply to presume a future market with the same characteristics as the existing structure of second home ownership is to define a competitive standard. Such a standard has little drawing appeal to overcome locational disadvantages or to insulate the project from direct price competition. Having named the customer type and located his home territory, it is then possible to focus on consumer research to define the merchandise required to take advantage of an opportunity area, careful product development and innovation, and makes possible monopoly pricing, the best source of adequate cash flows.

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

MARKET SEGMENTS & MERCHANDISING TARGETS

4

MERCHANDISING STRATEGY AND PRODUCT DESIGN

To construct an initial merchandising strategy with which to direct early planning and design, it is necessary to relate the profile to consumer groups to the competitive alternatives available to the consumer and then to the consumer decision system which produces a sale. This system of consumer attitudes and responses should treat matters related to degree of consumer sophistication, access and approach zones, development concept and image, package of special features, pricing, and promotion. The first sweep of product research is reported in this chapter.

Wisconsin has no shortage of recreational land development firms, particularly sophisticated large-scale national firms. Moreover, there are many huge assemblages of land in strong ownership available for development. Fortunately for the Lily Lake project many of these developers are in other quadrants of the state. For example, Juneau Land Corporation, a subsidiary of International Paper and American Central Corporation, is developing Potawatomi Estates, a 1,400-acre subdivision on six natural lakes in western Bayfield County, the northwest corner of the state. Also in that area is a 2,200-acre subdivision on Red Cedar and Hemlock Lakes in Barron and Washburn Counties under development by Wendell-West Company. Both these developments are directed to the Minneapolis market. Boise-Cascade has thousands of acres in Grant County in the southwest corner of Wisconsin under development for residents of the Quad-Cities in Illinois and Iowa. In the central part of the state the five largest power utility companies own 75,000 acres, most of it prime frontage on the largest lakes

and rivers in Wisconsin as a result of their hydro-electric projects. Almost every northern county in the state presently owns, as a result of tax default, large chunks of forest crop lands which they dream of converting to development and returning to the tax rolls. It should be noted that the major developers first choose a metropolitan market and then move one or two hours driving time away, either to find a natural water-related site or create an artificial lake. Proximity rather than natural scenic beauty has been given priority.

The largest development firm in the state is N. E. Isaacson and Assoc., of Reedsburg, and in the past ten years he has completed four developments totaling 4,700 acres--around 1,400 acres of man-made lakes. Of his two current projects the one in Burnett County does not represent a competitive threat to the subject site but his Legend Lake development, a joint venture with the Menominee Indians in the southern part of the county bearing their name, straddles the best transportation routes (Highways 52 and 55) to the subject site. It will have 3,800 acres of land--around 1,400 acres of water. In addition, the Campfire Land Company of Appleton is offering conventional lots in 46 different plats in 30 counties totaling some 2,000, much competitive to the Milwaukee and Fox River Valley market.

The septic tank and soil problems of unregulated early developments by all the major and minor developers have led to considerable pressure by the Department of Natural Resources on the developers to provide fully engineered sewage and water solutions as part of the plat submitted to the Department for approval. These conditions of plat approval have adversely affected any number of

development plans. The most important competitor to the Lily Lake project is Isaacson's Legend Lake for the Menominees. It has not provided any utility system and has had some problem in achieving desired water levels in its artificial lakes.

The Isaacson firm has been attempting new types of development layout and has found general consumer acceptance of cluster planning in which groups of lots, separated from one another by forest strips, are located off the lake with high proportions of lake frontage retained in common ownership. Deed restrictions have achieved deep setback lines for buildings from shorelines to preserve the natural treeline, and consumers have accepted severe restrictions on docks and shoreline structures as well as on exterior materials and finishes of cabins.

At Lake Camelot, in central Wisconsin, his cluster plan and conservation-minded areas sold first. Surveys of his customers and non-buyers alike show strong public acceptance of tight control of developer and of individual lot owner. In short, pioneering in land planning has been done by developers in Wisconsin with success.

Perhaps the two finest real estate Sunday supplements in newspapers throughout the country can be found in the Chicago Tribune and in the Milwaukee Journal. For several years these papers have devoted much space to the education of recreation land buyers with text and photos and should be recognized as a major force affecting public attitudes and marketing sophistication. Racine, Milwaukee and the Fox River Valley have long experienced tremendous demand for consumer housing magazines, plan books, and conservation materials and circulation of such publications has long

been correlated with higher quality, more innovative residential real estate and property ownership.

To test the sophistication of potential or recreational lot buyers in these publications, a questionnaire was placed in the major newspapers: the Milwaukee Journal, the Milwaukee Sentinel, the Appleton Post, and the Green Bay Press Gazette. The questionnaire was a paid advertisement space, but there was an attempt to place the ad near to a feature article on recreational land development. It was hoped that the article would provoke some dialogue with newspaper readers in regard to a hypothetical problem statement and project proposal. Although not fully successful in generating a large response, the survey did produce the initial guidelines for development concept and special features.

PROBLEM

Lakeshore lots are expensive and are in short supply. Most northern Wisconsin acreage is dotted with small lakes, streams, bogs, meadows, and large tracts of woods. How do we provide sites for everyone at reasonable costs without ruining the water and the wilderness?

PROPOSED SOLUTION

Co-ordinated planning and development of large tracts of 3,000 acres or more as recreation clubs. Membership in a club would be granted to purchasers of recreation sites, clustered in small groups for either camper-trailers, apartments, or small cottages. In addition to a recreation club house, various swimming facilities

and year-round maintenance, the club would offer hiking and riding trails, archery and rifle ranges, boat and scooter rentals, and social events, such as square dances or curling bonspiels. Annual club dues would be less than $120 per site. Purchase of a site with water, underground electrical, and septic services would begin at $2,500 per site. Such a development could be located within two hours' drive from Green Bay or the Fox River Valley, or four hours from Milwaukee.

Summary of Questions and Responses

Readers were asked to respond to six major questions. There were 110 usable questionnaires from all four ads. To focus responses, preferences were categorized by age of person filling in questionnaire as (a) under 40 years old, or (b) 40 years old or more. The questions and simple percentages of response follow:

1. One area of the club lands would feature private sites for parking a camper-trailer or motor-camper, consisting of at least 6,000 square feet of land in a small, semi-private cluster, complete with gravel pad for camper and guest, electricity outlet, cold water outlet and short path to a toilet and shower room serving only the cluster, all in a natural woodland setting owned and maintained by the club. No structures of any kind could ever be constructed on these sites. Prices: $2,500; dues $120.

Response	Total	Under 40	40+
Just what we need	38%	39%	37%
Good but not for me	45	46	45
Ridiculous	13	14	12
No Response	4	2	6

2. Consider an area of Holiday town house and apartment cluster units available on a minimum two-year lease with rent payable in advance each six months. Each little residential unit would be furnished with basic built-in furniture and indoor/outdoor lawn furniture, private patio and proximity to all club facilities. Design would be contemporary A frame, chalet and patio house styles.

Response	Total	Under 40	40+
Just what we need	26%	29%	24%
Good but not for me	48	47	49
Ridiculous	17	20	14
No Response	8	3	14

3. Consider an area of detached home sites on the club grounds for small, architecturally-approved cabins, rustic-style mobile homes or sectionals, with underground wiring, water and joint septic system. Price: $4,000; annual dues $120 per half-acre building site.

Response	Total	Under 40	40+
Just what we need	42%	46%	37%
Good but not for me	35	32	37
Ridiculous	15	19	12
No Response	8	2	16

4. Owners of cabin sites would share equally in club benefits and responsibilities with the owners of camper pads and apartment units.

a. Would you buy a home site under these rules?

Response	Total	Under 40	40+
Yes	66%	75%	57%
No	23	17	29
No Response	11	8	14

b. Do you believe camper owners and cabin owners would mix socially?

Response	Total	Under 40	40+
Yes	68%	73%	63%
No	23	17	29
No Response	6	5	8

5. In this question, respondents were to circle those features they would use in the community club house. The percentage of responses per line item is a good index of what respondents want in the way of clubhouse facilities.

Desired Features	Total	Under 40	40+
Indoor-outdoor heated pool	65%	77%	52%
Sauna bath	42	53	30
Snack bar with beer	42	44	40
Supper club with bar	36	44	28
Rumpus room	32	37	26
Bussing to ski areas	21	28	12
Motel guest rooms	19	21	16
Card rooms	17	12	22

6. In this question, respondents were to circle the five recreational features that they or their families would use most often on the club grounds. Many respondents listed more than five items. All items were included in the analysis. The percentage of responses per line item is a good index of what respondents want in the way of recreational facilities.

Recreational Feature	Total	Under 40	40+
Swimming beach	85%	90%	80%
Hiking on marked trails	67	66	69
Boat ramps	35	29	41
Nature courses	34	25	43
Boat rental	33	37	27
Riding stables	30	25	35
Supervised playground	28	42	12
Tennis courts	26	34	18
Outdoor skill classes	25	20	31
Rifle range	24	19	29
Golf driving range	22	22	22
Snowmobile trails	19	20	18
Indoor table games	15	5	25
Skeet shooting	15	7	24
Archery range	14	14	14
Shuffleboard	13	12	14
Snowmobile rentals	12	14	10
Motor scooter rental	5	7	2
Pony corral	2	2	2

Significant Conclusions

Despite the small number of responses, the pattern of responses is logical and the magnitude of preference for some design items seems highly significant. Those who filled in the questionnaire were genuinely interested in a recreation site away from home which respected the natural environment even if that meant an unconventional treatment. There were a significant number of responses from people who did not complete the questionnaire but who protested any further development of Wisconsin's north woods and who were in favor of interdicting all roads into the northern half of the state.

1. Of the respondents, 80 percent thought a camper-trailer pad which they could own was a good idea and half of those thought it was "just what we need." Many included their name and return address for information where they could purchase the hypothetical development.

2. The apartment concept was not well received and the younger respondents, perhaps those still living in apartments, were generally strongly opposed.

3. Relative to detached home sites subject to strict architectural control on semi-mobile units, the younger market was most enthusiastic.

4. The younger respondents were far more tolerant in their acceptance of mixing camper owners and cabin owners than those over 40. But still, two-out-of-three saw no social problem in terms of the different groups represented, thus permitting sufficient density of development

to keep the dues relatively low for the club services provided. At the same time, allowing many of the members of the club to use a camper trailer, leaves the families free to take other vacation trips and reduces the intensity of use for recreational facilities on any given weekend.

5. Relative to recreational activities, it was significant that two-out-of-three were most enthusiastic about hiking on marked trails and nature courses and that such advertising features as snowmobiles, archery, shuffleboard and motor scooter rentals were of little appeal. Indeed, there were many notes in the margins which were opposed to anything with a gasoline engine polluting the woods with noise and fumes. A supervised playground was the most significant feature for the younger market after swimming and hiking.

6. Relative to clubhouse facilities, the younger set seems to anticipate more fall and winter usage and, therefore, a strong preference for indoor pools, sauna bath, and a rumpus room for the kids on rainy days. Indeed, they look for a big night out with "a supper club with bar" and being activists, see little need for card rooms. Still, only one-out-of-four relate to skiing or at least to the need for direct bus linkages to ski runs.

The survey suggests that there are a good many enlightened buyers who were willing to accept unconventional design to achieve both a natural environment and a price they can afford. As usual in land development, the market is ahead of the typical developer.

The recreation features preferred in the newspaper questionnaire above are well supported by other leisure time consumer studies in Wisconsin and in other parts of the country. For example, in a northern New England activity participation ranking,[1] walking edged swimming as the number one leisure activity. Unlike the New England study where swimmers greatly preferred a lake or stream, Wisconsin swimmers much prefer a swimming pool.[2] A Cornell University study[3] reported the most frequently preferred recreational facilities as:

1. Man-made lake
2. Swimming pool
3. Tennis courts
4. Riding stables
5. Snow skiing
6. Golf course
7. Natural lake

---

[1]Richard L. Ragatz, Vacation Homes: The Market for Seasonal-Recreational Housing (Ithaca: Department of Housing and Design, Cornell University, 1965).

[2]John E. Powers, "Social and Economic Variables Affecting the Resort Features Desired by Northern Wisconsin Resort Users and Non-Users" (unpublished Ph.D. dissertation, University of Wisconsin, January, 1971).

[3]Richard L. Ragatz and Gabriel M. Gelb, "The Quiet Boom in the Vacation Home Market," California Management Review Vol. XII, No. 3 (Spring, 1970).

In Wisconsin, the Christianson study indicated the preference for non-water related activities as:

1. Hiking 45%
2. Picnicking 44%
3. Dining-out 40%
4. Hunting 33%

The strong reading on "dining-out" was reinforced by the Powers dissertation[4] which found most resorters preferring a combination American plan, where they could fix their own light meals but still give "mama" a vacation from kitchen chores by frequent visits to breakfast "buffets" and supper with some light music entertainment. A 1969 study in Wisconsin by E. L. David of the University of Wisconsin[5] not only provided the following ranking but was able to conclude that people with higher incomes have a generally higher activity level--swim and boat more, but hunt and fish significantly less. Her study also detected a slightly higher preference for winter sports among those with higher incomes as a result of skiing, and the early (1967) stages of the snow mobile craze in northern Wisconsin.

1. Pleasure driving 75%
2. Picnicking 67%
3. Fishing 42%
4. Swimming 41%
5. Boating 35%
6. Hunting 17%
7. Winter sports 17%

---

[4]Powers, "Resort Features."

[5]E. L. David and William B. Lord, "Determinants of Lake Property Values on Artificial Lakes," Agricultural Economics #54 (Madison: University of Wisconsin, May, 1969).

Both the general 1967 Census study and the Christianson study suggested that summer is the most popular season, closely followed by fall for Wisconsin users. The winter season occupancy was often related to the proximity of skiing which is one activity not too convenient to the Lily Lake site. Therefore, activities provided stress those of the summer-fall season.

Occupancy Patterns

1967 Census Data		Christianson Study	
When occupied?		What season do you use vacation home?	
Spring only	4%	Spring	61%
Summer only	70%	Summer	88%
Fall only	2%	Fall	73%
Winter only	2%	Winter	29%
Several seasons	26%		

In selecting the package of features to offer on the subject site a golf course was dropped from consideration due to the heavily wooded terrain and a higher priority attached to a utility system and conservation of the ecology system. Since the majority of land would be retained for hiking and other trail sports, a substantial capital budget was allocated to the construction of a trail network. Given the limited carrying capacity of the two available lakes within the site, other features were selected to emphasize non-water activities and pools were placed in each development area to provide both a method for social interaction and a means of reducing

the perceived inconvenience of locating residential sites at significant distances from the lakes. The main lodge with supper club and bar, as well as the management office was seen as the adult recreation center providing for community interaction among residential clusters while the two sub-centers were seen as primarily all-family activity centers. With the possible exception of meals and beverages, boats and motors, horseback riding, and special sports equipment rental services, which might lend themselves to commercial operation by an outside vendor or the club itself, all features would be provided to club members at no additional cost.

Initial facilities selected to be included by the design team are listed later in the chapter on programming.

A significant intangible amenity was to be the exclusiveness and physical security offered the site owners by membership (by deed convenant) in a condominium or "club" ownership of all joint facilities. Entry to the inner-roads of the development would be gained only at the main lodge and control center by means of a pass card or some other identification device. This gatehouse, after reaching the lodge, would eliminate sight-seeing traffic from the road, opportunists, and crashers attempting to make free use of unoccupied sites. The club atmosphere would be reinforced by repetitive design motifs in structures, signs, and promotion material. The maintenance obligations of the club, the year-round resident manager, and perhaps an intercom (with fire and furnace failure alarms for each residential unit) tied back to the management office would do much to relieve the anxieties of the absentee owner or the tenderfoot in the woods.

The decision process by which the leisure time consumer decides to commit an investment to a recreational home has not been well studied. There is some indication that as many as 5% of families above $12,000 a year income have thought about making such a purchase.[6] It can be argued that the second home buyer is under no pressure to buy as it is not a necessity and that a man can dream about it for years unless there is a good reason to buy now.[7] The Christianson study indicated that nearly half of recent lot buyers in Wisconsin had not looked at any development other than the one in which they bought. Developers often do not follow-up leads for those potential customers who leave the site, feeling these "shoppers" do not produce enough sales to justify off-site sales work. Apparently impulse buying is a major factor so that it is imperative to make a tangible and stimulating impression on the buyer on his first visit to the site. This merchandising objective requires that recreation facilities be installed and grouped to have a collective impact. Cluster planning contributes to the appearance of completion and of product quality instead of realtor promises.

In the past the vacation home buyer who depended on the scattered lot, or more recently on the subdivision of lake lots

---

[6]American Telephone and Telegraph Company, "Survey of 9,231 Bell System Telephone Users, New York, 1965. (Mimeographed.)

[7]Douglas Fir Plywood Association, Builders' Guide to the Second Home Market (Tacoma: Douglas Fir Plywood Association, 1963).

without paved road or public utility, suffered great difficulty in securing utilities, financing, and construction while operating in relatively unfamiliar territory with unknown trade sources. The timid as well as the busy did not care to endure the hassle of assembling a leisure home project. More recently the vacation home community which provides a complete package of utilities, facilities, and several degrees of completed shelters has the fastest consumer acceptance. One writer maintains that the Puritan ethic of keeping busy leads leisure home buyers to do much finishing and remodeling themselves as a part of the recreation experience.[8]

The Shelter Option

The most expensive part of a vacation home site is the shelter so that the cost of a leisure home site can be reduced where alternatives can be found to the more conventional cabin. Many buyers already have campers and camper trailers and others prefer the compact efficiency of mobile homes, particularly second-hand mobile homes. A recent innovation has been the high-style mobile modular unit. The camper-trailer type is unobtrusive and should be explicitly provided for, both during a period of time after purchase of a home site and on sites forever restricted to this portable and common type of shelter. Since the rate of cabin development on lake lot developments has been 2-3 percent a year, the camper-trailer set offers a market which can make immediate use of recreation facilities without a big investment beyond the price of the lot. Higher utilization of recreational facilities will provide better support to the association assessments with which facilities are

---

[8]Ragatz and Gelb, "Quiet Boom."

maintained. The mobile modular and the prefabricated cabin can be tightly controlled by architectural constraints and for those who desire a completely finished structure, 160 condominium units were located on Crawford Lake with a single cluster near the main lodge for sales purposes. Second-hand house trailers offered the most difficult problem of control, in terms of appearance and the overall image of the development, and were therefore to be prohibited by covenant. The most important element of merchandising to be stressed at the preliminary product specification stage was the attempt to sell "dream fulfillment" to the potential customer as he reached the site and to sell "transaction convenience" by providing a completed site with utility package and options as to the cost and degree of completion for shelter units.

The Approach Zone

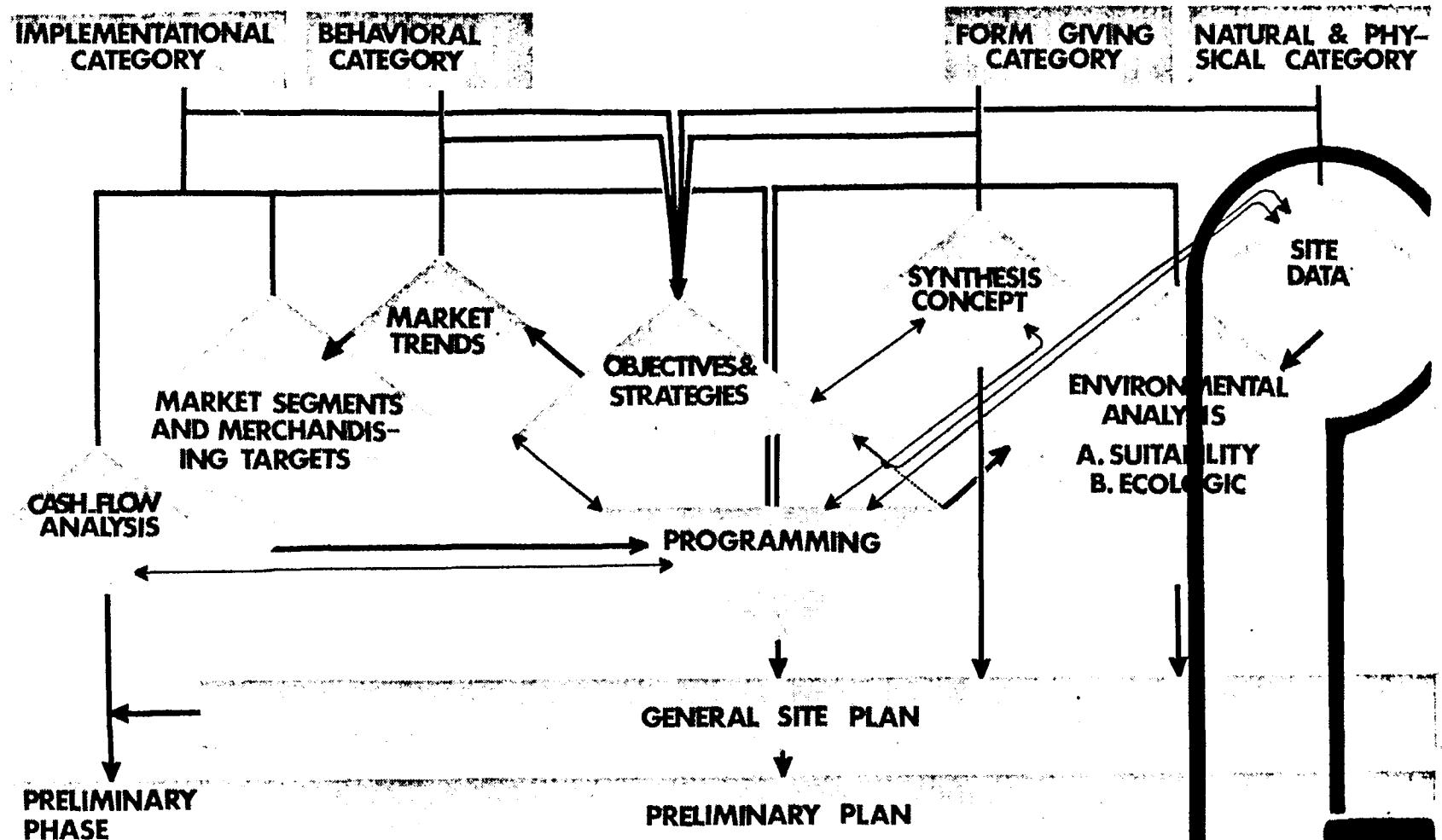
The important step, that of motivating the customer to drive to the site, is last but not least in merchandising importance. What would cause the family to take the trip off the beaten path? In earlier years vacation housing was sold primarily through classified ads or by long searches of a general area by a family seeking a summer place. However, Wisconsin developers have discovered the power of mass merchandising by newspapers and television. Through this media the Lily Lake Forest Recreational Environ would pitch the Volkswagon Puritan briefly sketched in Chapter 3. Great emphasis would be placed on the low ratio of developed land to natural areas, the nature trails and club activities, and the transaction convenience and relative freedom from responsibility provided in the club character of the project.

Receptivity of the customer upon arriving at the site depends in part on the difficulty of driving to and locating the project. Highway 45 from the Fox River Valley leads to Highway 52 at Antigo, which in turn leads directly to the site. Highway 29 from Green Bay leads directly to Scenic Highway 55, which travels through the scenic Menominee County and tangent to the rugged whitewater Wolf River to the town of Lily where it intersects Highway 52 with a right turn to the project. Highway 52 north from Lily leads directly into the town road which would serve as entrance to the club. These highways are only two lane but relatively new, where the scenery is minimal, and relaxing in their upper reaches where the scenery is some of the best in the north woods. The town road and Highway 52 link-up with the tourist and shopping center of Crandon, a few miles north of the development site. An alternative entrance from the west was ruled out because the approach zone followed a dangerous curving road and a view of the unfortunate development around Pelican Lake or the construction of six miles of new road at a prohibitive cost.

At the club entrance the railroad provides a minor irritant but then the potential buyer is given a series of relaxed glimpses of the woods, the Lily River complex, and the rolling forested terrain before coming over a rise to see Lily Lake and the main lodge. He will have been well romanced by the countryside before being asked to consider purchase of his dream site. The cost, pricing, and profit of these merchandising considerations are further developed in Chapter 10 on cash flow analysis.

HE WILL HAVE BEEN WELL ROMANCED BY THE COUNTRYSIDE
BEFORE BEING ASKED TO CONSIDER PURCHASE OF HIS DREAM SITE

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

CHAPTER

5 INVENTORY & SITE DATA

5.1 INTRODUCTION

The inventory of site data falls early in the sequence of tasks in the design effort. While it continues concurrently with a number of other processes discussed above, it should be completed before starting the programming process.

A discussion of "inventory and site data" follows. For convenience of listing, the data will be discussed in two sections: one related to the cultural milieu, and the other to the natural milieu.

5.2 THE CULTURAL MILIEU

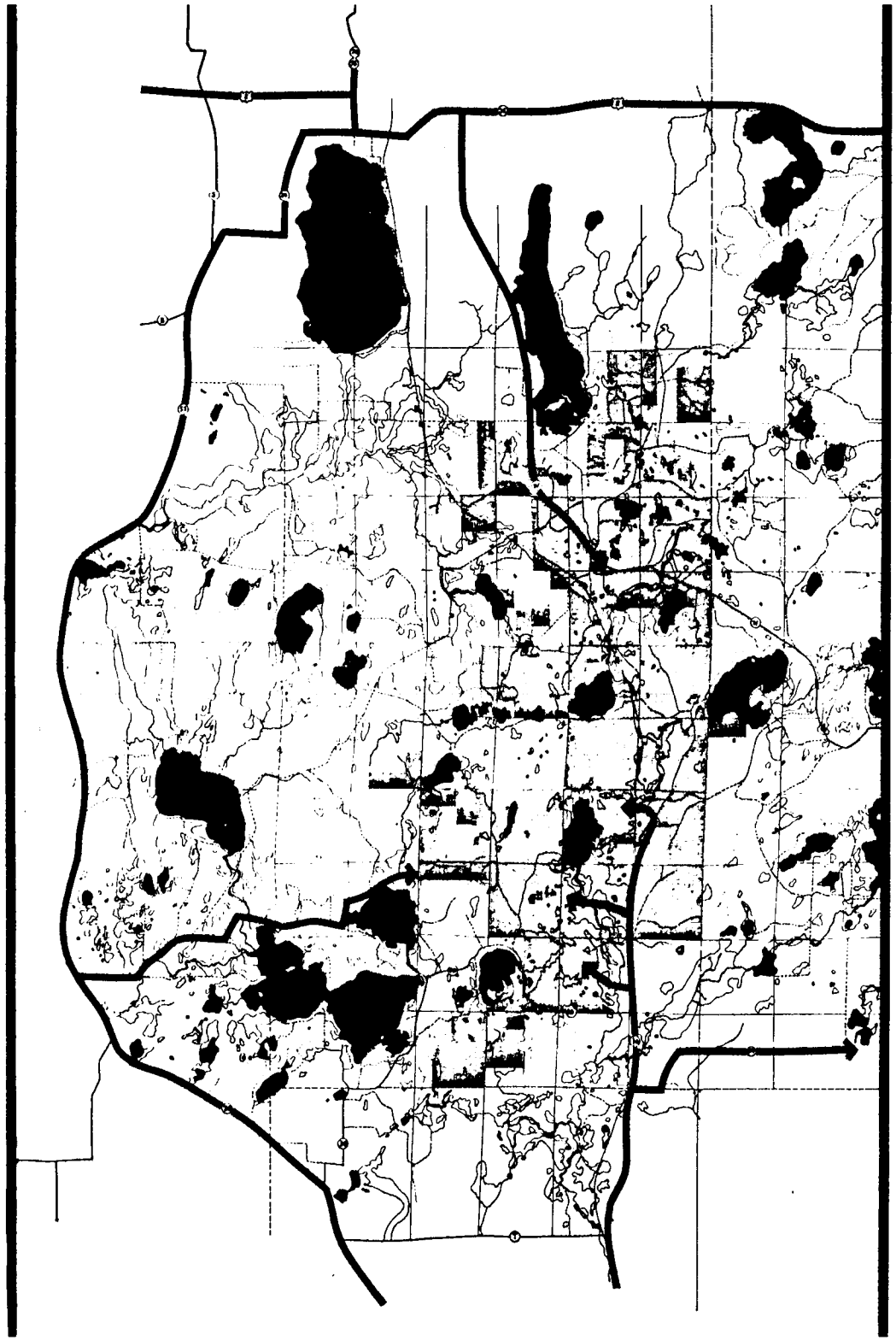
The elements of the cultural milieu inventoried in this study may be classified as follows as well as prior chapters' discussion.

POLITICAL AND DISTRICT BOUNDARIES

A preliminary survey of the various political and district boundaries affecting the site--county, townships, flood control, fire, police, etc. --was completed for use in later studies of relevant powers and regulations.

ACCESS TO SITE

Alternative access points to the site were defined as shown in the map on page 52 , recognizing the relationship of the site to populated areas, visual quality of the physical environs, directness of access, as well as cost of acquiring such access.



SITE BOUNDARY

From the property of Kimberly Clark in that area, a preliminary boundary was defined for the Lily Lake Forest Recreational Environ. The following location factors were considered:

Choice of a naturally well-defined area with clear boundaries (rivers, roads, etc.).

Recommendations for necessary land purchases and/or sales.

Maximization of use and value of remaining lands.

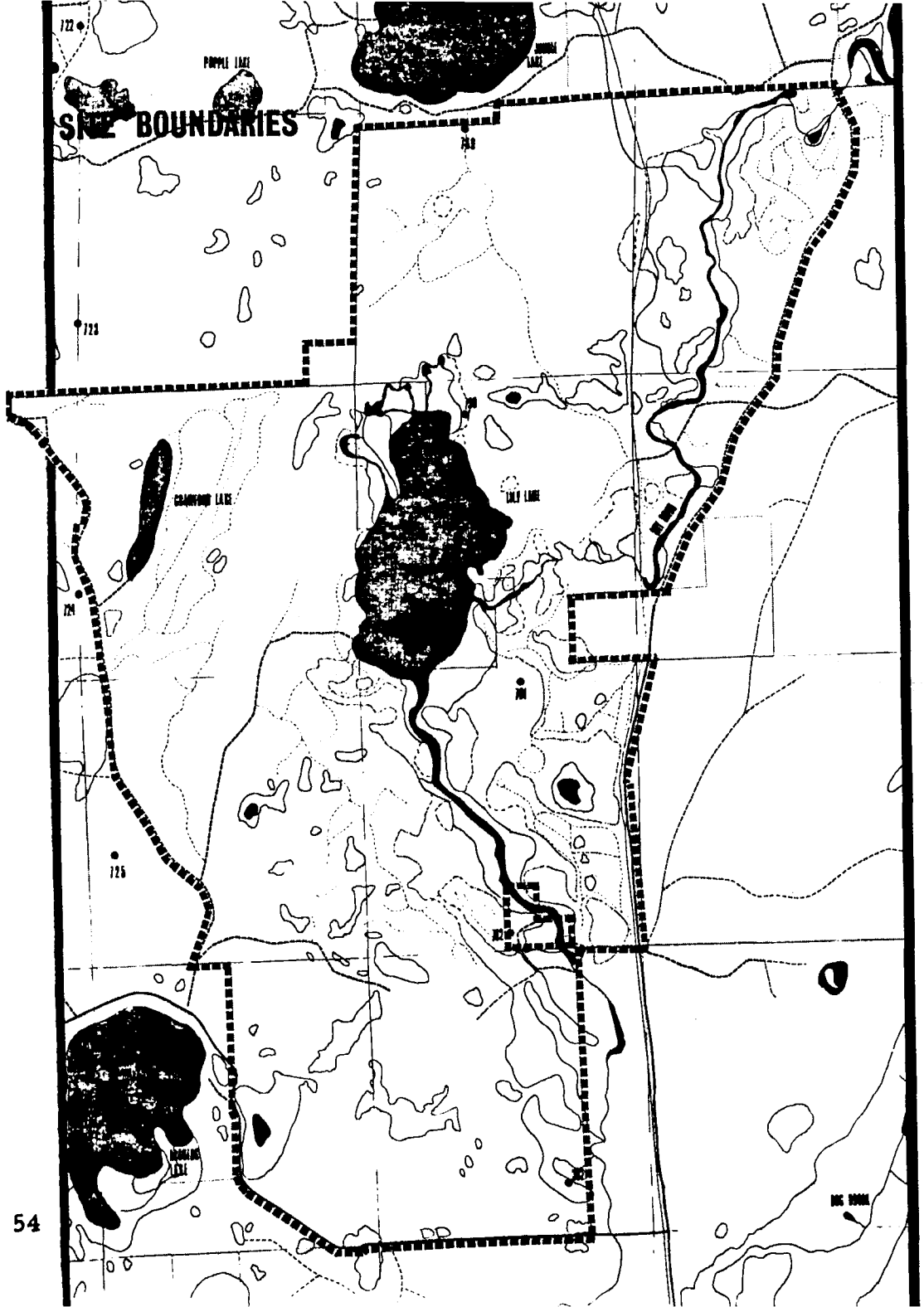
The boundary chosen is shown on page 54 . The analysis went beyond that boundary in some areas to keep the door open for possible changes in the boundary definition.

5. 3 THE NATURAL MILIEU

The elements of the natural milieu inventoried in this study fall into five subcategories of the natural and physical sciences, described in the discussion of the multidisciplinary team.

GEOLOGY AND SOILS

Data on the geology and soils are basic for the design effort, especially in this project site where 30-40 percent of the site is


SITE BOUNDARIES
PURPLE LAKE
DIAMOND LAKE
LILY LAKE
122
123
124
125
126

in wetland. However, except for a portion on the east shoreline of Lily Lake, data were not available. Consequently, a preliminary geologic survey was completed as part of the project by drilling a limited number of test holes, and a contract was signed with the Soil Conservation Service for a detailed soil survey of the site. The map on page 56 portrays the soil types.

TOPOGRAPHY

A topographic map is another basic data source for the design effort, especially on this project site with its undulating terrain. The only available topographic mapping was prepared by the Army Map Service at a scale of 1:250,000, with a 50-foot contour interval. Since this level of detail and accuracy is not adequate, form-line contouring was used to map the site's topography at a contour interval of 20 feet. This method employs aerial photographic interpretation using a ground survey to establish base-line elevations. Unfortunately, since the aerial photos available were taken during a period when vegetation was covered with foliage, much of the topography was obscured. This weakness in topographic data was offset somewhat by the availability of slope categories in the soil survey shown on page 57 .

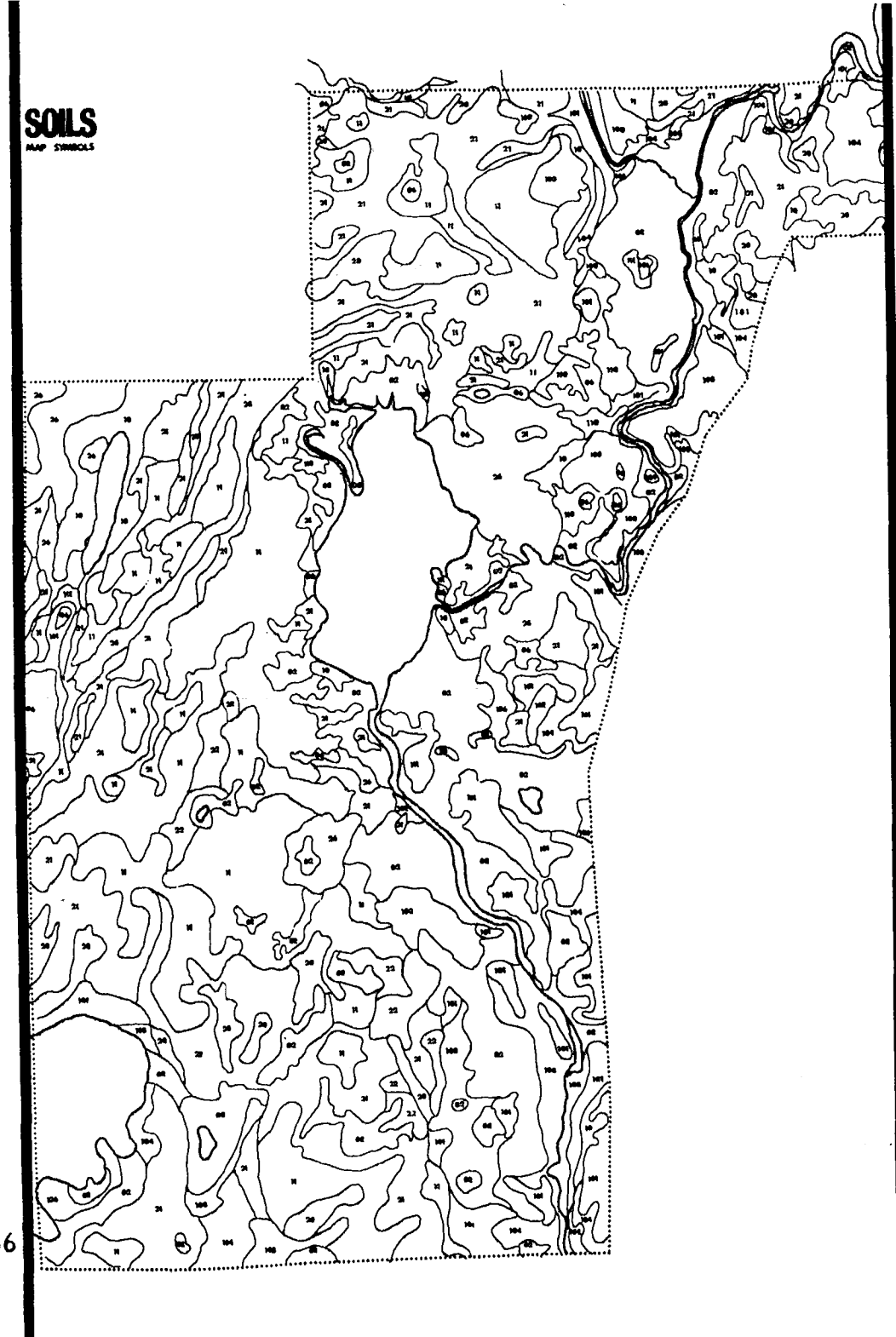
For further detail, a ground survey was completed by Kimberlands, Inc. for two small areas, one east and one west of Lily Lake.

THE WATER REGIMEN

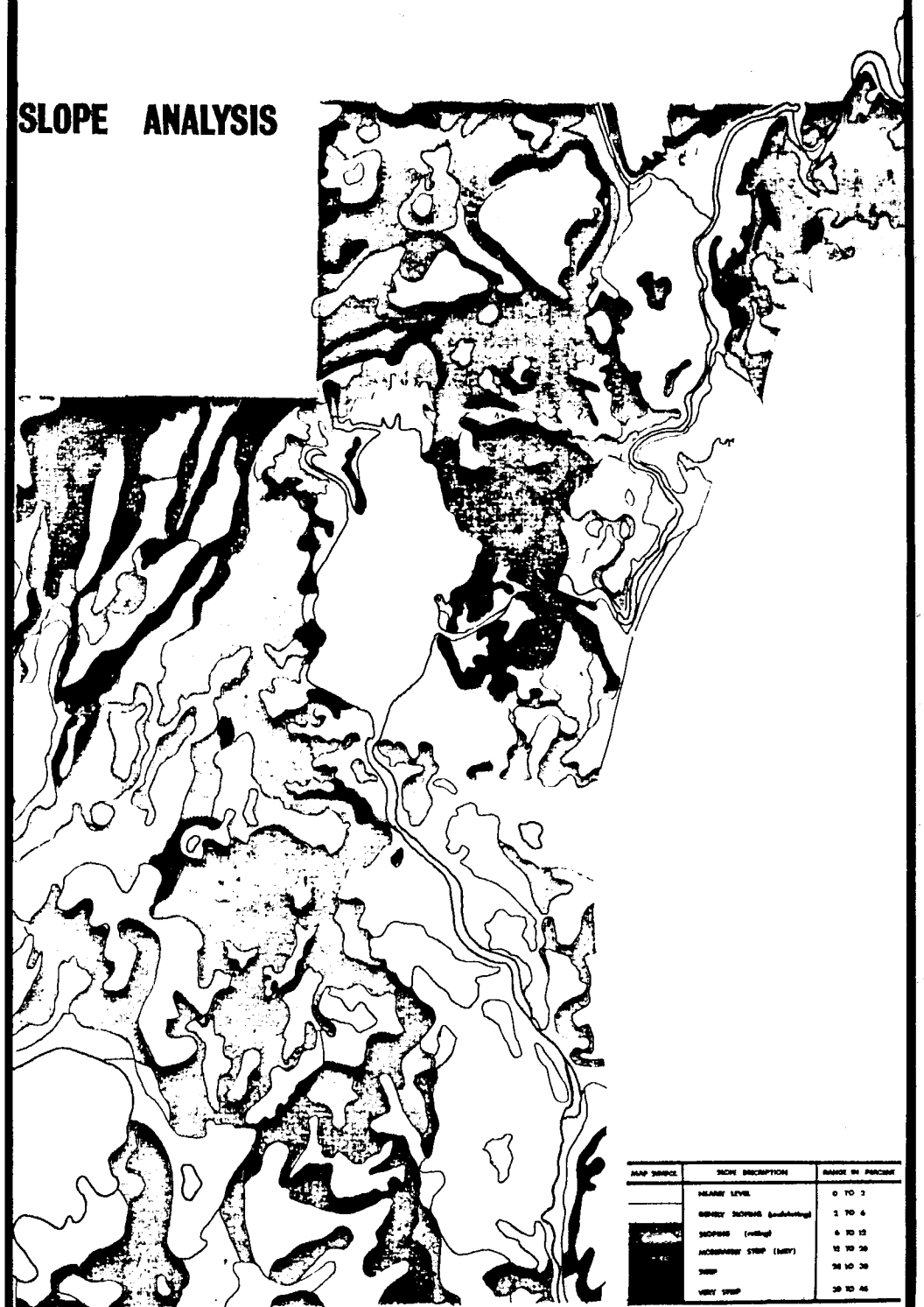
In a large-scale recreational development, nutrients contained in domestic sewage can enter the hydrologic system and cause

SOILS

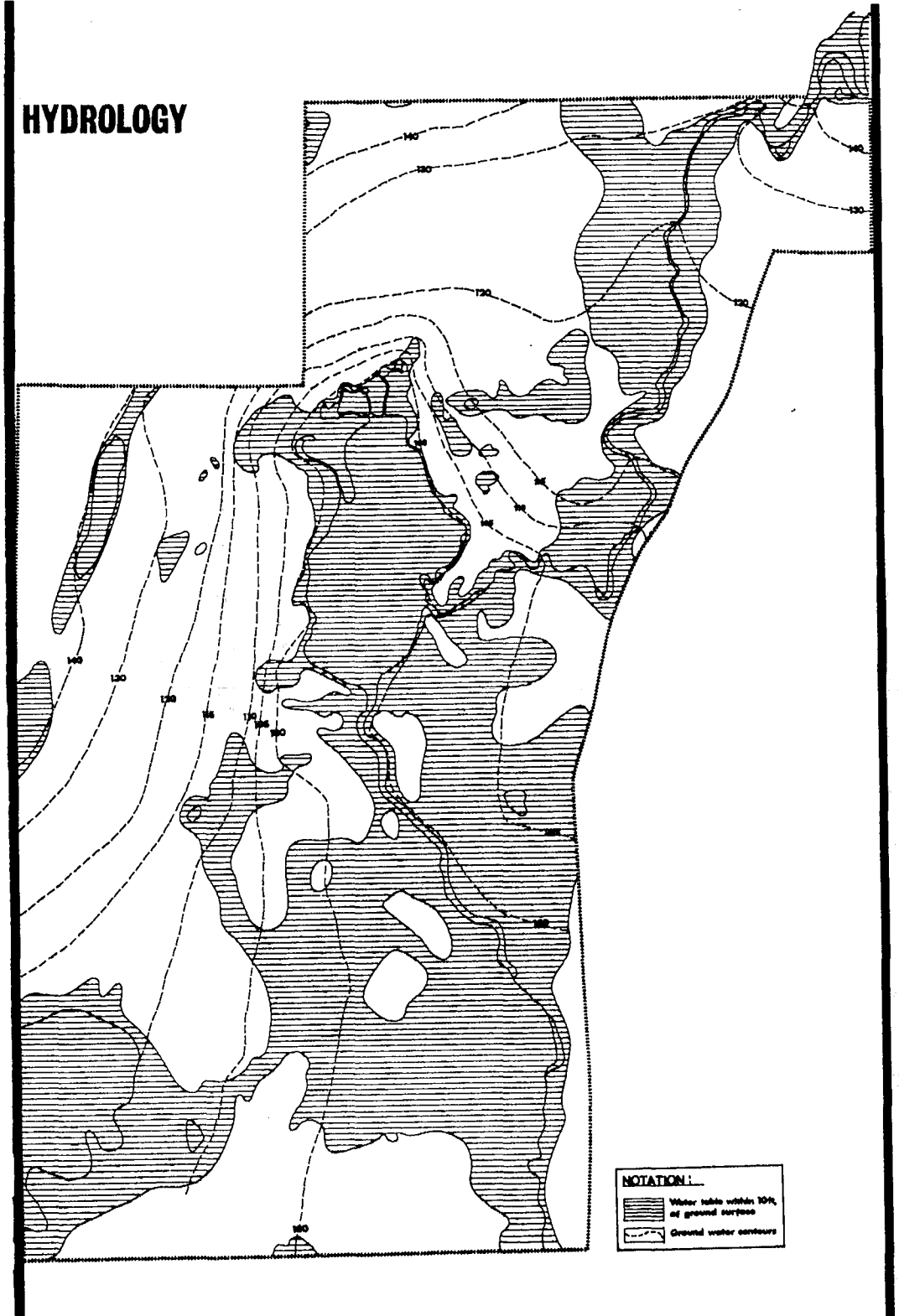
MAP SYMBOLS



SLOPE ANALYSIS



HYDROLOGY


NOTATION :
Water table within 10ft. of ground surface
Ground water contours

serious problems. Accelerated nutrient enrichment of water (entrophication) leads to deterioration of lake water quality with consequent degradation of the lake's recreational value. Data on the water table, as well as the ground water flow system, is essential in designing a development which protects natural water quality. The map on page 58 graphically portrays the data obtained from the hydrologic analysis.

CLIMATE

General data on temperature, humidity, rain and snowfall, frost depth, wind patterns and solar movement were obtained for the Lily Lake region and were useful in establishing some broad design criteria. However, micro-climate data--snow accumulation areas, frost fog pockets, shadow zones, warm slopes and micro wind patterns--could not be extrapolated because of the absence of detailed, accurate topographic mapping. This deficiency was not a significant hinderance in this project where the total design effort was not carried to the detail of a preliminary plan.

PLANT/WILDLIFE ECOLOGY

Detailed information was collected regarding distribution and description of the site's vegetation types--including understory vegetation. Data was also obtained on the site's cutting history since the project site is part of an area that has been repeatedly harvested for wood products. These data were provided by the Kimberly Clark Company. The map on page 61 shows the vegetation of the site.

To obtain the more detailed information needed for the ecologic analysis discussed in Chapter 7, page 95 , the site was surveyed by aerial infra-red photography.

5.4 PRELIMINARY ANALYSIS

While establishing goals and objectives, and before initiating detailed programming, a first approximation level of analysis is necessary to provide a background familiarity with the site. The preliminary analysis for the Lily Lake Forest Recreational Environ study was done through air photo interpretation of landforms within the site.[1]

Landforms are identified by studying the following characteristics: topography, drainage pattern, erosion gullies, photo tone, and vegetation under the stereoscope. An example using these characteristics to define wetlands and organic deposits follows.

a. Topography - the topography is flat and is lower than its surroundings.

b. Drainage - no drainage pattern exists since these areas are poorly drained.

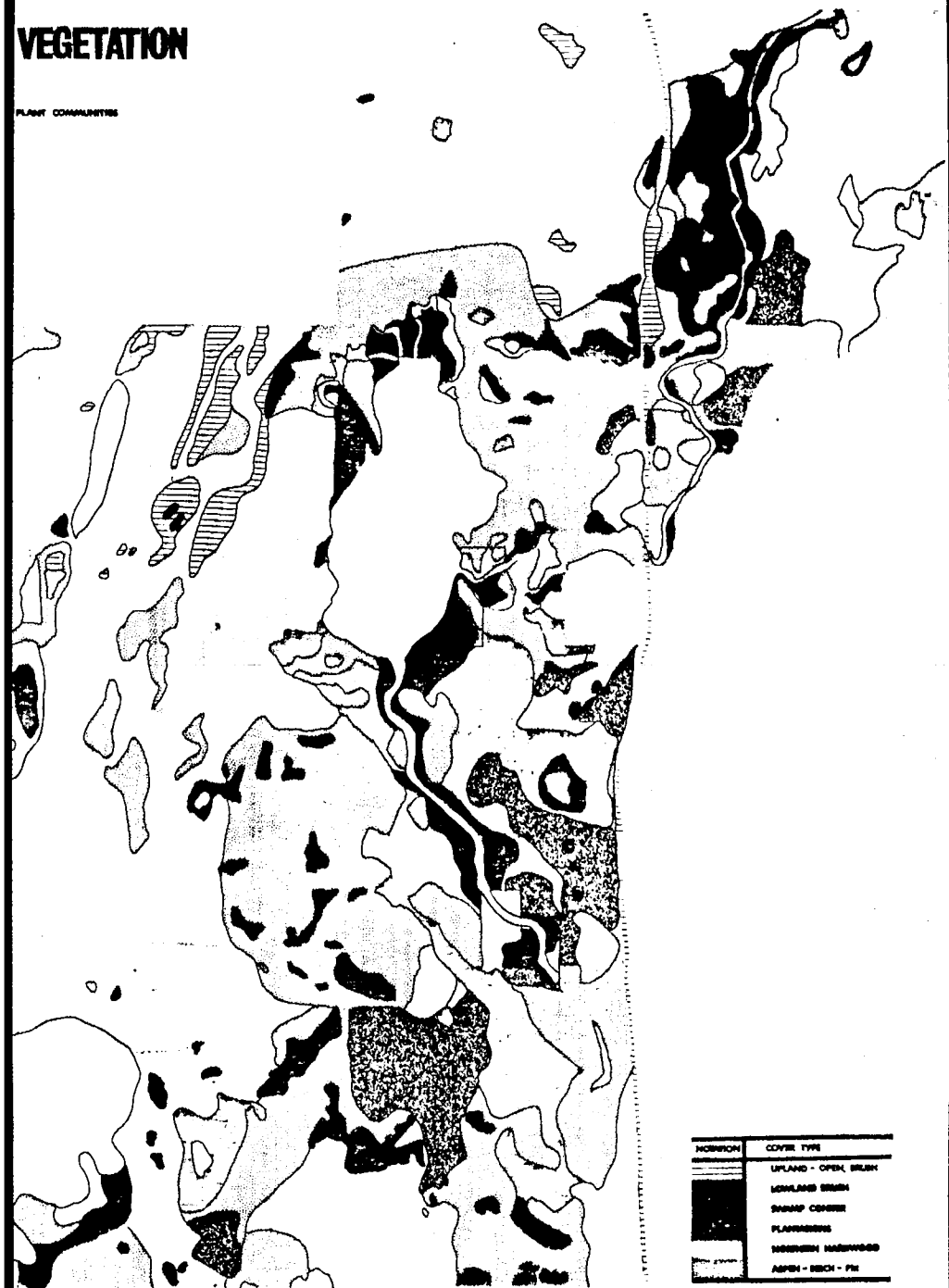
c. Erosion gullies - none.

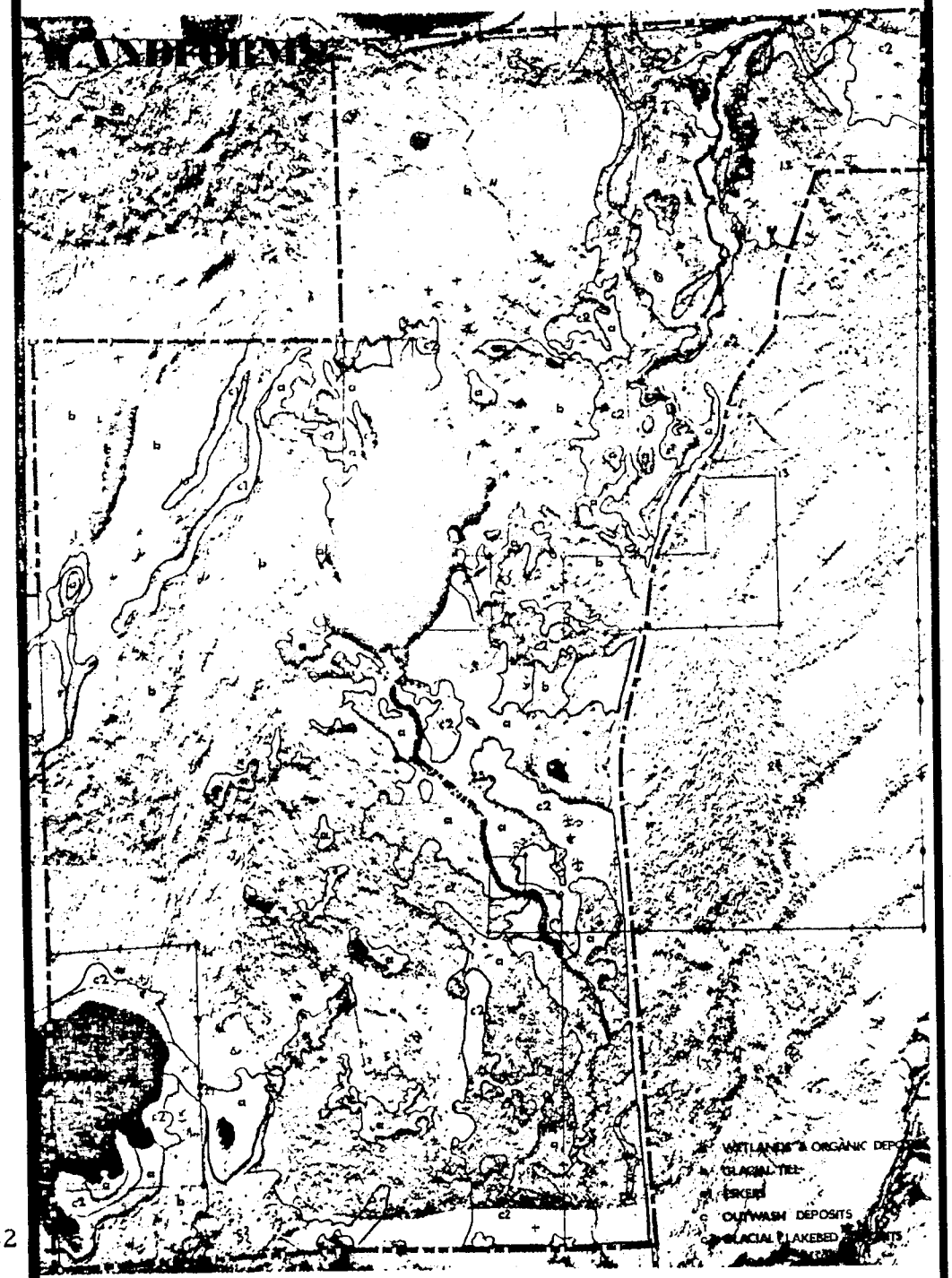
---

[1]Inas Aref Fahmy, "Air Photo Interpretation of Landscape Units for Recreational Development," Spring, 1970. (Term paper.)

VEGETATION

PLANT COMMUNITIES




WETLANDS & ORGANIC DEPOSITS
GLACIAL TILL
ESKER
OUTWASH DEPOSITS
GLACIAL LAKEBED

d. Photo tone - generally tends to be dark.

e. Vegetation - with wet, poorly-drained bogs and swamps, there are some existing water tolerant species. The conditions in the lowland brush type varies from sedge meadows to sphagnum-leatherleaf bog to tag alder flats. The succession trend is towards a tamarack-spruce type on the deeper and wetter organic areas and towards a swamp hardwood complex on the shallower areas.

Similarly, the following landforms were identified within the site.

a. Wetlands and organic deposits
b. Glacial till (primarily ground moraine)
c. Stratified drift
   (1) Eskers
   (2) Outwash deposits
   (3) Glacial lakebed deposits

The distribution of these landforms is portrayed in the map on page 62 .

By comparing the characteristics of each landform to the requirements of recreational housing--suitability for roads, foundations, septic systems--a preliminary evaluation of the site limitations can be prepared.[2] After performing the analysis for the

---

[2]The same air photo interpretation technique could be used for the selection of a project site from a very large acreage of land.

site, the following conclusions regarding the suitability for development of each of the landforms were reached:

a Wetlands and organic deposits. Due to the soil and water-table characteristics, this landform is unsuitable for development.

b Glacial till. This landform is generally suitable for development with the exception of the steeper slopes of its hummocky-type topography, and the few small poorly-drained depressions.

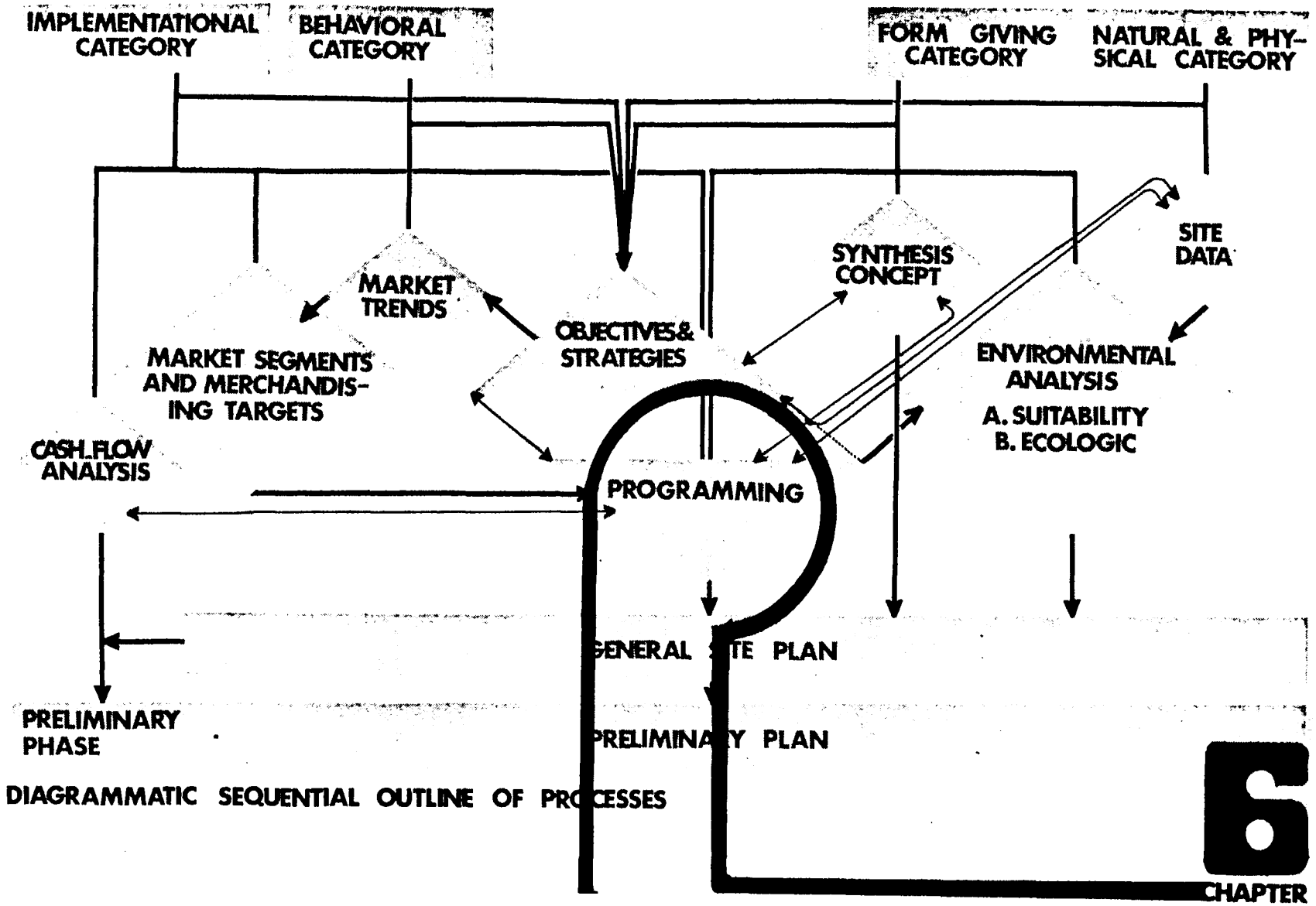
c1 Eskers. These long narrow ridges impose severe limitations due to the problems of accessibility and sewage waste-disposal problems.

c2 Outwash deposits. This landform generally poses slight limitations for development with its relatively gentle topography. However, since there is sometimes danger of contaminating ground water, the suitability rating of this landform hinges on the water table information.

c3 Glacial lakebed deposits. Although generally flat, this landform unit imposes very severe limitations to development because of its high seasonal water table and its silty clay soil characteristic.

This preliminary analysis forms a sufficient basis for establishing the program discussed in the following chapter. The Environmental Analysis, discussed in Chapter 7, adds the detail needed in the later design stages.

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

PROGRAMMING 6

6.1 PROJECT PHYSICAL COMPONENTS

This chapter defines the last level of the programming hierarchy of the design process, the specific project physical components. These components, chosen to satisfy market requirements and to recognize the limitations of the natural resource, are listed below:

A. Housing:

- Chalet clusters (condominium)
- Chalet lots (1/2 acre and 1-acre lots)
- Trailer lots (1/2 acre and 1-acre lots)

B. Recreation:

- Club house (community and indoor activity center)
- Multi-use structures (snowmobile hut, bath house, picnic shelter)
- Stable
- Tennis/basketball courts
- Football/baseball fields
- Picnic areas
- Childrens' playgrounds

B. Recreation (Continued)

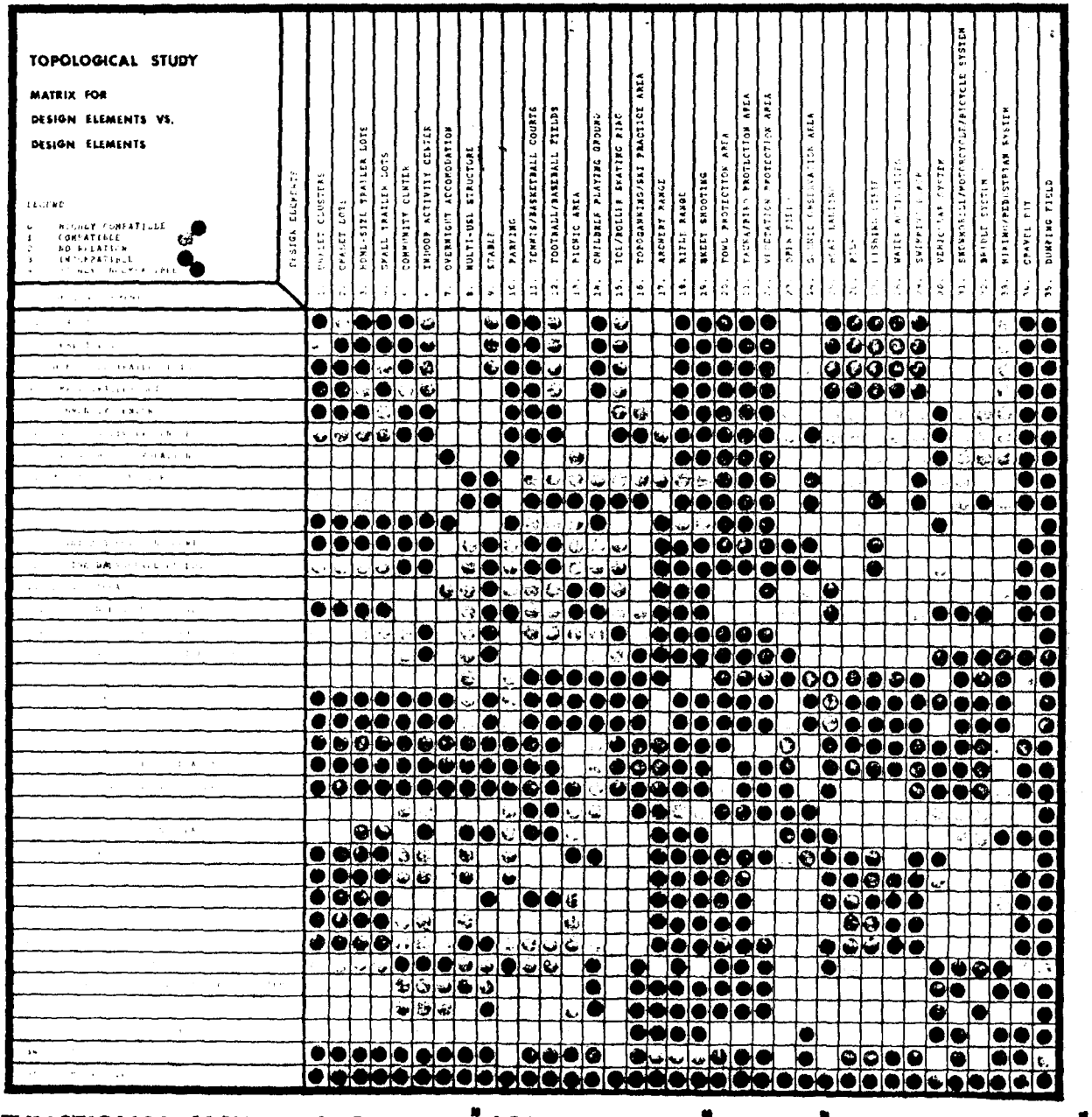
Ice skating rink
Tobogganing slope
Archery range
Wild fowl protection areas
Fauna/bird protection areas
Vegetation protection areas
Scenic observation areas
Boat landing
Piers
Fishing areas
Water activities (primarily boating)
Swimming beaches
Snowmobile trails
Bridle trails
Hiking and ecological trails

The one physical component that was not included is the camper lot. While this component satisfied a defined segment of the market, the demand of the cash flow analysis for the large number of low-cost units conflicted strongly with the limited carrying capacity of the site. The decision of the design team was to exclude this component from the program.

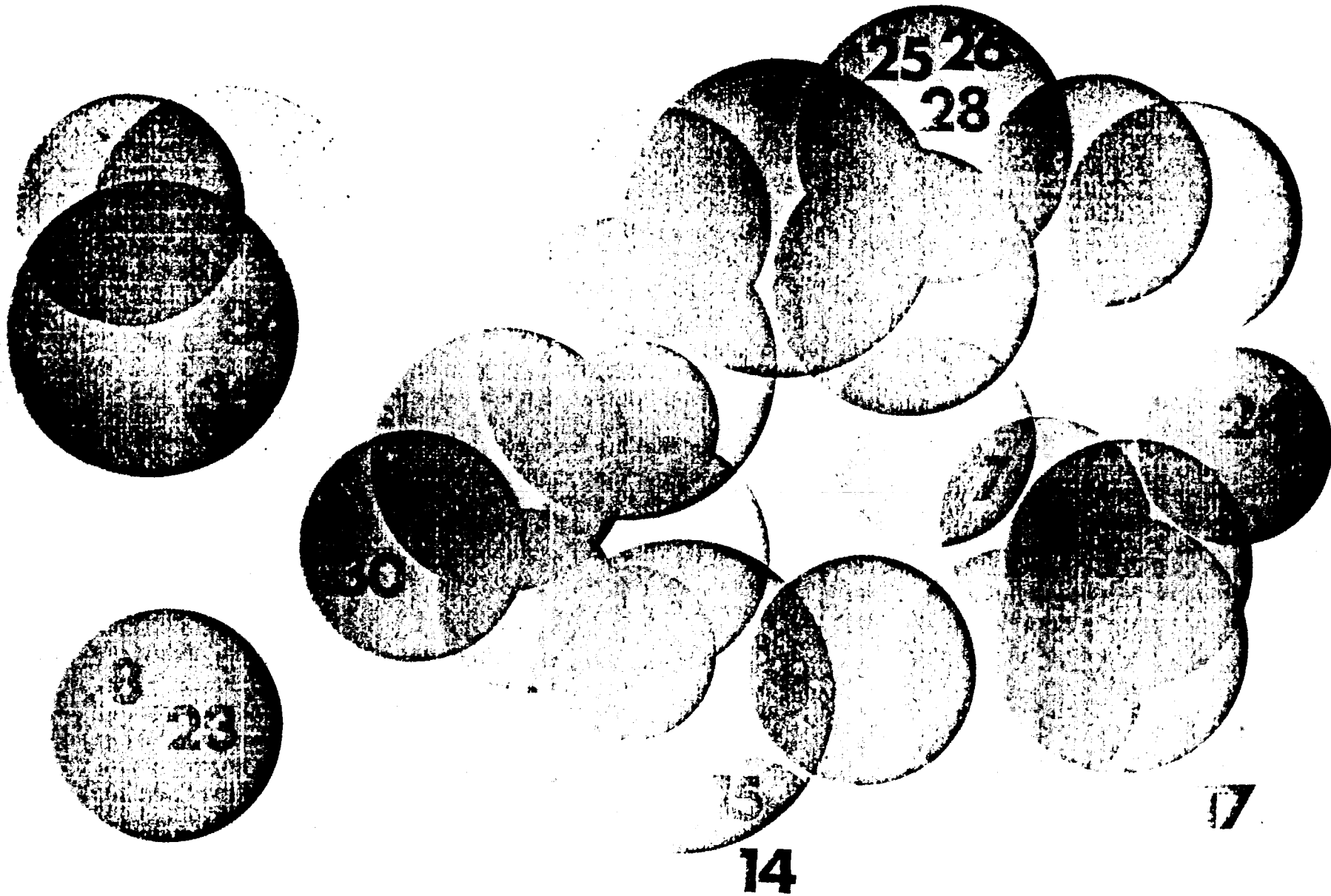
6.2 FUNCTIONAL ANALYSIS

Every design problem has a structure of its own--a structure of functional relationships among physical components. Good design depends on the designer's ability to accurately define this structure and let it govern the design process. One or two components cannot be considered out of the context of the problem's structure of relationships. The key to any design problem structure is the arrangement of "links" (functional relationships) among the project components. In the Lily Lake Forest Recreational Environ, the functional relationships among the project physical components stated earlier, were listed in a matrix format and classified in five ranges of value from compatible to incompatible. Copies of the matrix were completed by various members on the multidisciplinary team to avoid particular professional bias. A final cumulative matrix--which is shown on page 68 --was then developed.

The array of interactions between the various individual physical components in the matrix exhibit the compatibilities and incompatibilities among these physical components. By successive comparison of each pair of components, one can find the groups of "compatibles," or "incompatibles," and their areas of overlap. This process defines the problem's structure. Such a process is far too complex to be grasped "by eye," but the computer has the capacity to explore the relations in the matrix very quickly and systematically according to the prescribed rules of "cluster analysis." The cluster analysis for this project used as input the relationships in the final cumulative matrix completed by the multidisciplinary team. The product of this analysis is graphically



FUNCTIONAL MATRIX SHOWING "COMPATIBILITIES" AND "INCOMPATIBILITIES" AMONG PROJECT PHYSICAL COMPONENTS



THE FUNCTIONAL DIAGRAM.

LILY LAKE FOREST RECREATIONAL ENVIRON PHYSICAL COMPONENTS

1. CHALET CLUSTERS
2. CHALET LOTS
3. HOME-SIZE TRAILER LOTS
4. SMALL TRAILER LOTS
5. COMMUNITY CENTER
6. INDOOR ACTIVITY CENTER
7. OVERNIGHT ACCOMODATION *
8. MULTI-USE STRUCTURE
9. STABLE
10. PARKING
11. TENNIS/BASKETBALL COURTS
12. FOOTBALL/BASEBALL FIELDS
13. PICNIC AREA
14. CHILDREN PLAYING GROUND
15. ICE/ROLLER SKATING RING
16. TOBOGANNING/SKI PRACTICE AREA
17. ARCHERY RANGE
18. RIFLE RANGE *
19. SKEET SHOOTING *
20. FOWL PROTECTION AREA
21. FAUNA/BIRD PROTECTION AREA
22. VEGETATION PROTECTION AREA
23. OPEN FIELD
24. SCENIC OBSERVATION AREA
25. BOAT LANDING
26. PIER
27. FISHING AREA
28. WATER ACTIVITIES
29. SWIMMING BEACH
30. VEHICULAR SYSTEM
31. SNOWMOBILE/MOTORCYCLE/BICYCLE SYSTEM
32. BRIDLE SYSTEM
33. HIKING/PEDESTRIAN SYSTEM
34. GRAVEL PIT *
35. DUMPING FIELD *

* THESE PROJECT PHYSICAL COMPONENTS WERE NOT INCLUDED IN THE FINAL PROGRAM .

portrayed in the functional diagram shown on page 70 , defining the problem's structure.

The functional diagram is one of three determinants in locating the physical components of the Lily Lake Forest Recreational Environ on the 3,600 acre site. The suitability analysis and ecologic analysis are the two other determinants used in the final locational decisions. These two analyses will be discussed in the following chapter, Environmental Analysis.

6.3 CARRYING CAPACITY

The functional diagram portrays the structure of the problem as abstracted from the relationships among the project physical components. These components were defined in the programming process to fulfill the requirements identified in the market trends analysis, market segments and merchandising targets, and the specific goals and objectives set for the Lily Lake Forest Recreational Environ.

The analyses described above establish a strong basis for understanding the project's requirements for human use. But, increasing human use beyond a certain level causes escalating human impact which adversely affect the environmental quality of the natural resource--ultimately impairing human enjoyment. It is necessary to find that level of human occupancy (carrying capacity) beyond which the natural resource can no longer sustain human use without deterioration. The following is an exploratory effort to find the carrying capacity of the project site. It should be viewed as an exploratory study and not as a finished procedure.

In calculating the carrying capacity of a natural resource, surface water represents a logical point of departure. Because the surface water is finite in area, it is especially vulnerable to environmental damage and its use is naturally more limited than the surrounding lands. In a project where the use of surface water is of primary importance, it could be assumed that the carrying capacity of the total site is primarily determined by that of the available surface water. In computing the carrying capacity, the following steps were followed:

1. The water bodies and their characteristics -- surface area, maximum depth, and beach lengths, widths and slopes--were inventoried.

2. A wide range of water-oriented recreational space standards[1] was surveyed, i.e., x acres per rowboat, y linear feet of suitable shore per fisherman, z square feet of beach per swimmer, etc. Since each water-oriented recreational activity was given different standards by different agencies, a "final" standard was agreed upon for each activity.

---

[1]Most of these data are contained in the publication Outdoor Recreation Space Standards, Bureau of Outdoor Recreation, April, 1967, available from the U. S. Government Printing Office. Also, C. W. Threinen, "An Analysis of Space Demands for Water and Shore," an article reprinted from transactions of the 29th North American Wildlife and Natural Resources Conference, 1964, Wisconsin Conservation Department, Madison, Wisconsin.

3. By multiplying the appropriate use factor (standard) by the related physical characteristic--e.g., water surface area for boating, length of suitable shoreline for fishing, area of beach for swimming, etc. --a single use capacity for the project site was established assuming the water resource would be utilized by one use (activity) at a time.

4. Since the water resource is utilized by many uses simultaneously, the question of how the resource can be utilized by the maximum number of uses in the widest diversity of uses (combined use) becomes most important. To find an answer, the following elements were studied:

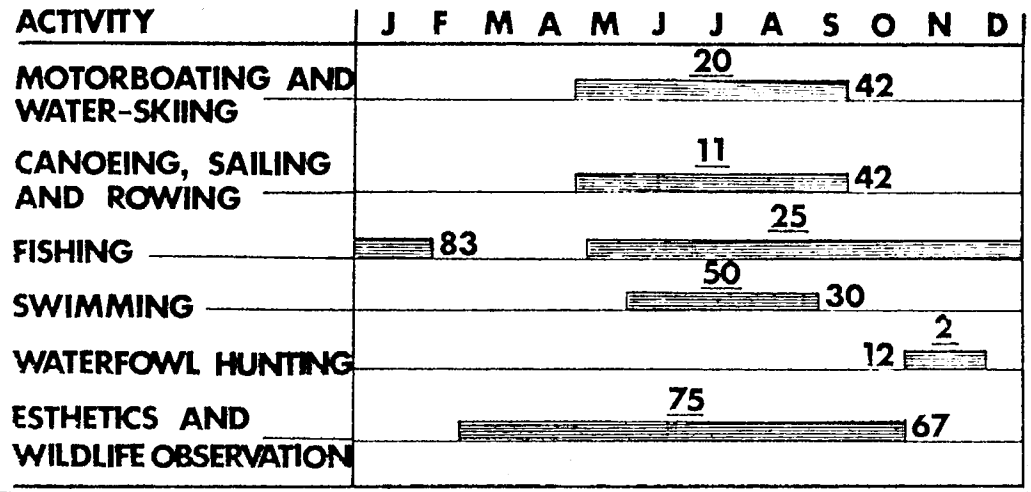
   a. Participating Rates. To define the user preferences for the various uses (activities)--e.g., 50 percent participation rate for swimming, 67 percent for ecologic and wildlife observation trails, 2 percent for waterfowl hunting, etc.

   b. Use Cycles. To find the most satisfactory and efficient pattern of use of the water resource during the course of the day--e.g., fishing, early morning; swimming, mid-morning; canoeing in the afternoon, etc.

   c. Seasonal Characteristics. To find the seasonal nature and duration of the various uses--e.g., fishing during 83 percent of the year, waterfowl hunting during 12 percent of the year in the late fall, swimming during 30 percent of the year in mid-summer, etc. Diagram A on page 73 portrays the combination of the participation rates and the seasonal characteristics in one graph.

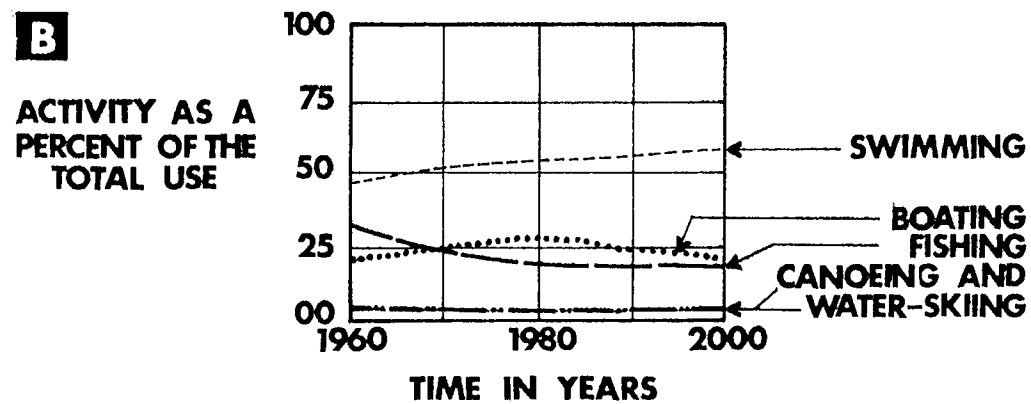
A

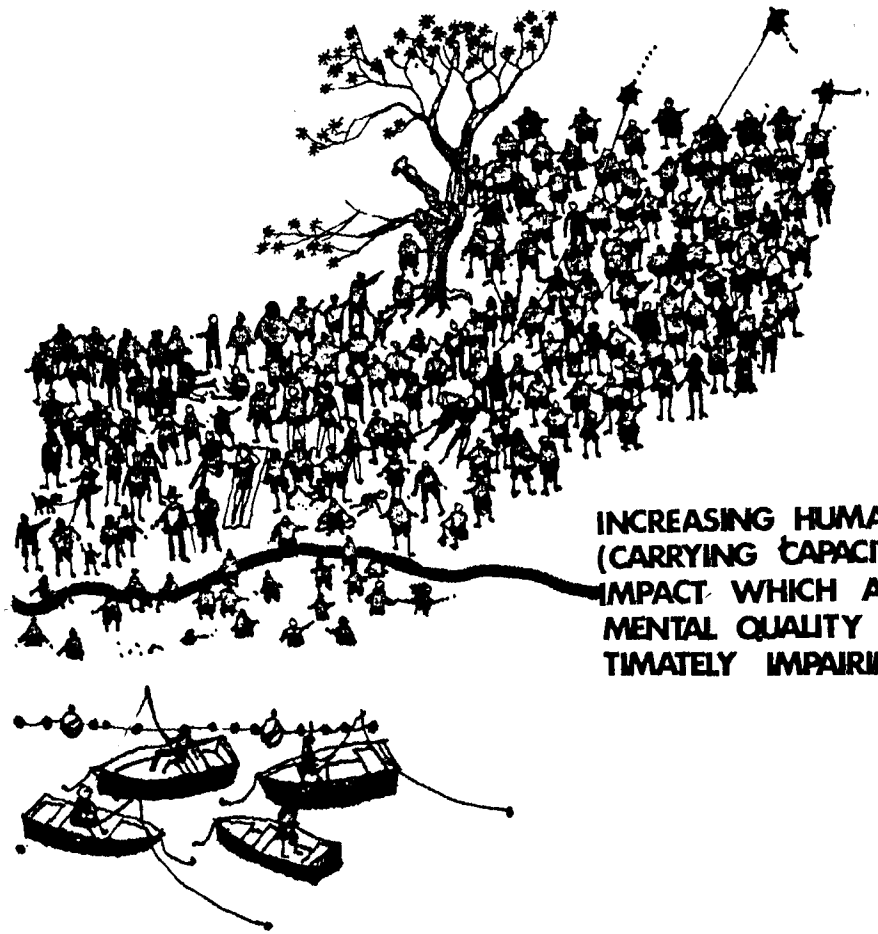
USE ACTIVITIES BY DEGREE AND INTENSITY OF PARTICIPATION



DEGREE = % OF TOTAL POPULATION, INDICATED AS 20
INTENSITY = % OF YEAR, INDICATED AS ▬ 42

B





INCREASING HUMAN USE BEYOND A CERTAIN LEVEL (CARRYING CAPACITY) CAUSES ESCALATING HUMAN IMPACT WHICH ADVERSELY AFFECT THE ENVIRONMENTAL QUALITY OF THE NATURAL RESOURCE ULTIMATELY IMPAIRING HUMAN ENJOMENT .

d. Activity Trends. To define the right "combined use" for the future as well as the present since some activities are expected to decline in demand while others increase. Diagram B on page 73 portrays such trends according to the data included in the Wisconsin Statewide Outdoor Recreation Plan (1966).

By defining the combination of activities--including the percent of water resource they occupy and the sequence and duration of such occupancy--and by multiplying the result by the recreational space standards, a carrying capacity for the water resource can be calculated.

5. To compute the site carrying capacity from the water resource carrying capacity, the following elements were studied:

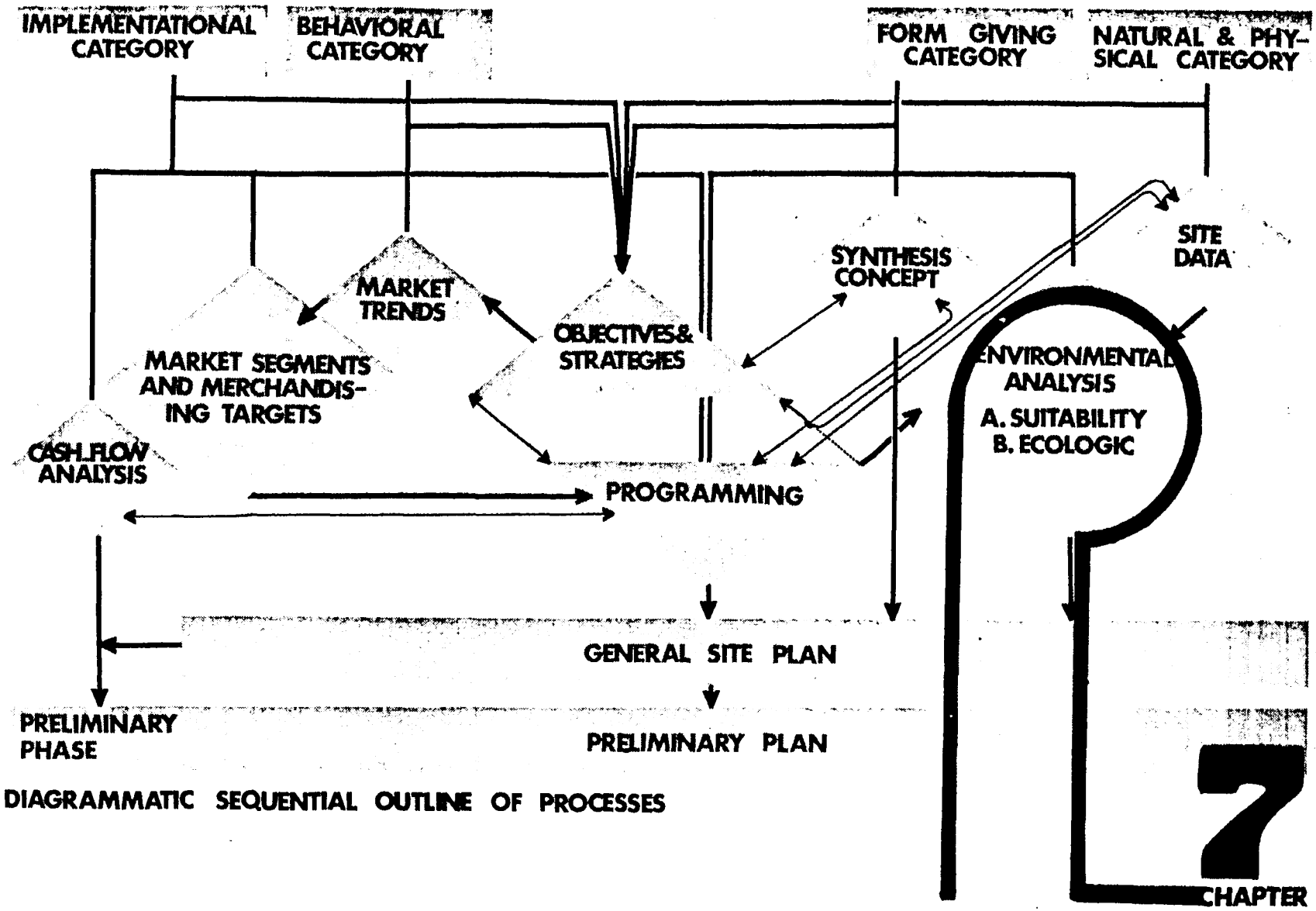
a. Occupancy Factors. Since the pattern of use of the site is cyclic, peaking on a few summer weekends--especially holiday weekends--the average use of the water resource carrying capacity should be considered to be slightly below the absolute peak capacity.

b. Diversionary Tactics. The non-water resource physical components--e.g., ecologic trails, swimming pools, etc.--could be emphasized to diffuse the recreational use over both water and land. Such a tactic could decrease the concentration of users on the water resource with the consequent increase in the carrying capacity of the total site.

6. By dividing the carrying capacity of the total site by the average family size, the number of recreational housing units--chalet lots, trailer lots, and condominium units--was determined. This figure represents the maximum human occupancy level at which the natural resource can sustain human use without deterioration. The total number of housing units generated in this carrying capacity analysis was considered only as a guide to the cash flow discussed in Chapter 10 because of the exploratory nature of this analysis.

Determining the use capacity is only a small part of analyzing the natural resource. The remainder of that analysis is discussed in the following chapter.

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

CHAPTER 7

ENVIRONMENTAL ANALYSIS 7

7.1 A LANDSCAPE IS BECAUSE

In order to design any human development in such a way that it does not disrupt the natural resource, the elements of the natural system must be understood.

The GEOLOGY of a landscape results from complex geologic forces working on the earth's crust in different ways at different times. The same forces together with CLIMATE produce TOPOGRAPHY. An understanding of climate and geology can help to interpret the current configuration of a landscape and its SOILS. Soils, topography, climate and geology are intimately interrelated. Geology and soils, topography and climate produce the WATER REGIMEN, the pattern and distribution of rivers and aquifers. Together, these five elements determine the PLANT and WILDLIFE ECOLOGY of that landscape, i.e., the distribution, quantity and quality of constituent plant communities and wildlife habitats in a landscape.

The interrelationships of these subsystems maintain the balance of the natural milieu. Man cannot overtax one of these subsystems except at a cost to the others and to the total system--man's environment. Overtaxing is not only an economic question due to the lack of environmental motivation in the market mechanism (although price is a function of quality, especially in recreational development), overtaxing is also a result of the lack of proper environmental analysis in the design method, and thus, the lack of better alternatives in the final produce. To the first "lack" we devote this chapter, and to the second "lack" we devote the following chapter on the synthesis concept.

7.2 THE BASIC PREMISE

The basic premise employed in the "Environmental Analysis" process is that each area in a landscape has an intrinsic suitability for certain land uses or, in other words, that the characteristics of the natural subsystem--geology, topography, climate, water regimen and plant and wildlife ecology--in a specific area match the requirements for a specific land use (or a specific physical component of a project). There could be different degrees of matching, or suitability, of the characteristics measured against the requirements.

For example, one can measure site characteristics against the following list of requirements for septic waste disposal systems:[1]

1. Depth to bedrock or other impervious layers should exceed 6 feet to provide sufficient depth for adequate leaching of effluents.

2. Soils should have moderate to slow-moderate permeability for proper leaching of effluents.

3. Slopes should not exceed 12 percent to avoid possible flow of effluent to the surface at lower points.

---

[1] Requirements for septic waste disposal systems are available from state and local sanitary codes. The requirements in the Lily Lake Forest Recreational Environ exceeds such codes.

4. Depth to water table should exceed 10 feet to avoid pollution of ground water.

A single-use suitability map for locating septic waste disposal systems can then be developed portraying graphically the different degrees of suitability, ranging from the best suited to the completely unsuitable portions of the site, as shown on page 88.

As in the septic systems example, requirements of a certain use are often related to the characteristics of only four of the six natural subsystems--geology, soils, topography and the water regimen--since these characteristics are the essential "locational determinants" of that use. However, plants and wildlife ecology are as essential, though indirectly. For example, the location of a picnic area can fulfill all the requirements in terms of geology and soils, topography and the water regimen, but if this area happens to have a plant community that is vulnerable to impact due to soil compaction or change in humidity, the future quality of human experience in such an environment deteriorates and the inherent value and use of that area are destroyed.

To consider all the natural subsystems, the environmental analysis process is divided in two sections, the suitability analysis and the ecological analysis. The sixth natural subsystem--climate, is considered later in the final design phase rather than in the preliminary design phase. The following is a description of the suitability and ecological analyses as performed in the Lily Lake Forest Recreational Environ.

A. SUITABILITY ANALYSIS

7.3 SINGLE - USE AND GROUP SUITABILITY MAPS

A "single-use suitability" map can be developed by comparing the requirements of one use (physical components) to the characteristics of the site in terms of geology and soils, topography, and the water regimen, as explained in the septic system example on page 88. A single-use (component) suitability map can be developed for most of the thirty some physical components in the Lily Lake Forest Recreational Environ. But since some components have very similar requirements, this is not necessary. Instead, a group-use suitability map can be developed for each group of components with similar requirements.

To define such groups a list of characteristics (locational determinants) for the three natural subsystems--geology and soils, topography, and the water regimen, was accumulated. A partial list follows as an example:

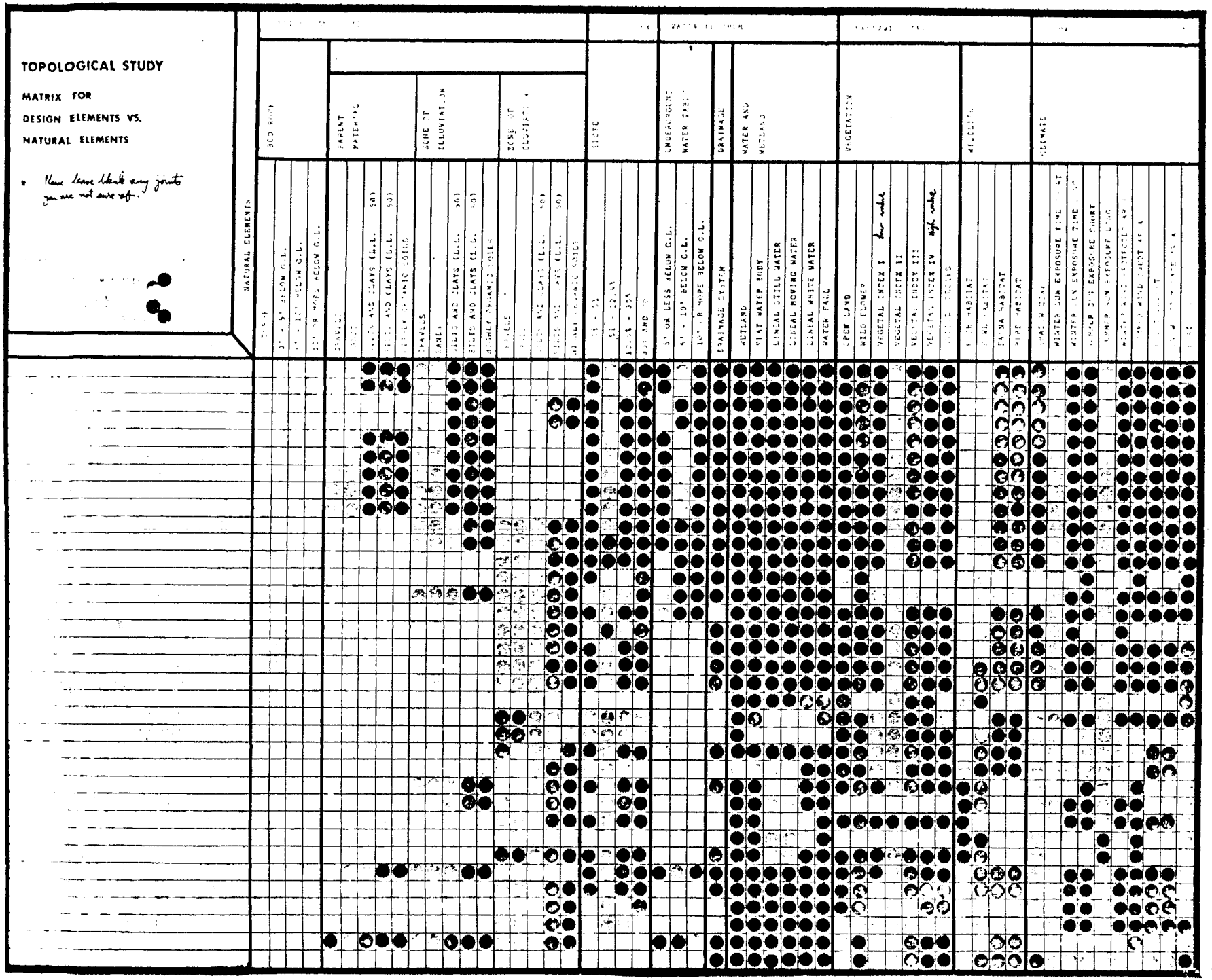
Geology:	Bedrock	Rock outcrop
		Bedrock below 6 feet from surface
		Bedrock above 6 feet from surface
Water Regimen:	Water table	Water table below 10 feet from surface
		Water table above 10 feet from surface

A matrix for the relationships between the physical components of the development and the natural characteristics was completed--measured in five ranges from compatible to incompatible. Different individuals on the multidisciplinary team completed different parts of the matrix shown on the following page. A computer cluster analysis, similar to the one performed in the programming process (page 65), was used to cluster the physical components of the development into six groups, as the diagram on page 84 shows. Each group is composed of a number of physical components that have similar requirements.

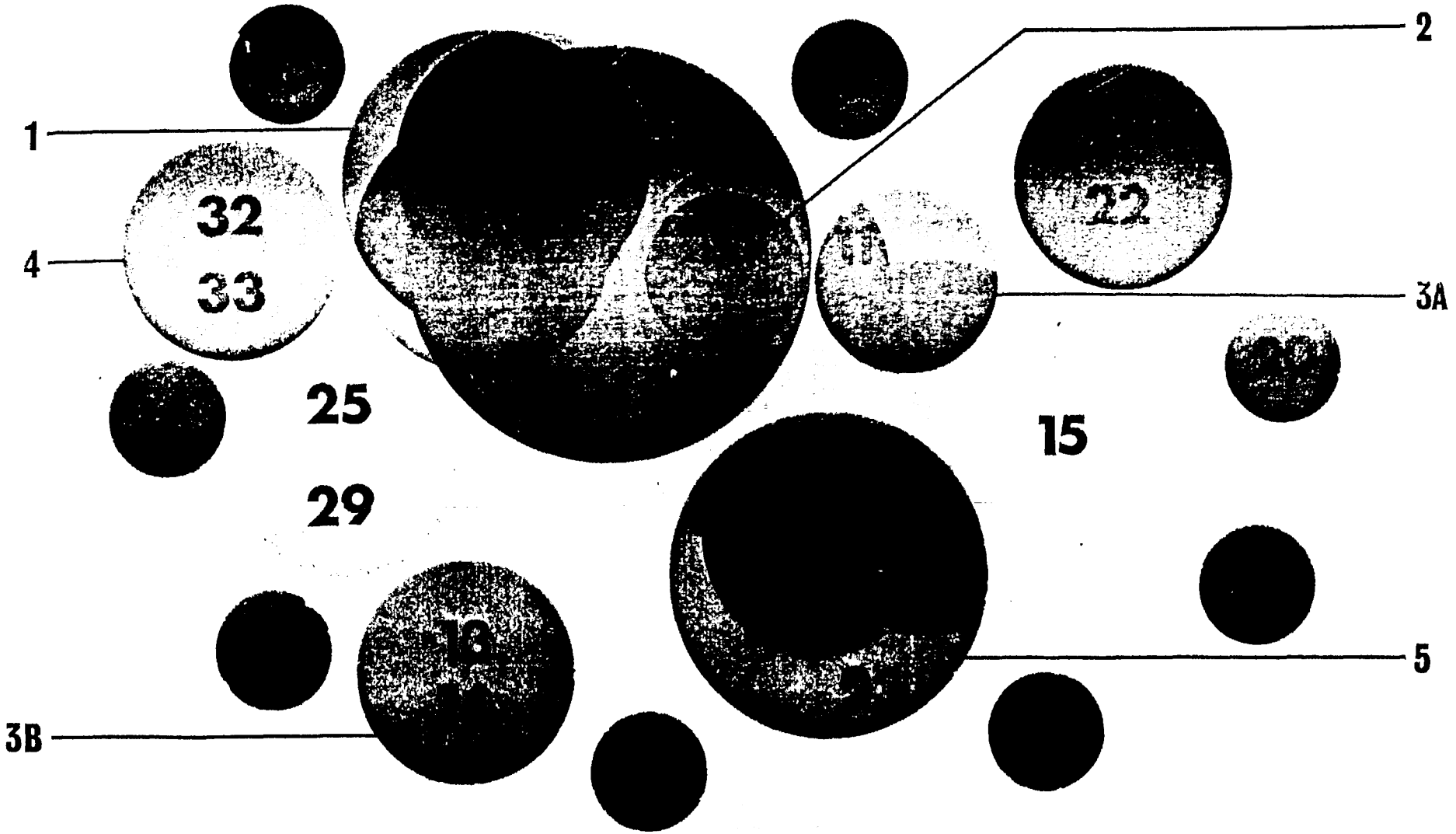
7.4 CATAGORY AND TOTAL SUITABILITY MAPS

A "group-suitability" map can be developed for each of the six groups. Different combinations of these group-suitability maps can be added together by superimposition to show category suitabilities--i.e., residential, recreational, etc., which in turn can be added to show the "total" suitability of the site for the different physical components of the development. Since certain areas will lend themselves to multiple, coexisting land uses, a system of evaluation must be created to provide guidelines for decisions on locational priorities.

The following is a step-by-step explanation of the mechanics of developing the total suitability map for the site of the Lily Lake Recreational Environ. To easily follow the explanation, unfold the diagram on page 95 and refer to it while turning the pages and reading the explanation or studying the suitability maps.



SUITABILITY MATRIX SHOWING "COMPATIBILITIES" AND "INCOMPATIBILITIES" BETWEEN PROJECT PHYSICAL COMPONENTS AND BETWEEN NATURAL CHARACTERISTICS



THE SUITABILITY GROUPING DIAGRAM

LILY LAKE FOREST RECREATIONAL ENVIRON PHYSICAL COMPONENTS

1. CHALET CLUSTERS
2. CHALET LOTS
3. HOME-SIZE TRAILER LOTS
4. SMALL TRAILER LOTS
5. COMMUNITY CENTER
6. INDOOR ACTIVITY CENTER
7. OVERNIGHT ACCOMODATION ✳
8. MULTI-USE STRUCTURE
9. STABLE
10. PARKING
11. TENNIS/BASKETBALL COURTS
12. FOOTBALL/BASEBALL FIELDS
13. PICNIC AREA
14. CHILDREN PLAYING GROUND
15. ICE/ROLLER SKATING RING
16. TOBOGANNING/SKI PRACTICE AREA
17. ARCHERY RANGE
18. RIFLE RANGE ✳
19. SKEET SHOOTING ✳
20. FOWL PROTECTION AREA
21. FAUNA/BIRD PROTECTION AREA
22. VEGETATION PROTECTION AREA
23. OPEN FIELD
24. SCENIC OBSERVATION AREA
25. BOAT LANDING
26. PIER
27. FISHING AREA
28. WATER ACTIVITIES
29. SWIMMING BEACH
30. VEHICULAR SYSTEM
31. SNOWMOBILE/MOTORCYCLE/BICYCLE SYSTEM
32. BRIDLE SYSTEM
33. HIKING/PEDESTRIAN SYSTEM
34. GRAVEL PIT ✳
35. DUMPING FIELD ✳

✳ **THESE PROJECT PHYSICAL COMPONENTS WERE NOT INCLUDED IN THE FINAL PROGRAM .**

7.5 "LILY LAKE FOREST RECREATIONAL ENVIRON" SUITABILITY ANALYSIS

1. The development of the following maps is essentially similar to the process of developing the "single-use" suitability map for septic waste disposal explained on page 78.
   A. A suitability map for the group 1 components which includes the housing lots and condominium structures.
   B. A suitability map for the group 2 components which includes the trailer home lots. (Page 87)

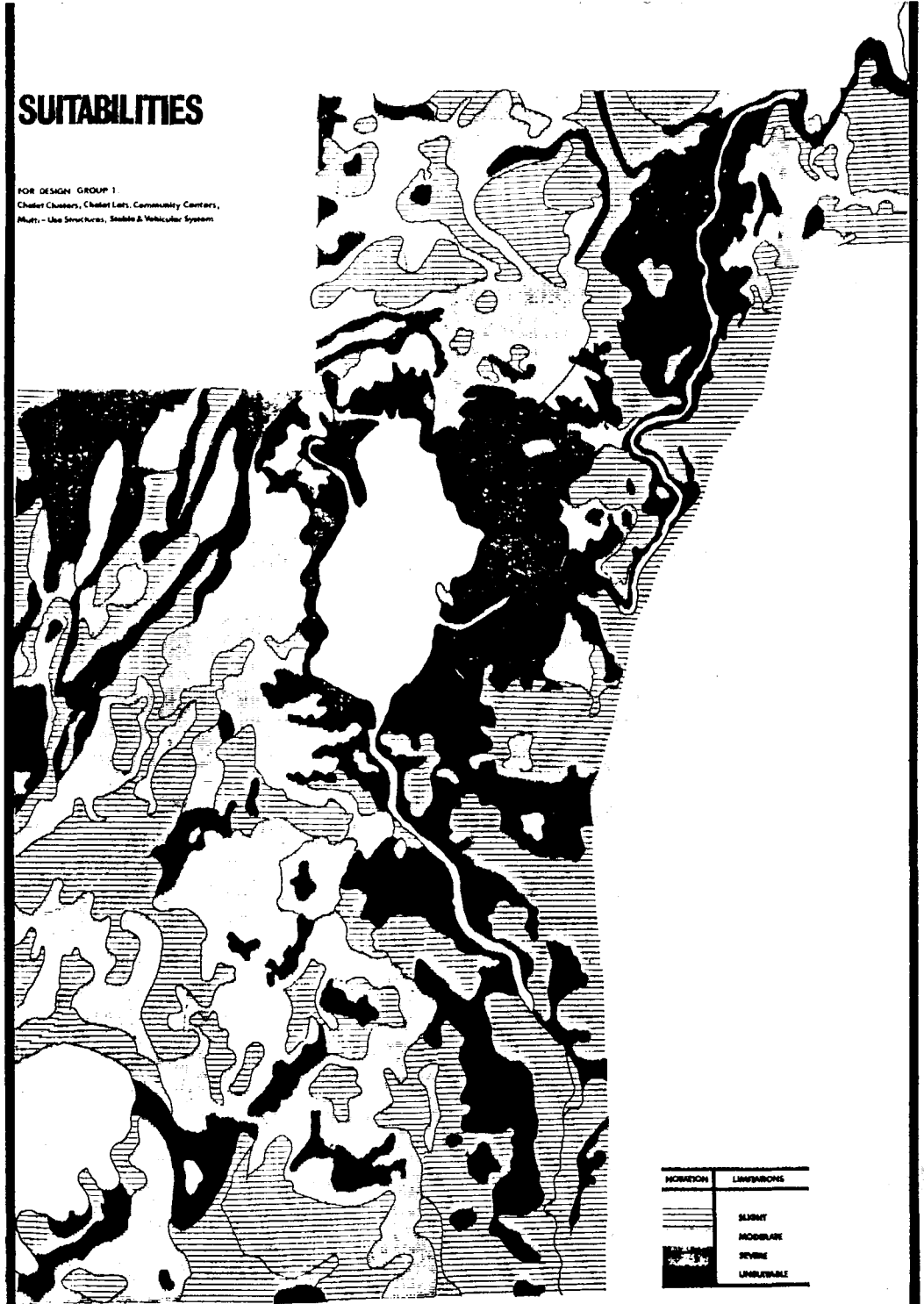
2. By superimposition, the following maps were developed:
   A. A suitability map for housing lots and condominiums with septic systems by adding map 1A to the septic systems suitability map on page 88. (Page 89)
   B. A suitability map for trailer home lots with septic systems by adding map 1B to the septic systems suitability map. (Page 90)

3. By adding map 2A to 2B, a suitability map for the recreational housing category in the Lily Lake Forest Recreational Environ resulted. (Page 91)

4. As in the first step, "group-suitability" maps were developed for group 3A--tennis and basketball courts, and football-baseball fields; group 3B--picnic areas, and children's playgrounds; group 4--bridle trail system, and hiking and pedestrian system; and, group 5--archery range and snowmobile trails.

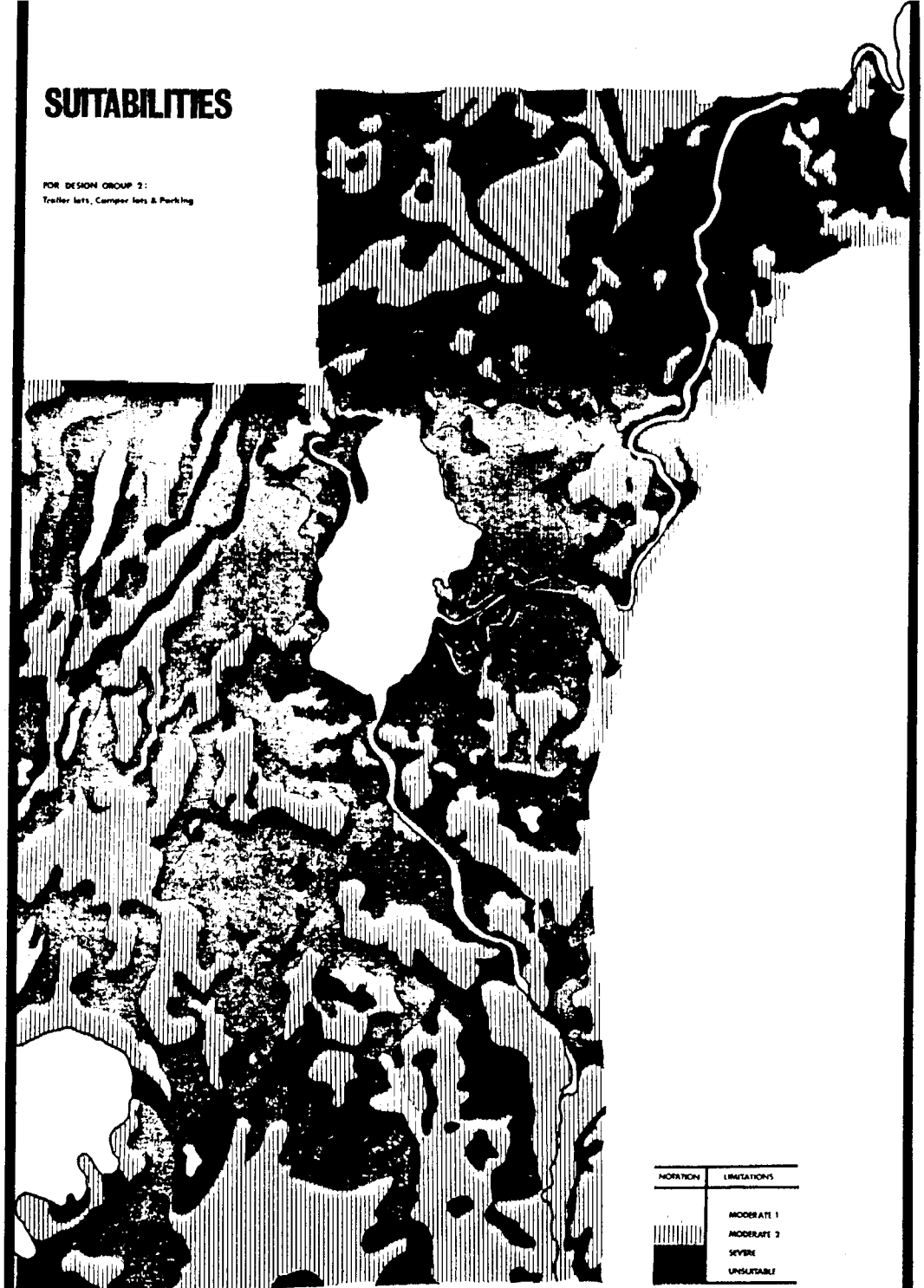
SUITABILITIES

FOR DESIGN GROUP 1
Chalet Chasers, Chalet Lets, Community Centers,
Multi - Use Structures, Stables & Vehicular System



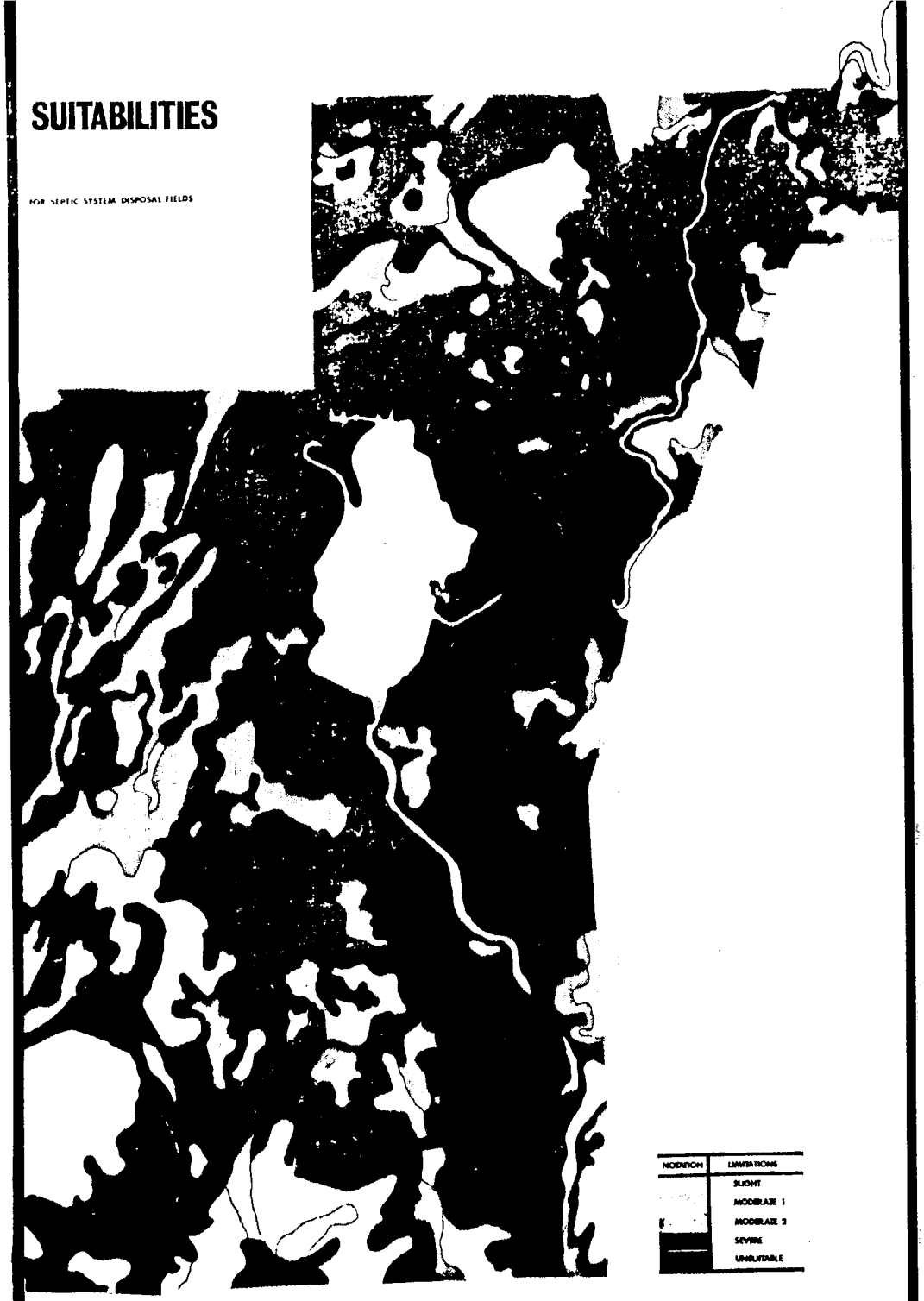
SUITABILITIES

FOR DESIGN GROUP 2:
Trailer lots, Camper lots & Parking



SUITABILITIES

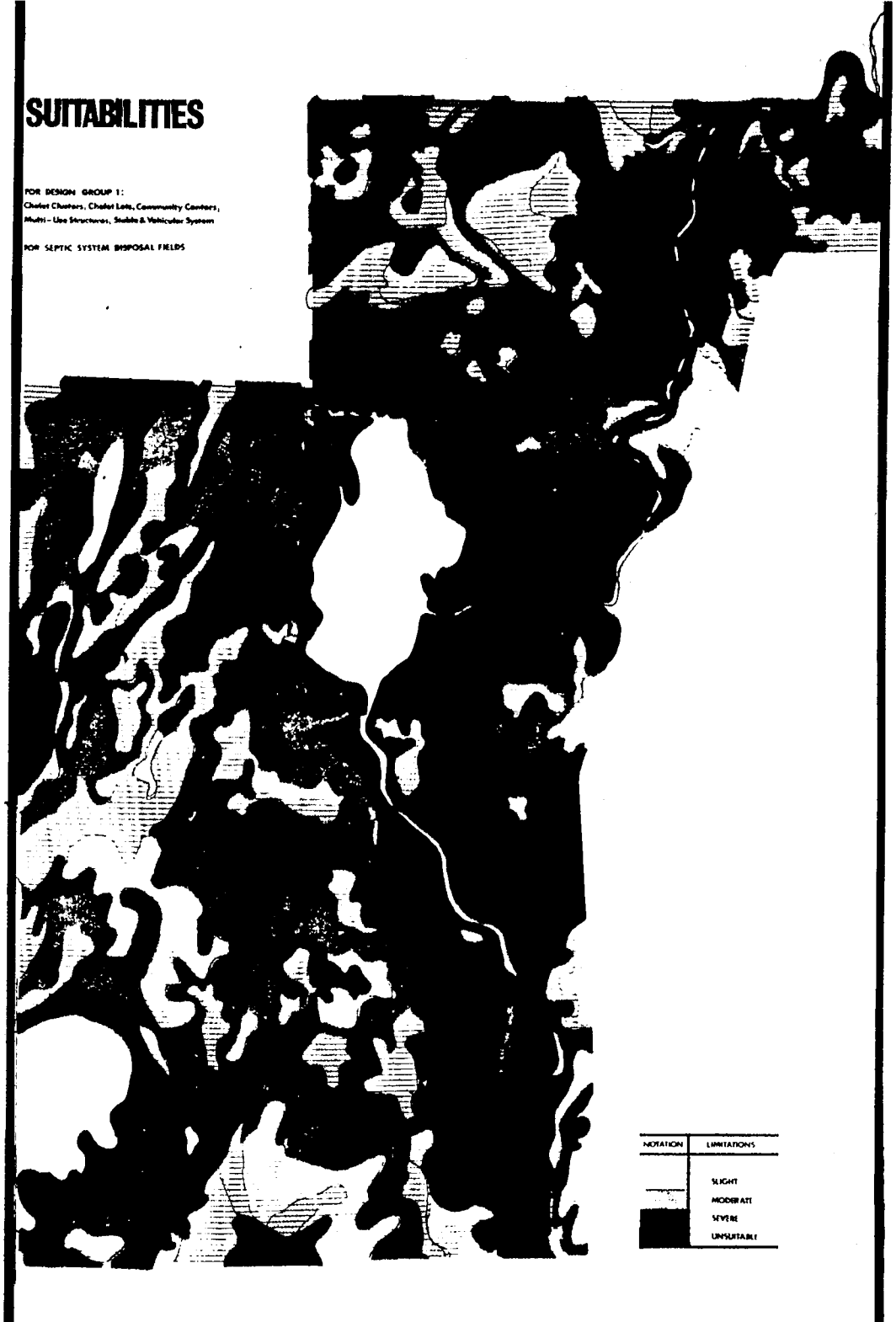
FOR SEPTIC SYSTEM DISPOSAL FIELDS



SUITABILITIES

FOR DESIGN GROUP 1:
Chalet Clusters, Chalet Lots, Community Centers,
Multi - Use Structures, Stables & Vehicular System

FOR SEPTIC SYSTEM DISPOSAL FIELDS



SUITABILITIES

FOR DESIGN GROUP 2
Trailer Lots, Camper Lots & Parking

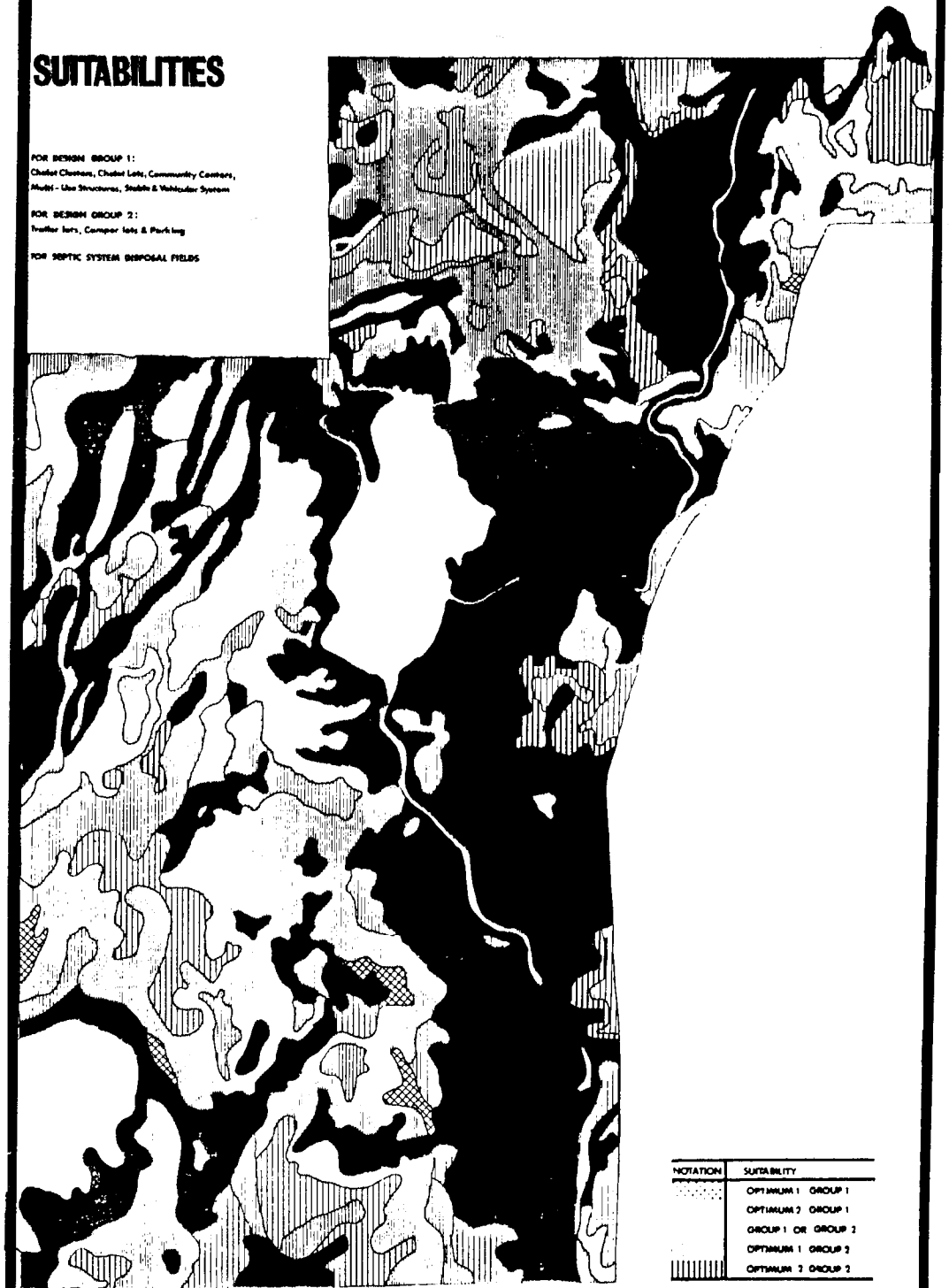
FOR SEPTIC SYSTEM DISPOSAL FIELDS

SUITABILITIES

FOR DESIGN GROUP 1:
Chalet Clusters, Chalet Lots, Community Centers,
Multi - Use Structures, Stables & Vehicular Systems

FOR DESIGN GROUP 2:
Trailer Lots, Campsite Lots & Parking

FOR SEPTIC SYSTEM DISPOSAL FIELDS



NOTATION	SUITABILITY
	OPTIMUM 1 GROUP 1
	OPTIMUM 2 GROUP 1
	GROUP 1 OR GROUP 2
	OPTIMUM 1 GROUP 2
	OPTIMUM 2 GROUP 2

5. By combining these four "group-suitability" maps, a suitability map for the recreational activities category in the Lily Lake Forest Recreational Environ resulted.

6. Finally, by combining maps 3 and 5 above, a "total suitability" map for all the physical components of the development resulted. (Page 94)

7.6 CONCLUSION :

This "total-suitability" map indicates the areas of the site with natural suitability for each physical component of the development, shown in different ranges of suitability. The total-suitability map is the most important determinant in locating the various physical components on the site, but it is not the only determinant. The "functional diagram" and the plant/wildlife ecological analysis are the two other determinants leading to the final locational determination. The first was discussed in the programming process (page 65), and the discussion of the second follows on page 95.

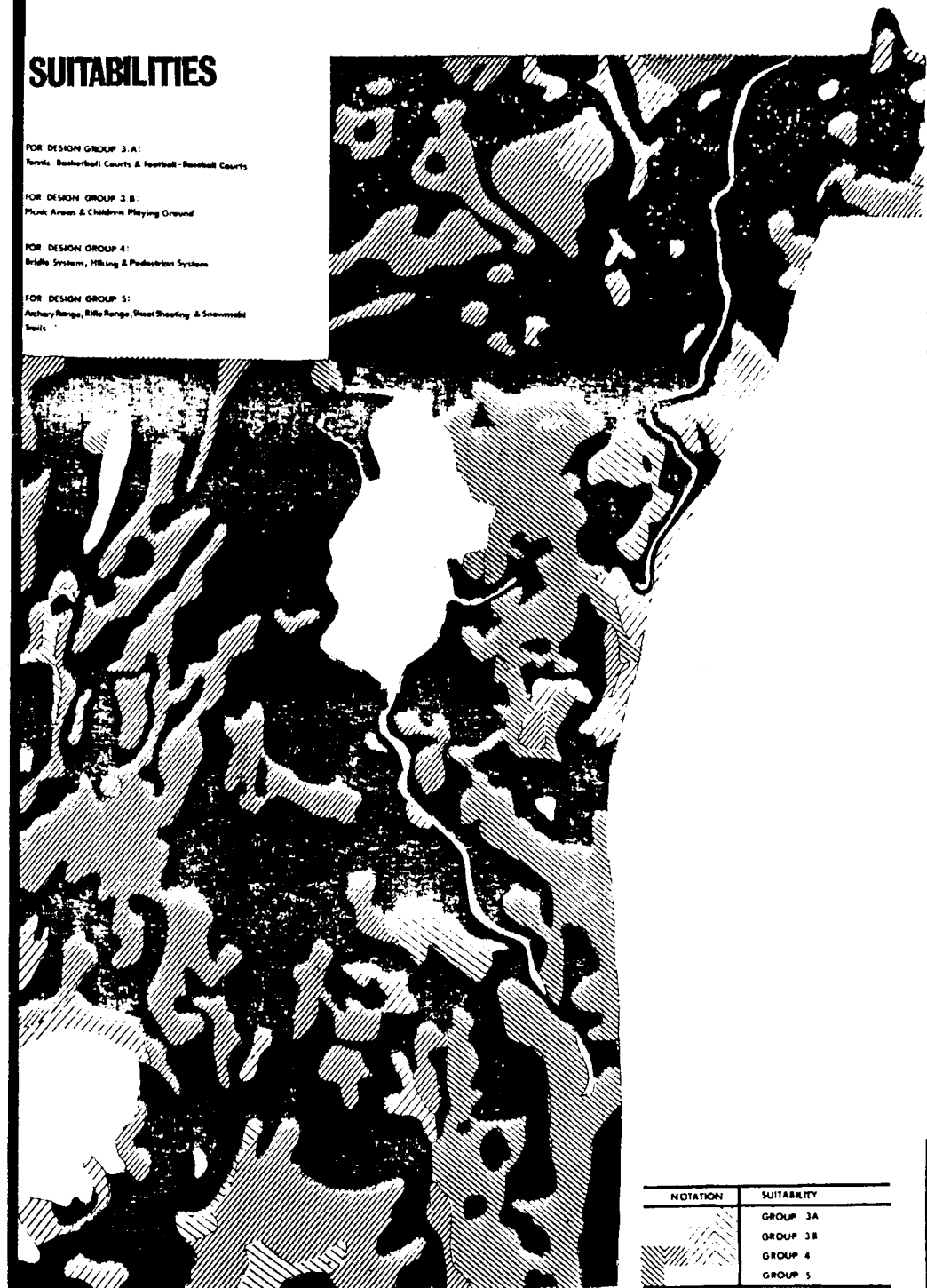
SUITABILITIES

FOR DESIGN GROUP 3 A:
Tennis - Basketball Courts & Football - Baseball Courts

FOR DESIGN GROUP 3 B:
Picnic Areas & Children Playing Ground

FOR DESIGN GROUP 4:
Bridle System, Hiking & Pedestrian System

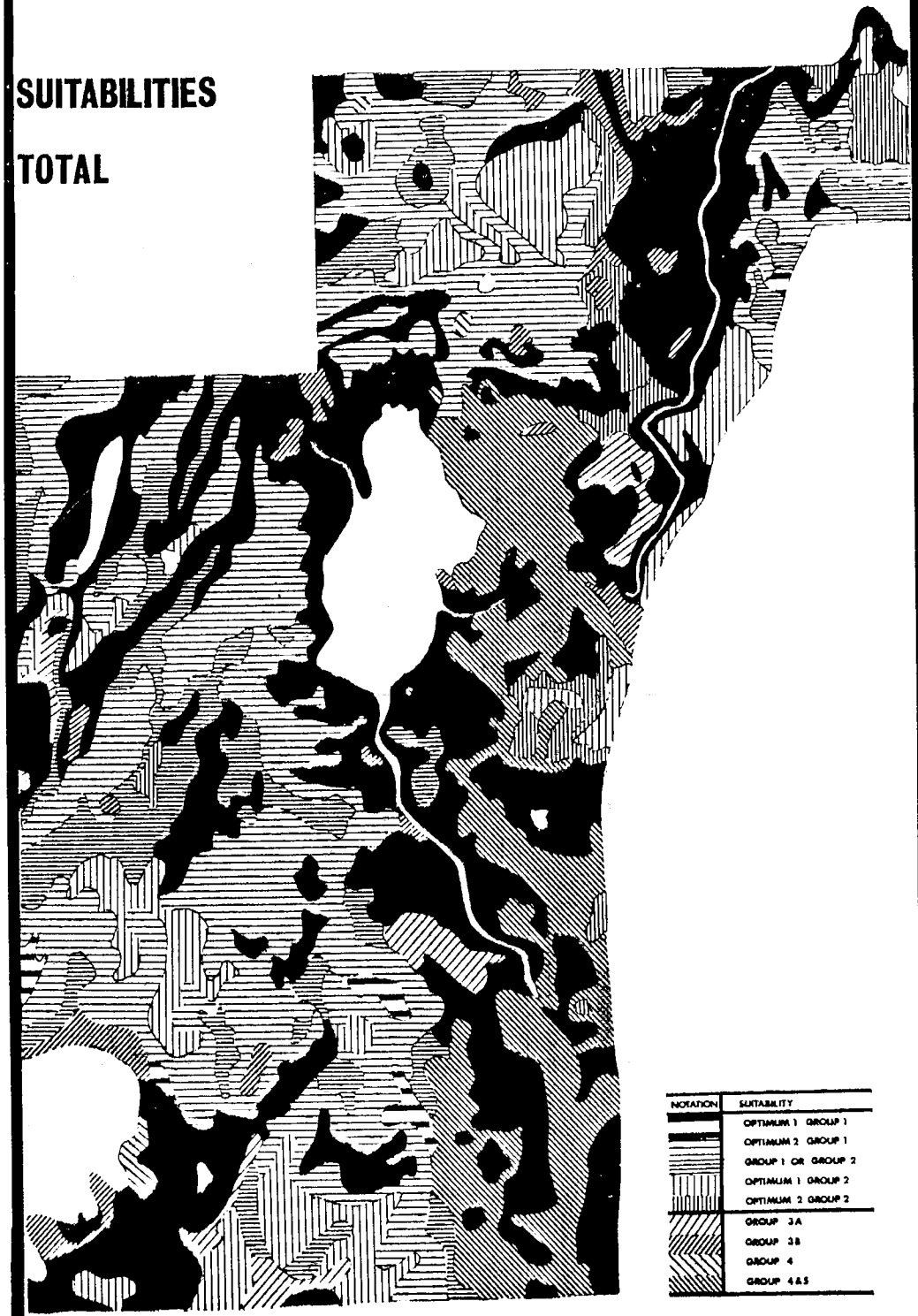
FOR DESIGN GROUP 5:
Archery Range, Rifle Range, Skeet Shooting & Snowmobile Trails



NOTATION	SUITABILITY
	GROUP 3A
	GROUP 3B
	GROUP 4
	GROUP 5

SUITABILITIES

TOTAL



B. PLANT / WILDLIFE ECOLOGIC ANALYSIS

A FOREST IS THAT DELICATE

✳ SINGLE USE SUITABILITIES

1.A P.86 1.B P.87 SEPTIC P.88 SIMILARLY

✳ CATEGORY USE SUITABILITIES

HOUSING RECREATION

✳ TOTAL SUITABILITIES

3

P.91

7.7 INTRODUCTION

Ian McHarg has a favorite statement he paraphrased from a lecture by Loren Eisely. It reads: "Man in space is enabled to look upon the distant earth, a celestial orb, a revolving sphere. He sees it to be green, from the verdure on the land, algae greening the oceans, a green celestial fruit. Looking closely at the earth, he perceives blotches, black, brown, gray and from these extend dynamic tentacles upon the green epidermis. These blemishes he recognizes as the cities and works of man and asks, 'Is man but a planetary disease?' "[1] It is a sarcastic way of rephrasing reality.

Although the natural vegetation cover improves microclimate and exercises a major balancing effect upon the water regimen, regulating soil and air temperature and diminishing erosion and sedimentation, it is certainly retreating as civilization advances. That is not necessarily by intent; it is mostly a by-product due to man's lack of understanding of the consequences of his actions. In order to minimize such consequences, the methodology followed in this study includes two different analyses of plant/wildlife ecology. Following is a discussion of these two analyses as they were performed in the Lily Lake Forest Recreational Environ.

---

[1]Ian McHarg, Design with Nature (Garden City, N.J.: Natural History Press, 1969), p. 43.

7.8 B1. INDEX EVALUATION

Plant communities have different degrees of vulnerability and tolerance to human impact (through soil compaction, change in moisture, etc.). High impact land uses should be located away from ecologically fragile communities. To evaluate the different plant communities, an index value was assigned to each, according to the following seven characteristics:

1. Genetic reserve: Assigning low to high scores as follows: weedy species, common native species, occasional native species, rare and/or endemic species.

2. Community reserve: Assigning low to high score as follows: man-made or weedy, highly disturbed natural, typical natural virgin, and/or disjunct natural.

3. Environmental stabilization: Assigning score based on frequency, density, and dominance of species.

4. Environmental protection of slopes: Based on percentage of slope, the steeper it is, the higher the score.

5. Environmental protection of lakes and streams: Based on distance from water, the closer it is, the higher the score.

6. Environmental protection of rare and/or endemic species: Based on distance from such species to form a buffer zone from human impact.

While aesthetics are not part of the ecological analysis in the traditional sense, they are evaluated in this analysis because of the plant cover special value in a recreational development.

7. Aesthetic value: Based on color, texture, seasonality, and canopy and enclosure effects, the more the diversity the higher the score.

The index evaluation was transferred graphically to a map with areas of index values ranging from high to low as portrayed in the map on page 99. The index evaluation part of the analysis dealt with the value and tolerance of the plant communities to human impact. The consideration of the continuity of the green system and the wildlife habitat follows.

7.9 B2. EDGE EFFECT

The basic premise of this analysis is that areas with mixed plant forms and communities furnish prime habitat for wildlife. One can define such areas by dividing the vegetation cover into subdivisions according to the following characteristics:[2]

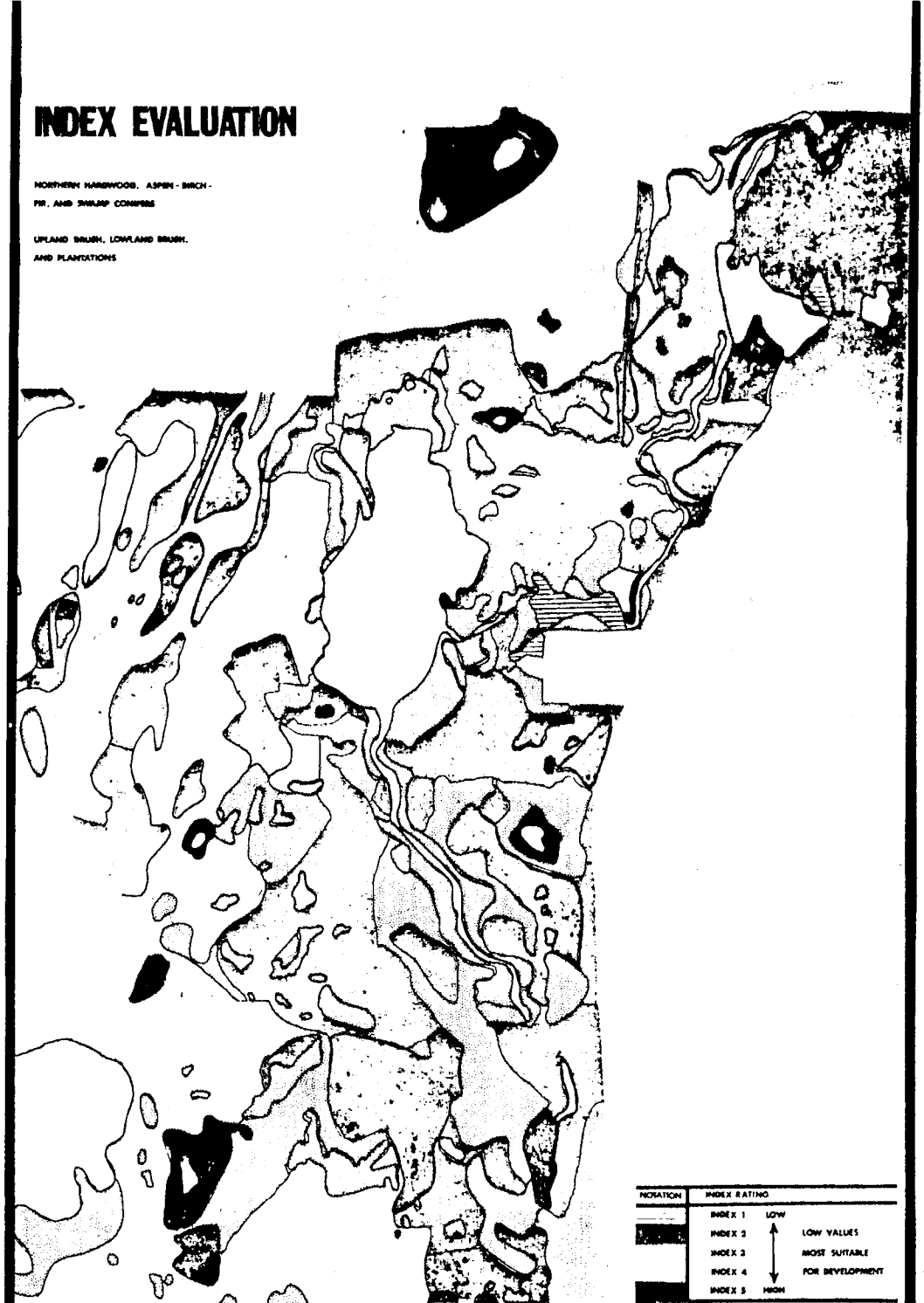
---

[2]Michael M. McCarthy, "Towards Organismic Management of the Leisure Environment-A Preliminary Inquiry" (unpublished Master's thesis, University of Wisconsin, 1969.

INDEX EVALUATION

NORTHERN HARDWOOD, ASPEN - BIRCH - FIR, AND SWAMP CONIFERS

UPLAND BRUSH, LOWLAND BRUSH, AND PLANTATIONS



1. Impact form: The amount and type of disturbance of the community by human impact--species artificial replacement, retardation, regression, and release effect.

2. Community form: The type of community--the maturity, dominance, and water relationships of species.

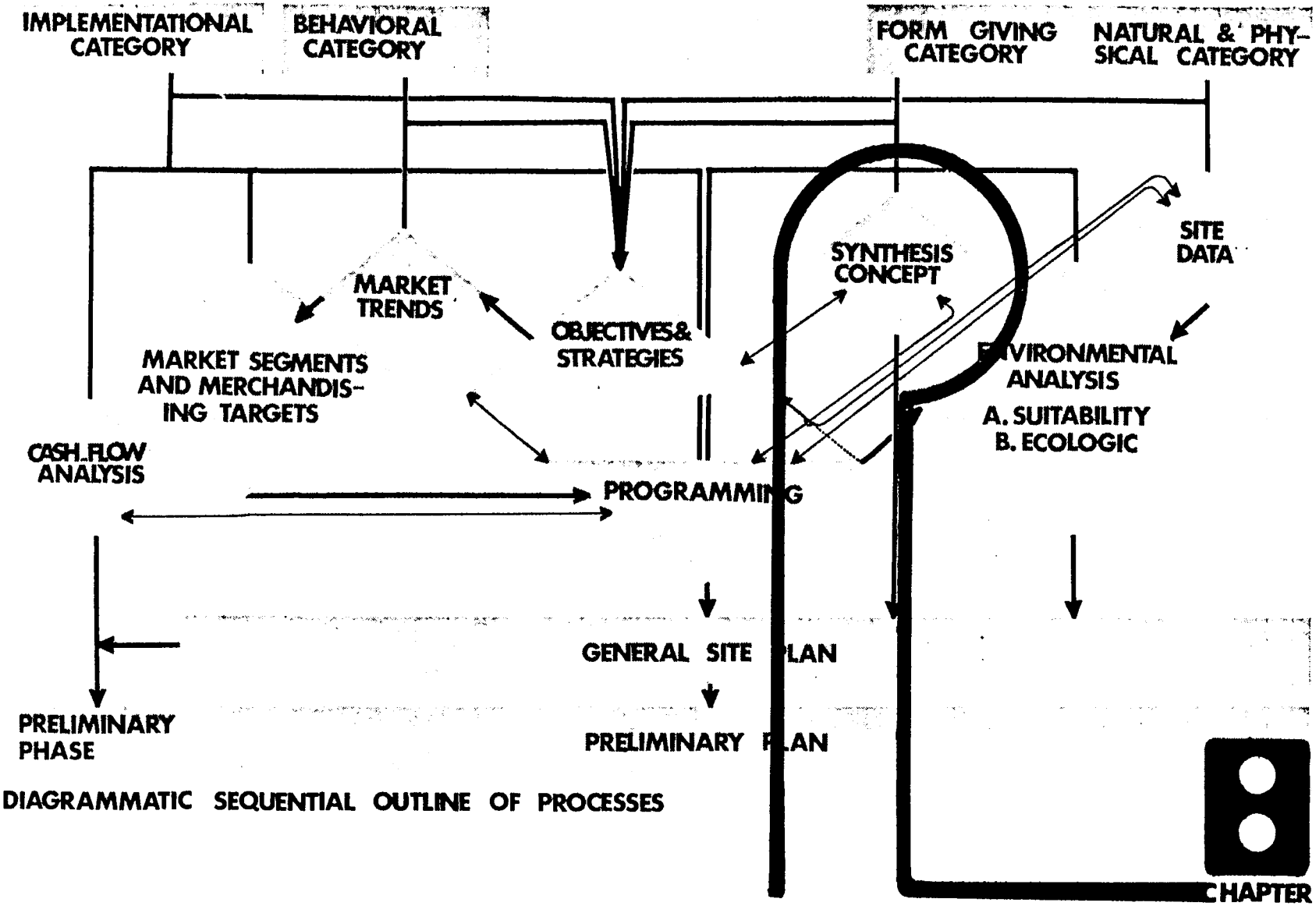
3. Stratification form: The pattern of stratification--percentage of canopy, and understory.

The linear "edges" between these various subdivisions (edge effect) will constitute prime wildlife habitat areas. These curvilinear patterns will also form a continuous green system for both wildlife habitat and movement, and human use, as the map on page 101 portrays.

Finally, the index evaluation and the edge effect analyses are combined by superimposition in an ecological map (plant/wildlife). This map (page 102) is one of the three locational determinants--functional, suitability, and ecological. The combination of these maps will lead to the final determination of the locations of each physical component of the Lily Lake Forest Recreational Environ.

EDGE EFFECT

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

CHAPTER

SYNTHESIS CONCEPT 8

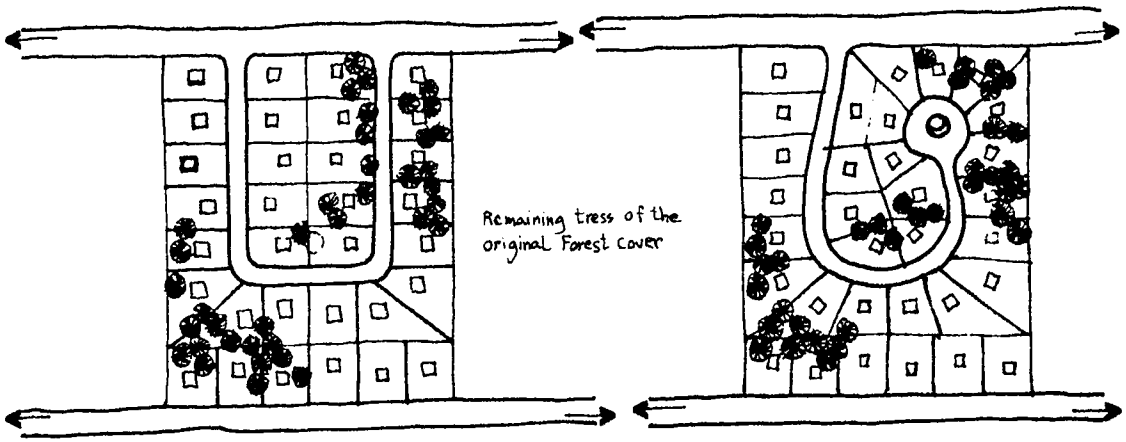
8.1. INTRODUCTION

The last chapter dealt with the natural milieu--the opportunities it offers and the limitations it imposes on the development of a landscape. The design task in this project is one of merging the human desires and needs within such opportunities and limitations to form a recreational environ. More specifically, it is the task of merging the functional analysis, suitability analysis, and ecological analysis into a general site plan. But to do that, it is necessary to first define a framework of ideas that constitutes a design concept. That framework is what I refer to in this study as the synthesis concept.

The two major interrelated concepts constituting the framework or synthesis concept in the Lily Lake Recreational Environ are the "cluster concept" and the "green corridor system."

8.2. THE CLUSTER CONCEPT

The basic premise of the methodology is that each area in the landscape has an intrinsic suitability for a certain land use. It implies a very organic pattern of development which necessitates a different approach to housing than the conventional subdivision with large tracts spread regularly or irregularly over most of the site, as shown in the diagram on page 104. The organic pattern clusters relatively small lots together on the most naturally suitable areas for housing, thus respecting the intrinsic natural suitability, and maximizing the open-space or green areas for club member's enjoyment. Each cluster can

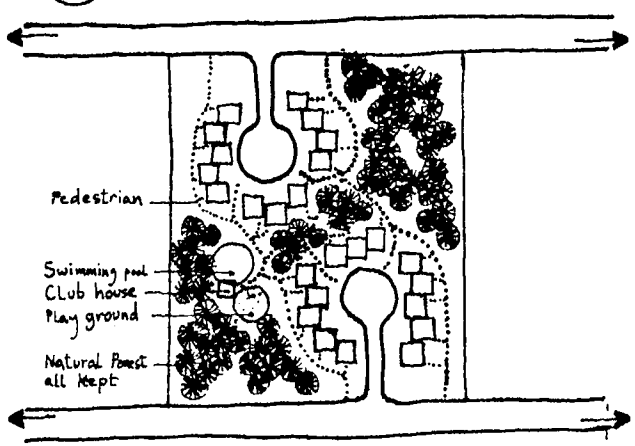


SAME PARCEL DEVELOPED BY

Convential regular Sub-division (A)

(B) Convential irregular Sub-division

(C) Cluster concept



also be served by one septic waste-disposal system located on the most suitable areas of the site, i.e., those areas whose natural characteristics match the requirements for septic systems. Such an arrangement serves to safeguard the ground water resource from possible contamination.

The cluster concept also fulfills a major human requirement of the Lily Lake Forest Recreational Environ; to offer the owners a feeling of belonging to a group--a unit each can identify with--identity. The development is divided into three neighborhoods, each subdivided into a number of housing groups which are further subdivided into a number of housing clusters. The housing cluster includes 10 to 20 chalets, depending on the size of the area naturally suitable for housing. This hierarchical arrangement offers the owner four levels of identity--the cluster, the group, the neighborhood, and the whole recreational club.

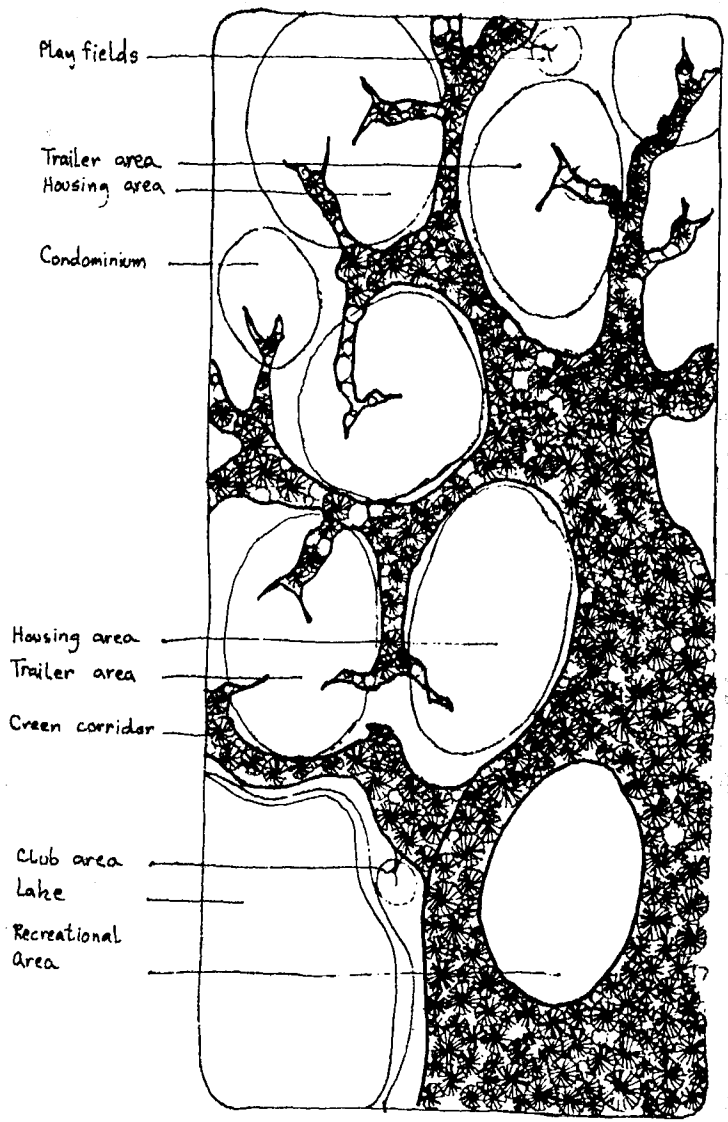
Finally, the cluster concept eliminates the potential drabness of suburb-like monotony. The relationships between the clusters, groups, and neighborhoods--in their organically varying outlines--and the different natural features--vegetation communities and landforms--will preclude any potential repetition in character, appearance, form or even density. The location of the various recreational physical components, i.e., pools, club house, bridle trail, etc., can also enhance the sense of diversity.

8.3. THE GREEN CORRIDOR SYSTEM

The relationship between the cluster concept and the green corridor concept could best be described as symbiotic. Clustering enables the designer to keep a large tract of land in one piece for recreational use, thus preserving the most aesthetically appealing features: the most viable ecosystems, and the most diversified wildlife habitat areas. Clustering also enables the designer to keep the green system identified in the edge-effect analysis (page 101) intact.

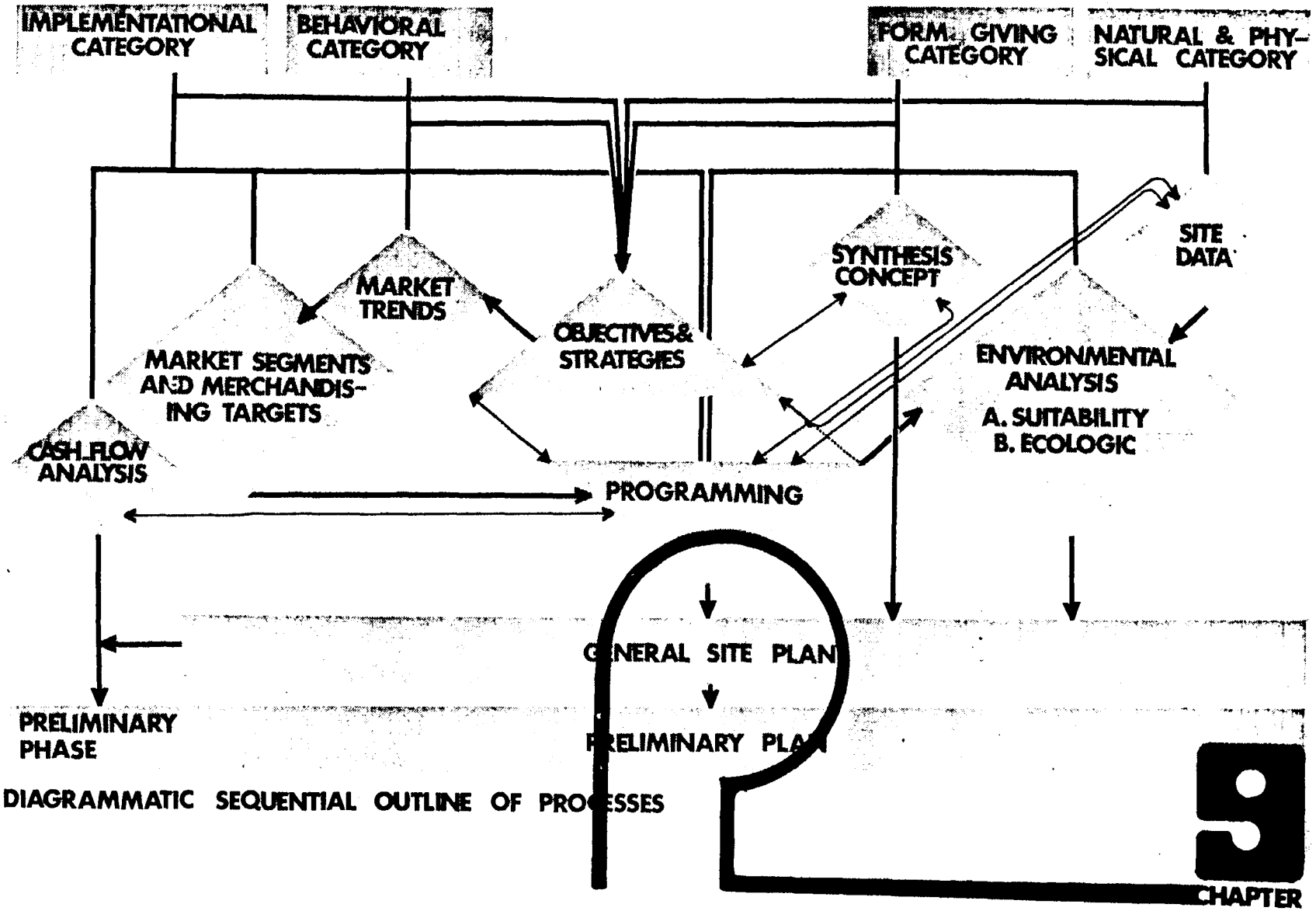
The green corridor system is a hierarchy of forest land that branches from a large tract and gets smaller and smaller with continual division. The branches include the curvilinear pattern of the edge effect, the steep slopes, strips at least 200 feet wide on lakes and rivers, as well as those areas with high plant indexes identified in the "plant index analysis" (page 99). This green corridor system serves as a skeleton for the physical components of the Lily Lake Forest Recreational Environ, as portrayed in the diagrams on the following page.

Finally, the green corridor system fulfills the major project requirement of "awareness." The green corridors are laced by a system of pedestrian trails far from the mechanical asphalt domain of the automobile. The green corridor system is designed to draw man into a continuous natural system released from artificial influence


Play fields
Trailer area
Housing area
Condominium
Housing area
Trailer area
Green corridor
Club area
Lake
Recreational
Area

where the smell of earth, the touch of leaves, and the sound of birds intervene to make man not only aware of his natural environment, but also aware of his awareness.

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

CHAPTER

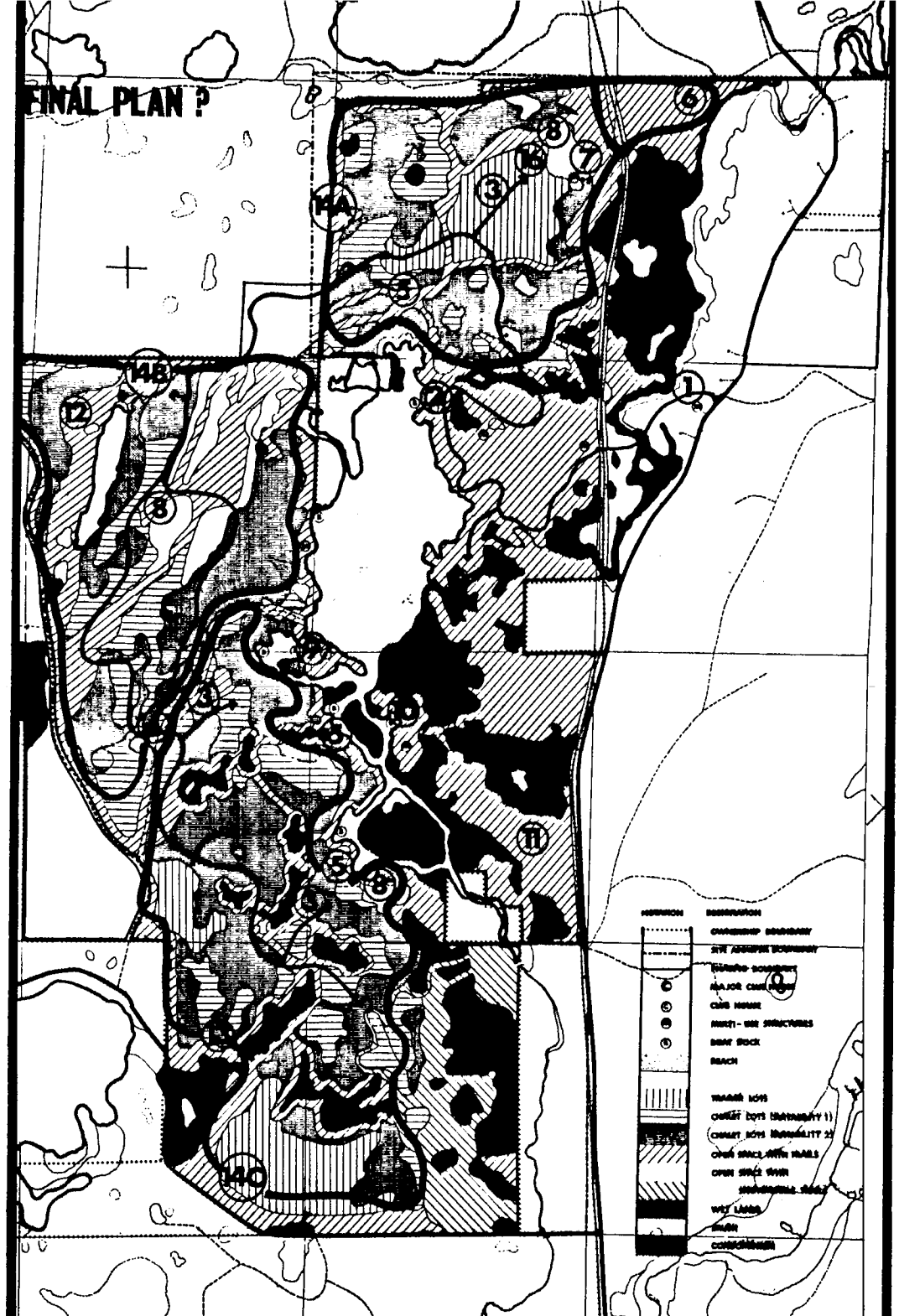
GENERAL SITE PLAN

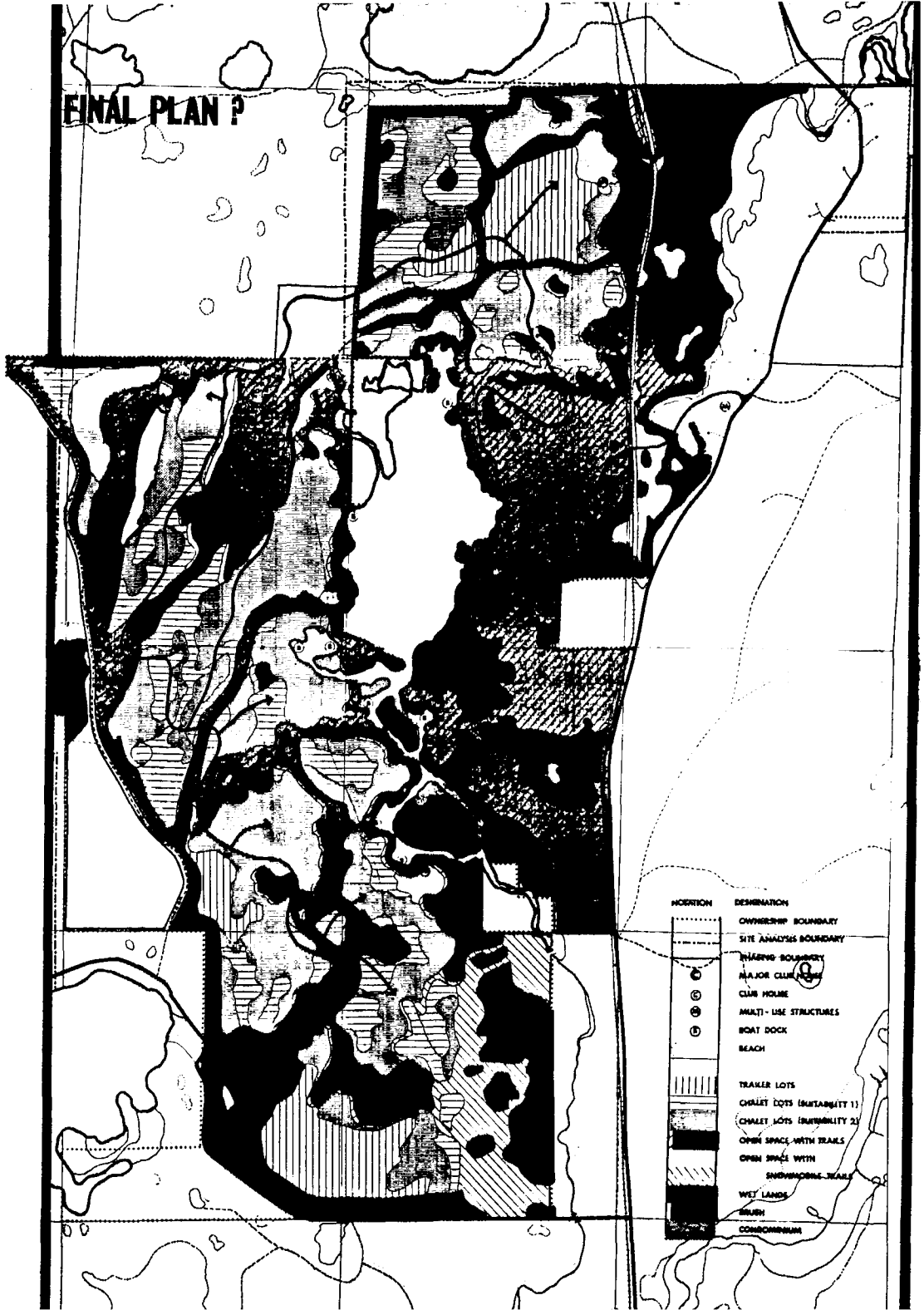
9.1 INTRODUCTION

The leading statement in the introduction of this report was that of Bertrand Russell on the "technique of suspended judgment." Adopting such a technique in developing his environment, man should not only create a development that would meet human requirements, but should also anticipate the effects of such development on his environment and offset such effects before they are felt.

The effects of such a development on man's environment are both cultural and natural. In the methodology applied to this study, adverse cultural effects were avoided by properly analyzing the market and measuring the attitudes of the potential buyers, by properly establishing goals and objectives, and finally by establishing the proper program of physical components and analyzing their functional relationships. Adverse natural effects were avoided by performing the suitability analysis--matching the site characteristics to the locational requirements of the different physical components in the development--and by completing a plant/wildlife ecological analysis to locate high-impact physical components away from fragile plant communities and to provide a continuous green system for the preservation of wildlife habitats.

The final task is to put together the human requirements discussed in market segments and merchandising targets, market trends, goals and objectives, programming, and synthesis concept processes within the natural resource avoiding any undesirable cultural or natural effects. In more technical terms, the task is


FINAL PLAN ?


FINAL PLAN ?
NOTATION
DESIGNATION
OWNERSHIP BOUNDARY
SITE ANALYSIS BOUNDARY
PHASING BOUNDARY
MAJOR CLUB HOUSE
CLUB HOUSE
MULTI - USE STRUCTURES
BOAT DOCK
BEACH
TRAILER LOTS
CHALET LOTS (SUITABILITY 1)
CHALET LOTS (SUITABILITY 2)
OPEN SPACE WITH TRAILS
OPEN SPACE WITH SNOWMOBILE TRAILS
WET LANDS
BRUSH
CONDOMINIUM

that of merging the functional analysis, the suitability analysis, and the ecological analysis--within the framework of the synthesis concept. It is in this part of the design process that intuition and imagination blend with the systematic formal analysis. A description of the product of this merger--the general site plan (topological diagram) of the Lily Lake Forest Recreational Environ--- follows.

9.2 PLAN DESCRIPTION; ACCESS, ROADS AND TRAILS

It is rather natural to start the general plan description by discussing the users' access to the site. It is especially important in this project because of the requirement of 'exclusiveness' of the private club, and is especially difficult in this site because of the public access road to the lake that splits the site.

A controlled access was aligned to enter from the eastern end of the site through an entry structure--a psychological gate--that would deter by-passers from venturing into the private club. This entry structure also functions as an information center (1). The road meanders through the central portion of the major open space, with an experience designed for the impulse buyers. It penetrates enclosures of different plant communities, continues along the river and lake, and finally reaches the club house which happens to be the sales office (2)! After going through a check point at the club house, the road continues through the site with branching, dead end roads serving the housing groups and clusters (3). An overpass over the public road to the lake (4) ensures a completely controlled access to the private club. Emergency access

required by law is provided in the form of controlled exists opened only for emergency vehicles.

The pedestrian system is physically separated from the vehicular system. The former overlaps the green corridor (5) system as described in the synthesis concept. The green corridor system branches from the major forest land that extends along the entire eastern section of the site. It encompasses the relatively untouched meandering strip of the Lily River in the northeastern section of the site (6), as well as the middle-eastern section--extending from the eastern boundary to the shore of Lily-Lake--the area with the highest diversity of vegetation and wildlife. The major network of trails through these sections focuses on the main club house on the Lake (2).

The club house offers a variety of social spaces; a supper club; a heated swimming pool; concession booths for the rental of boats, snowmobiles, and other equipment; and a number of other activities. The club house will also house the home owners association offices when the whole project reverts to the association after all sales are completed.

9.3 THE RECREATIONAL ACTIVITIES CATEGORY

To diffuse human impact and avoid its concentration in one area, especially around the Lake, the various recreational activities were dispersed throughout the site, mostly inland as a diversionary means of protecting the lakes. Bridle trails (7), ecologic trails (12) (13) athletic fields (8), a second club house (9), two swimming pools, swimming beaches, a number of picnic

areas, and a recreational island (10) --surrounded by water and wetlands--are easily accessible from many points within the development. Snowmobile trails were confined to the southeastern section of the site (11) where vegetation had been previously manipulated (highly disturbed). All these activities are connected by the green corridors that branch from the major forest land.

The green corridors act as buffers between housing neighborhoods, groups, and clusters, and enclose the trails connecting the individual chalets to the recreational activities. They also help to protect lake and river shorelines as well as all the other natural features.

9.4 THE RECREATIONAL HOUSING CATEGORY

The recreational housing category is composed of three divided neighborhoods--north (14) , mid (14) and south (14) --divided, in housing groups, which in turn are divided in housing clusters of ten to twenty chalets, trailers, or condominium units. Each of the three neighborhoods in the Lily Lake Forest Recreational Environ includes within itself athletic fields, boat docks, and some unique physical components of the development. While the first neighborhood includes the bridle trails (7) , the river ecological trail (6), and the major club house (2); the second includes a recreational social center with a swimming pool, more swimming beaches, and the lake ecological trail (9); and the third includes the second club house (12), the recreational island (10) , and the bog ecological trail (13) . Each housing group includes tennis/

basketball courts, children's playgrounds, and picnic areas. These varying recreational physical components of the development help create the individual identity of each of the neighborhoods and the housing groups. These residential components fit within the green corridor system creating a comprehensive totality that could provide a truly natural recreational environ.

The housing category presented the design team with the most difficult problem. The suitability analysis (page 80) showed an extreme conflict with the functional diagram (page 67). All suitable lands for this category were concentrated too far from the lake with no water access--an obvious conflict with the functional criteria of proximity and boat access. To satisfy both analyses, the only solution was to bring the water back to the residential areas. This task could be accomplished only by dredging, an operation that could prove detrimental to the environment of the Lily Lake Forest Recreational development.

9.5 DREDGING, PROBLEMS AND SOLUTION

Through removing the littoral-zone plant communities, the dredging of large areas can impair spawning grounds of fish, i.e., northern pike and large-mouth bass in Lily Lake, as well as the habitats of many insects, birds and mammals. The removal of the littoral-zone plant communities will also cause soil erosion which decreases water transparency and thus limits the penetration of light in water. Dredging, especially the creation of long channels, is likely to change the water table causing the oxidization of exposed organic soils and thus releasing some nutrients

that increase the algae growth. All these changes together would lead to a noticeable decrease in water quality with a consequent decrease in quality of fish and wildlife.

To solve the original conflict between the suitability and the functional analyses and avoid the consequences of dredging, a special sequence of channels (15) was designed, and new techniques were applied. The channel alignment was chosen to avoid changes in the water table. The bottom of each channel is to be covered with plastic sheeting to prevent aquatic plant growth. The sides of each channel are to be planted with wild rice, thus stabilizing the edges, minimizing sediments, and increasing fish spawning grounds and bird and mammal habitats. Bubblers are to be located in dead alcoves to add currents to the water eliminating the consequences of stagnation. This solution optimizes the functional aspect by providing close water access and boat docks for the housing groups, and it keeps the design within the limits of the intrinsic suitability constraints of the site.

9.6 CONCLUSION

The general site plan described above was achieved through the systematic analysis of the human requirements summarized in graphic format in the functional analysis of the intrinsic natural suitabilities combined in the total suitability map, and of the ecological values indicated in the edge effect index map. In the merging of these three analyses together within the framework of the synthesis concept, the systematic process mingled with non-systematic intuition to produce an imaginative solution based on solid ground of analysis.

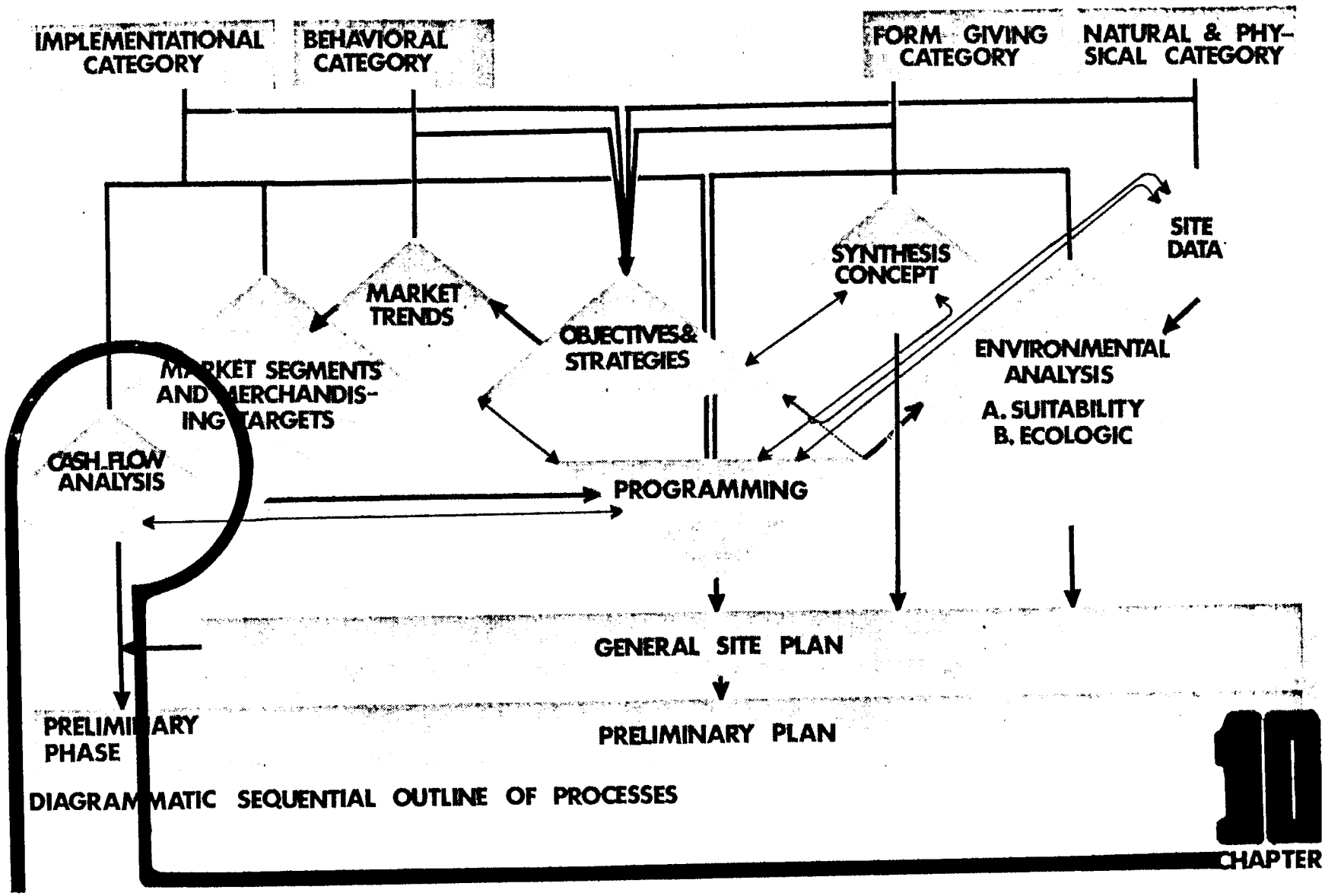
The general site plan is very similar to a zoning map, but at a much smaller scale. It indicates the general areas where certain uses are to be located without specifying any definite location for the elements of these uses. For exampke, the general site plan indicates where recreational housing (chalets) should be, rather than where the individual lots are.

The development of the preliminary plan from the general site plan is part of the hierarchical structure of this design method. The hierarchy of tasks--from the general to the specific--includes the following:

1. Study of "market trends."
2. Analyzing the "market segments" and choosing 'merchandising targets."
3. Establishment of "goals and objectives" for the Lily Lake Forest Recreational Environ.
4. "Programming" the project physical components.
5. Developing a 'general site plan" through proper 'Environmental Analysis."
6. And, finally, developing the "preliminary plan."

In order to develop a specific preliminary plan from the general site plan, a final list of project physical components--described in numbers, types, and costs--must be obtained. Alternative lists are generated by computer runs of the cash-flow analysis, and a final list is chosen by the design team and the clients. The cash-flow analysis is discussed in the following chapter.

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

CASH-FLOW ANALYSIS 10

10.1 FINANCIAL IMPLICATIONS OF DESIGN & MARKET CONSTRAINTS

Real estate decisions for both public and private projects ultimately involve issues relative to the wise management of money over time. Unlike investment in bonds and stock, real estate seldom provides any fixed points in advance relative to total investment required, timing of returns, or standardized formats facilitating comparison or statistical forecasting. In the design stages of a project financial analysis and comparison of alternatives must depend on extensive and detailed assumptions in dollars but these assumptions and the conclusions are highly volatile numbers.

Measurable returns to the investor are generally confined to cash returns. The ultimate feasibility of a project depends on successful management of cash flows to maintain solvency, stability and hopefully a profit surplus appropriate to risk and capital employed. Cash may be generated from rents, sales, financing gambits, or income tax ploys. The sequence of these returns must be matched to the sequence of outlays to measure both business risk and financial risk. Business risk is concerned with the ability to repay financial obligations with interest on schedule. Profit is measured in dollars and yield, as a function of money at work over time. Thus financial management, risk analysis, and comparative profitability all require some minimum set of assumptions in the following areas:

10.2 A time line or calendar of events related to financial assumptions.

10.3 A product mix and revenue sequence.

10.4 A capital budget outlay schedule.
10.5 An operating cost and outlay sequence.
10.6 A financing plan with specific credit terms and contributions.
10.7 Summary sequence of cash outlay and surplus expectations.
10.8 Measurement standards of risk and yield.
10.9 Identification of possible indirect benefits and profit centers.

To simulate the financial consequences of any set of land development assumptions, the University of Wisconsin School of Business and Robert Gibson[1] had developed a cash flow model which combined a variety of features borrowed from capital cost estimating models, critical path network analysis, and investment evaluation models. While all its features and mathematics are too detailed to develop in this case, one set of financial inputs and output are provided as a demonstration of the technique. Many runs of the model were made and further planning would require continual financial revisions to specify the range of alternative outcomes the developer might expect.

Financial inputs can be no more specific than the design detail available at any stage of analysis and yet the quantitative nature of finance and electronic computation may lead to exaggerated

---

[1]The computer program used in this study is available to developers from Robert Gibson, 130 Fairview Street, Walworth, Wisconsin, 53189.

credibility inherent in pseudo-accurate detail. With this explicit warning the reader can match some of the brief explanations and assumptions which follow to the computer outputs which form the last half of this chapter.

10.2 A. THE TIME LINE OR CALENDAR OF EVENTS

Development is a process over time and each set of time dimensioned variables have been noted on the computer runs with an (A) . Computer runs are numbered pages 1 to 8

Page 1

To reflect inflation influences on raw land, real estate taxes and capital costs; all assumptions of these items are adjusted annually. Construction costs per feature are expected to rise 5 percent a year. Real estate taxes have been rising in the county at 2 percent a year and there would be an initial increase of 20 percent upon sale of the land from the parent corporation to the developing company. Raw land value was inflated at 1 percent a year net of sales commissions to provide a basis for estimating real estate tax assessed value and liquidating value of the development firm at the end of any specific year. The "Cash Column" is in units of one thousand dollars and states no cash is available for profit distribution unless surplus exceeds $90,000 on the first year, a control to permit internal financing from profits.

Page 2

The capital scheduling of general improvements such as road construction for the clubhouse is indicated by year. The release of title and therefore real estate tax responsibility and carrying charges for land not specifically allocated to lots is also indicated by year under the title "acres dedicated."

Page 3

Timing of borrowing, interest payments, and principal payments on a construction credit line are recorded under first mortgage transaction.

Pages 4 - 7

For each type of sales product a sales price must be set by year together with the estimated number of units which might be sold. Note that no sales are expected for the first year which is reserved for design and construction. Other time line assumptions which do not appear on the output but are required on the input form, include the lead time necessary to produce a lot, the inventory to be maintained in excess of sales and carrying charges on finished inventories. This particular set of assumptions requires six years to build and to complete.

10.3 B. A PRODUCT MIX AND REVENUE SEQUENCE

The revenue cycle begins with the nature of merchandise for sale. For a planned unit development a portion of the product is in the nature of community facilities which may be not directly costed to individual sales units. However, a large portion of land and improvement costs, as well as overhead, can be allocated to specific types of salable products such as home sites or a class of condominium apartments. These specific sales price and allocated capital costs are summarized below and appear on pages 4 to 7 and are noted with Ⓑ.

Page 2

> Provided a summary statement of land use allocations with approximately 858 acres improved and lotted. Left as wilderness acres in common ownership were 2,442 acres, marred with only trails and picnic areas, etc., which means a ratio of developed acres and wilderness acres of 1:2.8 or about 27 percent. There are a total of 1,460 dwelling units or sites which is a ratio of only one DU for each 2.2 acres of land!

Page 4

> One-half acre lots (approximately 100 x 200) with water, electricity and group septic services — 900 units

1. Initial sales price	$8,000
2. Absorption rate 180 units per year	
3. Specific allocated improvement costs:	
a. 100 feet of half road	350
b. electrical service	200
c. water line	250
d. cluster septic share	500
e. recreation equipment allowance	25
f. pedestrian trail at rear of lot	50
g. contingencies	200
h. financing charge*	425
Total capital cost per unit	$2,000/lot
4. Gross profit per unit	6,000

Page 5

One-acre lots (approximately 150 x 290) without water and septic.	400 units
1. Initial sales price	$5,500
2. Absorption rate 100 units per year	
3. Specific allocated improvement costs:	

*Allowance for discount on sale of 8 percent land contract for cash. Marked with * in following references also.

a. 150 feet of half road	525
b. electrical service	200
c. recreation equipment allowance	25
d. pedestrian trail at rear of lot	75
e. contingencies	200
f. financing charge*	325
Total capital cost per unit	$1,350/lot
4. Gross profit per unit	$4,150

Page 6

Studio deluxe condominium (550 square feet living space) — 80 units

1. Initial sales price with land	$17,900
2. Absorption rate 20 units per year	
3. Specific allocated improvement costs:	
a. road share plus 2 parking stalls	350
b. electrical service	200
c. recreation equipment allowance	25
d. cluster septic share	500
e. water line	250
f. structure @ $15/sf	8,250
g. financing charge*	1,000
h. contingencies	200
Total capital cost per unit	$10,775/unit
4. Gross profit per unit	$ 7,125

Two-bedroom condominium (750 square feet living space)	80 units
1. Initial sales price with land	$22,500
2. Absorption rate 20 units per year	
3. Specific allocated improvement costs:	
a. road share plus 2 parking stalls	350
b. electrical service	200
c. recreational equipment allowance	25
d. cluster septic share	500
e. water line	250
f. structure @ $15/sf	11,250
g. financing charge*	1,000
h. contingencies	200
Total capital cost per unit	$13,775/unit
4. Gross profit per unit	$ 8,725
Total number of salable units of 3,300 acres:	1,460

10.4 C. A CAPITAL BUDGET OUTLAY SCHEDULE

The basic elements of the capital budget and cost estimating models are a catalog of construction costs, an inventory of land

used and available, and some initial inputs of land and capital These items are identified on the computer run with Ⓒ .

Page 1

The catalog of costs for capital budgeting may be placed in the computer at any level of detail, in lumps such as the clubhouse budget of $100,000 or in modules such as "one running foot of 40 foot wide trail area" occupying 40 square feet of land and costing $1 per running foot. The input forms make it possible to assemble a capital budget for any improvement by specifying quantities of required items in the catalog. These quantities of input are converted by the computer to the cost of general improvement which appear on page 2 or the total cost of allocated capital improvement which appear for each product on pages 4 - 7.

Page 3

The initial capital resources provided by the parent corporation to its development subsidiary can be summarized as consisting of a total equity in development of $540,000 allocated among $330,000 for 3,300 acres at $100 per acre, $95,000 for purchase of key parcels owned by others, and $115,000 in cash. The price of $100 per acre provides more than a $200,000 capital gain to the parent corporation which is not included in profit calculations by the computer. This information also provides the basis for estimating income taxes for the development corporation during the life of the project.

10.5 D. AN OPERATING COST AND OUTLAY SEQUENCE

Operating costs and allowances can be fixed or can be variable as a function of both construction in process and the level of sales activity. These basic assumptions are itemized below and identified where they appear on the computer outputs with (D) . Since they appear virtually throughout the computer output they are not all identified by page.

1. Organizational legal fees $5,000.
2. Fixed management cost of $75,000 per year, plus
3. Professional fees and construction administration at 10 percent of construction cost in place, plus
4. Sales administration and advertising at 15 percent of sales, plus
5. Sales commission of 15 percent of sales unit cost.
6. Credit line for construction of improvements provided at 12 percent.
7. Working capital loans from parent corporation at 15 percent per annum.
8. On page it should be noted that a basis for computing both real estate taxes and income tax is provided. The proration formula refers to the need of allocating investment in general improvement to unit sales or dollar sales or some combination of both. In this case general costs were prorated according to sales value of the unit to equalize the gross profit spread and to avoid distortion if higher profit items tended to sell earlier or later during the development. Once other items in the financial plan were firmly established, the computer model would permit testing of alternative sales or financial strategies.

10.6 E. A FINANCING PLAN OF SPECIFIC CREDIT TERMS & EQUITY CONTRIBUTIONS

The financing specifications for this particular demonstration were greatly simplified by the credit rating of the client. While the computer model is designed to provide elaborate combinations of various land development financing terms available today, only a very basic two stage financing program was required. All capital improvements were paid for from a basic credit line which did not exceed $2,000,000 at any time during the project life and which would be closed out during the fifth year. Operating expenses were met out of initial cash capital with a 12 percent opportunity cost and 20 percent yield target, retained earnings, or short term working capital loans available from the parent corporation at 1.25 percent per month.

It was assumed that all sales were cash sales as any consumer credit contracts would be instantly sold to a bank. Fifty percent of all sales were expected to be credit sales and the average discount of $700 per credit sale sold to the bank was distributed to all sales as a $350 component of closing costs on lots with correspondingly higher discounts for condominium mortgages in their closing costs.

10.7 F. SUMMARY SEQUENCE OF CASH OUTLAY SURPLUS EXPECTATIONS &

With all of the various subcomponents of the development process taking place at once, it is useful to assemble and aggregate these outlays and receipts over time.

This summary page includes distributions over the six-year development plan and in total with a percentage analysis. Most items are self-explanatory and therefore discussion will focus on the key line Net Cash After Taxes.

Cash flows are essentially negative until the fifth year because the financing utilizes advances in the form of loans from the parent corporation. With repayment of all debt, cash surpluses available for dividends appear in the fifth and sixth years. The present value by simple discounting of these returns of 20 percent suggests an investment value well in excess of the $540,000 initially required. The internal rate of return, however, when the cost of capital is recognized at 12 percent, is slightly lower at 19.1 percent.

Thus at the preliminary stage of design the project indicates that it can probably provide the targeted rate of return for funds employed but the financial analysis recommends that the design process now refine:

1. The timing of capital expenditure to reduce financing and interest costs.
2. The assumptions of management and general administration costs (excluding sales costs) which are high.
3. The sales price or cost estimates for allocated capital outlay which at 30 percent of sales may be high.

4. The quantity and timing of unit sales which would most certainly not be equal per year as assumed but rather which would peak during the third and fourth years.
5. Assumptions regarding sales to finished inventory ratios and the absence of any sales during the first year when many developers are able to secure deposits on future deliveries.

10.8 G. MEASUREMENT OF STANDARDS OF RISK AND YIELDS

The traditional financial ratios and discounting of future returns or the application of industry rules of thumb would be best applied after plans and financial assumptions were more firmly set by the feedback process of testing and researching the inputs from the designers, the merchandisers, and the financial consultants. This project is marginal with a rate of return of 19 percent until plans can be detailed to assure greater accuracy of capital costs and rate of sale.

10.9 H. IDENTICATION OF POSSIBLE INDIRECT BENEFITS & PROFIT CENTERS

These runs of the computer did not include this but could be expanded to measure profit from business centers beyond those strictly tied to land development. These would include:

1.	Possible mobile home franchising, estimated sales of 400 units x $600 commission/unit =	$240,000 gross profit
2.	Possible project management contract with ownership association, 1,460 property owners at $30 each per year = (Assume assessments at $100/year)	$43,650 net fees
3.	Sale of 3,300 acres x $100/acre = or a $195,000 profit of a $40/acre basis.	
4.	Interest on working capital loans to subsidiary at 1.25 percent/month or 15 percent/year.	
5.	If K-C finances Kimberlands' land contracts, assume 50 percent of total sales on 5-year land contracts x 80 percent loan ratio x allowance for 10 percent discount + 8 percent per year on-going interest.	

SUMMARY OF INPUTS

CAPITAL COST COMPONENTS (C)

NAME	PRICE PER UNIT	LAND COVERED	TYPE
10FT 1/2 SURF RD	4.00	20.00	2
SECOND REC BLD	35000.00	1.00	1
ELECT TO SITE	200.00	.00	0
CLUB HOUSE	100000.00	25.00	1
I-O POOL	75000.00	1.00	1
AREA SWM POOL	15000.00	1000.00	2
AREA UTIL BLDG	9000.00	1000.00	2
ENTRANCES + SGNS	30000.00	80000.00	2
1RF OF 40FTW TRL	1.00	40.00	2
STABLE	10000.00	4.00	1
SKEET + RIF RANG	5000.00	1.00	1
DOCKS + LANDINGS	10000.00	.50	1
REC EQUIP	25.00	.00	0
MGR HOUSE	20000.00	.50	1
.1 CLUSTERSEPTIC	500.00	.00	0
WATER WELL	2100.00	.00	0
MAINT FACILITIES	10000.00	2.00	1
RES BLDG CUST SF	15.00	.00	0
WILDNERNESS LAND	100.00	2120.00	1
AREA 1 DREDGING	18000.00	.00	0
AREA 2 DREDGING	30000.00	.00	0
CONTINGENCIES	200.00	.00	0
HIKING TRAIL	2000.00	15740.00	2
WATER LINE	250.00	1.00	0

TYPE CODES
0=NO LAND COVERED
1=LAND COVERED IN ACRES
2=LAND COVERED IN SQUARE FEET

ANNUAL PERCENTAGE INDEXES (A)

YEAR	LAND	R.E. TAXES	CAPITAL COSTS	CASH
1	100.	100.	100.	90.
2	101.	120.	105.	80.
3	102.	123.	110.	70.
4	103.	124.	115.	60.
5	104.	126.	120.	.
6	105.	128.	125.	.
7	106.	130.	130.	.
8	107.	132.	135.	.
9	108.	134.	140.	.
10	109.	136.	145.	.

MARGINAL TAX RATE	.4800	CARRYING COST PER RAW ACRE OF LAND	1.00
WORKING CAPITAL INTEREST RATE	.1500	EQUITY RATE OF RETURN--USED IN PRESENT VALUE CALCULATIONS	20.00
REAL ESTATE TAX EQUALIZATION RATE	33.00	PORTFOLIO RATE OF RETURN--OR OPPORTUNITY COST	12.00
REAL ESTATE TAXES PER THOUSAND OF VALUE	90.00	FIXED ADMINISTRATIVE + GENERAL EXPENSES PER YEAR	75000.
PRORATION FORMULA 0/0 TO LAND AREA	.00	ADMIN. + GENERAL EXPENSES AS A 0/0 OF SALES VALUE	15.00
PRORATION FORMULA 0/0 TO SALES VALUE	100.00	ADMIN. + GENERAL EXPENSES AS A 0/0 OF CAPITAL EXPENDITURES	10.00

(D)

COSTS OF GENERAL IMPROVEMENTS (A)

	1	2	3	4	5	6	7	8	9	10
10FT 1/2 SURF RD	280000.	73500.	77000.	80500.	.	.	.	.	.	.
SECOND REC BLD	.	.	38500.	.	.	.	.	.	.	.
CLUB HOUSE	100000.	.	.	.	.	.	.	.	.	.
I-O POOL	75000.	.	.	.	.	.	.	.	.	.
AREA SWM POOL	30000.	.	.	.	.	.	.	.	.	.
AREA UTIL BLDG	18000.	.	.	.	.	.	.	.	.	.
ENTRANCES + SGNS	30000.	.	.	.	.	.	.	.	.	.
1RF OF 40FTW TRL	42240.	44352.	.	.	.	.	.	.	.	.
STABLE	10000.	.	.	.	.	.	.	.	.	.
SKEET + RIF RANG	5000.	.	.	.	.	.	.	.	.	.
DOCKS + LANDINGS	20000.	.	.	.	.	.	.	.	.	.
MGR HOUSE	20000.	.	.	.	.	.	.	.	.	.
WATER WELL	6300.	.	.	.	.	.	.	.	.	.
MAINT FACILITIES	10000.	.	.	.	.	.	.	.	.	.
WILDNERNESS LAND	100.	.	.	.	.	.	.	.	.	.
AREA 1 DREDGING	18000.	.	.	.	.	.	.	.	.	.
AREA 2 DREDGING	.	.	33000.	.	.	.	.	.	.	.
HIKING TRAIL	16000.	.	17600.	.	.	.	.	.	.	.
TOTAL	680640.	117852.	166100.	80500.	.	.	.	.	.	.

ACRES DEDICATED (A)

	1	2	3	4	5	6	7	8	9	10
GENERAL USE										
10FT 1/2 SURF RD	32.13	8.03	8.03	8.03	.00	.00	.00	.00	.00	.00
SECOND REC BLD	.00	.00	1.00	.00	.00	.00	.00	.00	.00	.00
CLUB HOUSE	25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
I-O POOL	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AREA SWM POOL	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00
AREA UTIL BLDG	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00
ENTRANCES + SGNS	1.83	.00	.00	.00	.00	.00	.00	.00	.00	.00
1RF OF 40FTW TRL	38.78	38.78	.00	.00	.00	.00	.00	.00	.00	.00
STABLE	4.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
SKEET + RIF RANG	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
DOCKS + LANDINGS	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MGR HOUSE	.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
MAINT FACILITIES	2.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
WILDNERNESS LAND	2120.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
HIKING TRAIL	2.89	.00	2.89	.00	.00	.00	.00	.00	.00	.00
SPECIFIC USE										
10FT 1/2 SURF RD	.00	16.98	16.98	16.98	16.98	8.26	.00	.00	.00	.00
1RF OF 40FTW TRL	.00	15.15	15.15	15.15	15.15	8.26	.00	.00	.00	.00
TOTAL	2230.24	78.96	44.06	40.17	32.13	16.52	.00	.00	.00	.00

(B)

INITIAL RAW LAND AVAILABLE--	3300.00 ACRES
LAND FOR .5AC LOTS W/UTIL	450.00
LAND FOR 1AC LOT W/O UTIL	400.00
LAND FOR STUDIO CONDO LUX	4.00

PURCHASE BASIS OF RAW LAND FOR DEVELOPER	425000.	(C)
DEBT OUTSTANDING ON RAW LAND AT START OF DEVELOPMENT	.	
BOOK EQUITY IN RAW LAND AT START OF DEVELOPMENT	425000.	
RESALE VALUE OF RAW LAND NET OF TRANSFER COSTS	425000.	
RESALE EQUITY IN RAW LAND	425000.	
INITIAL EQUITY CASH IN DEVELOPMENT ENTITY	115000.	
TOTAL EQUITY IN DEVELOPMENT ENTITY	540000.	
CASH EXPENSES OF ORGANIZATION	5000.	AMORTIZED FOR 5 YEARS--RECOGNIZED IN TAXABLE INCOME
NET CASH FOR DEVELOPMENT	110000.	INCLUDED IN YEAR 1 NET CASH AFTER TAXES

FINANCING FOR LAND DEVELOPMENT (D)

1ST MORTGAGE AMOUNT-- 3000000. INTEREST RATE--.1200 MONTHLY PAYMENT-- .RELEASE PAYMENT-- 8000.

	1	2	3	4	5	6	7	8	9	10
PRINCIPAL PAID	.	1504000.	1504000.	1504000.	526990.	.	.	.	.	.
INTEREST	105000.	180728.	127644.	67741.	15824.	.	.	.	.	.
PRINCIPAL RECEIVED	1750010.	1016120.	1107150.	902460.	263250.	.	.	.	.	.
BALANCE	1750010.	1262130.	865280.	263740.	.	.	.	.	.	.

LAND DEVELOPMENT CASH FLOW ANALYSIS FOR--WATER RESOURCES UNIT STUDY

.5AC LOTS W/UTIL

SUMMARY OF INPUTS

			YEAR	SALES PRICE (A)	NO. UNITS SOLD
LOT SIZE--SQUARE FEET	21780.		1	8000.	.
LOT SIZE--ACRES	.50		2	8000.	180.
PERCENT SOLD FOR CASH EACH YEAR	100.00		3	8400.	180.
O/O DOWN REQUIRED ON LAND CONTRACT SALES	.00		4	8400.	180.
INTEREST RATE ON LAND CONTRACT SALES	.00		5	8800.	180.
TERM IN YEARS ON LAND CONTRACT SALES	.00		6	8800.	180.
CARRYING COST PER UNIT OF SALES INVENTORY	100.00	(D)	7	.	.
SALES COMMISSIONS O/O OF SALES PRICE	15.00		8	.	.
CLOSING COSTS PER UNIT	425.00		9	.	.
CAPITAL COST PER UNIT	1625.00		10	.	.

DEVELOPMENT PERIOD	1	2	3	4	5	6	7	8	9	10
BEGINNING INVENTORY (B)	.	.	45.	45.	45.	45.	.	.	.	.
PRODUCTION STARTS	225.	180.	180.	180.	135.	.	.	.	.	.
PRODUCTION COMPLETIONS	.	225.	180.	180.	180.	135.	.	.	.	.
SALES IN UNITS	.	180.	180.	180.	180.	180.	.	.	.	.
UNITS SOLD FOR CASH	.	180.	180.	180.	180.	180.	.	.	.	.
PRICE PER UNIT	8000.	8000.	8400.	8400.	8800.	8800.	.	.	.	.
REVENUE FROM CASH SALES	.	1440000.	1512000.	1512000.	1584000.	1584000.	.	.	.	.
UNITS SOLD ON LAND CONTRACTS	.	.	.	.	.	.	.	.	.	.
DOWN PAYMENT RECEIVED	.	.	.	.	.	.	.	.	.	.
ACCOUNTS RECEIVABLE ADDED	.	.	.	.	.	.	.	.	.	.
SALES COSTS										
COMMISSIONS PAID	-.	216000.	226800.	226800.	237600.	237600.	.	.	.	.
CLOSING COSTS	.	76500.	76500.	76500.	76500.	76500.	.	.	.	.
NET CASH GENERATED FROM SALES	-.	1147500.	1208700.	1208700.	1269900.	1269900.	-.	-.	-.	-.
RUNOFF OF LAND CONTRACT SALES										
INTEREST	.	.	.	.	.	.	.	.	.	.
PRINCIPAL	.	.	.	.	.	.	.	.	.	.
PERIOD END ACCOUNTS RECEIVABLE	.	.	.	.	.	.	.	.	.	.
REAL ESTATE TAXES ON INVENTORY	.	5346.	11226.	11226.	11761.	5880.	.	.	.	.
CARRYING COST OF INVENTORY	.	2250.	4500.	4500.	4500.	2250.	.	.	.	.
CAPITAL COST OF IMPROVEMENTS (C)	365625.	307125.	321750.	336375.	263250.	.	.	.	.	.
TOTAL CASH REVENUE	-365625.	832784.	871224.	856604.	990390.	1261770.	.	.	.	.

1AC LOT W/O UTIL

SUMMARY OF INPUTS

	(B)	YEAR	SALES PRICE (A)	NO. UNITS SOLD
LOT SIZE--SQUARE FEET	43560.	1	5500.	
LOT SIZE--ACRES	1.00	2	5500.	100.
PERCENT SOLD FOR CASH EACH YEAR	100.00	3	5775.	100.
O/O DOWN REQUIRED ON LAND CONTRACT SALES	.00	4	6050.	100.
INTEREST RATE ON LAND CONTRACT SALES	.00	5	6050.	100.
TERM IN YEARS ON LAND CONTRACT SALES	.00	6	.	.
CARRYING COST PER UNIT OF SALES INVENTORY	100.00	7	.	.
SALES COMMISSIONS O/O OF SALES PRICE	15.00 (D)	8	.	.
CLOSING COSTS PER UNIT	325.00	9	.	.
CAPITAL COST PER UNIT	1100.00	10	.	.

DEVELOPMENT PERIOD (B)	1	2	3	4	5	6	7	8	9	10
BEGINNING INVENTORY	.	.	25.	25.	25.	.	.	.	.	.
PRODUCTION STARTS	125.	100.	100.	75.	.	.	.	.	.	.
PRODUCTION COMPLETIONS	.	125.	100.	100.	75.	.	.	.	.	.
SALES IN UNITS	.	100.	100.	100.	100.	.	.	.	.	.
UNITS SOLD FOR CASH	.	100.	100.	100.	100.	.	.	.	.	.
PRICE PER UNIT	5500.	5500.	5775.	6050.	6050.	.	.	.	.	.
REVENUE FROM CASH SALES	.	550000.	577500.	605000.	605000.	.	.	.	.	.
UNITS SOLD ON LAND CONTRACTS	.	.	.	.	.	.	.	.	.	.
DOWN PAYMENT RECEIVED	.	.	.	.	.	.	.	.	.	.
ACCOUNTS RECEIVABLE ADDED	.	.	.	.	.	.	.	.	.	.
SALES COSTS										
COMMISSIONS PAID	.	82500.	86625.	90750.	90750.	.	.	.	.	.
CLOSING COSTS	.	32500.	32500.	32500.	32500.	.	.	.	.	.
NET CASH GENERATED FROM SALES	.	435000.	458375.	481750.	481750.	.	.	.	.	.
RUNOFF OF LAND CONTRACT SALES										
INTEREST	.	.	.	.	.	.	.	.	.	.
PRINCIPAL	.	.	.	.	.	.	.	.	.	.
PERIOD END ACCOUNTS RECEIVABLE	.	.	.	.	.	.	.	.	.	.
REAL ESTATE TAXES ON INVENTORY	.	2041.	4287.	4492.	2246.	.	.	.	.	.
CARRYING COST OF INVENTORY	.	1250.	2500.	2500.	1250.	.	.	.	.	.
CAPITAL COST OF IMPROVEMENTS	137500.	115500.	121000.	94875.	.	.	.	.	.	.
TOTAL CASH REVENUE	-137500.	316209.	330588.	379883.	478254.	.	.	.	.	.

STUDIO CONDO LUX

SUMMARY OF INPUTS

(B)			(A)	
		YEAR	SALES PRICE	NO. UNITS SOLD
LOT SIZE--SQUARE FEET	550.	1	17900.	.
LOT SIZE--ACRES	.01	2	17900.	20.
PERCENT SOLD FOR CASH EACH YEAR	100.00	3	18795.	20.
O/O DOWN REQUIRED ON LAND CONTRACT SALES	.00	4	19690.	20.
INTEREST RATE ON LAND CONTRACT SALES	.00	5	20585.	20.
TERM IN YEARS ON LAND CONTRACT SALES	.00	6	.	.
CARRYING COST PER UNIT OF SALES INVENTORY	300.00	7	.	.
SALES COMMISSIONS O/O OF SALES PRICE (D)	15.00	8	.	.
CLOSING COSTS PER UNIT	1000.00	9	.	.
CAPITAL COST PER UNIT	9825.00	10	.	.

(B) DEVELOPMENT PERIOD	1	2	3	4	5	6	7	8	9	10
BEGINNING INVENTORY	.	.	5.	5.	5.	.	.	.	.	.
PRODUCTION STARTS	25.	20.	20.	15.	.	.	.	.	.	.
PRODUCTION COMPLETIONS	.	25.	20.	20.	15.	.	.	.	.	.
SALES IN UNITS	.	20.	20.	20.	20.	.	.	.	.	.
UNITS SOLD FOR CASH	.	20.	20.	20.	20.	.	.	.	.	.
PRICE PER UNIT	17900.	17900.	18795.	19690.	20585.	.	.	.	.	.
REVENUE FROM CASH SALES	.	358000.	375900.	393800.	411700.	.	.	.	.	.
UNITS SOLD ON LAND CONTRACTS	.	.	.	.	.	.	.	.	.	.
DOWN PAYMENT RECEIVED	.	.	.	.	.	.	.	.	.	.
ACCOUNTS RECEIVABLE ADDED	.	.	.	.	.	.	.	.	.	.
SALES COSTS										
COMMISSIONS PAID	.	53700.	56385.	59070.	61755.	.	.	.	.	.
CLOSING COSTS	.	20000.	20000.	20000.	20000.	.	.	.	.	.
NET CASH GENERATED FROM SALES	.	284300.	299515.	314730.	329945.	.	.	.	.	.
RUNOFF OF LAND CONTRACT SALES										
INTEREST	.	.	.	.	.	.	.	.	.	.
PRINCIPAL	.	.	.	.	.	.	.	.	.	.
PERIOD END ACCOUNTS RECEIVABLE	.	.	.	.	.	.	.	.	.	.
REAL ESTATE TAXES ON INVENTORY	.	1329.	2791.	2923.	1528.	.	.	.	.	.
CARRYING COST OF INVENTORY	.	750.	1500.	1500.	750.	.	.	.	.	.
CAPITAL COST OF IMPROVEMENTS	245625.	206325.	216150.	169480.	.	.	.	.	.	.
TOTAL CASH REVENUE	-245625.	75896.	79074.	140827.	327667.	.	.	.	.	.

2 BR CONDOMINIUM

SUMMARY OF INPUTS

	B			A	
			YEAR	SALES PRICE	NO. UNITS SOLD
LOT SIZE--SQUARE FEET	750.		1	22500.	.
LOT SIZE--ACRES	.01		2	22500.	20.
PERCENT SOLD FOR CASH EACH YEAR	100.00		3	23625.	20.
O/O DOWN REQUIRED ON LAND CONTRACT SALES	.00		4	24750.	20.
INTEREST RATE ON LAND CONTRACT SALES	.00		5	25875.	20.
TERM IN YEARS ON LAND CONTRACT SALES	.00		6	.	.
CARRYING COST PER UNIT OF SALES INVENTORY	300.00		7	.	.
SALES COMMISSIONS O/O OF SALES PRICE	15.00	D	8	.	.
CLOSING COSTS PER UNIT	1000.00		9	.	.
CAPITAL COST PER UNIT	12825.00		10	.	.

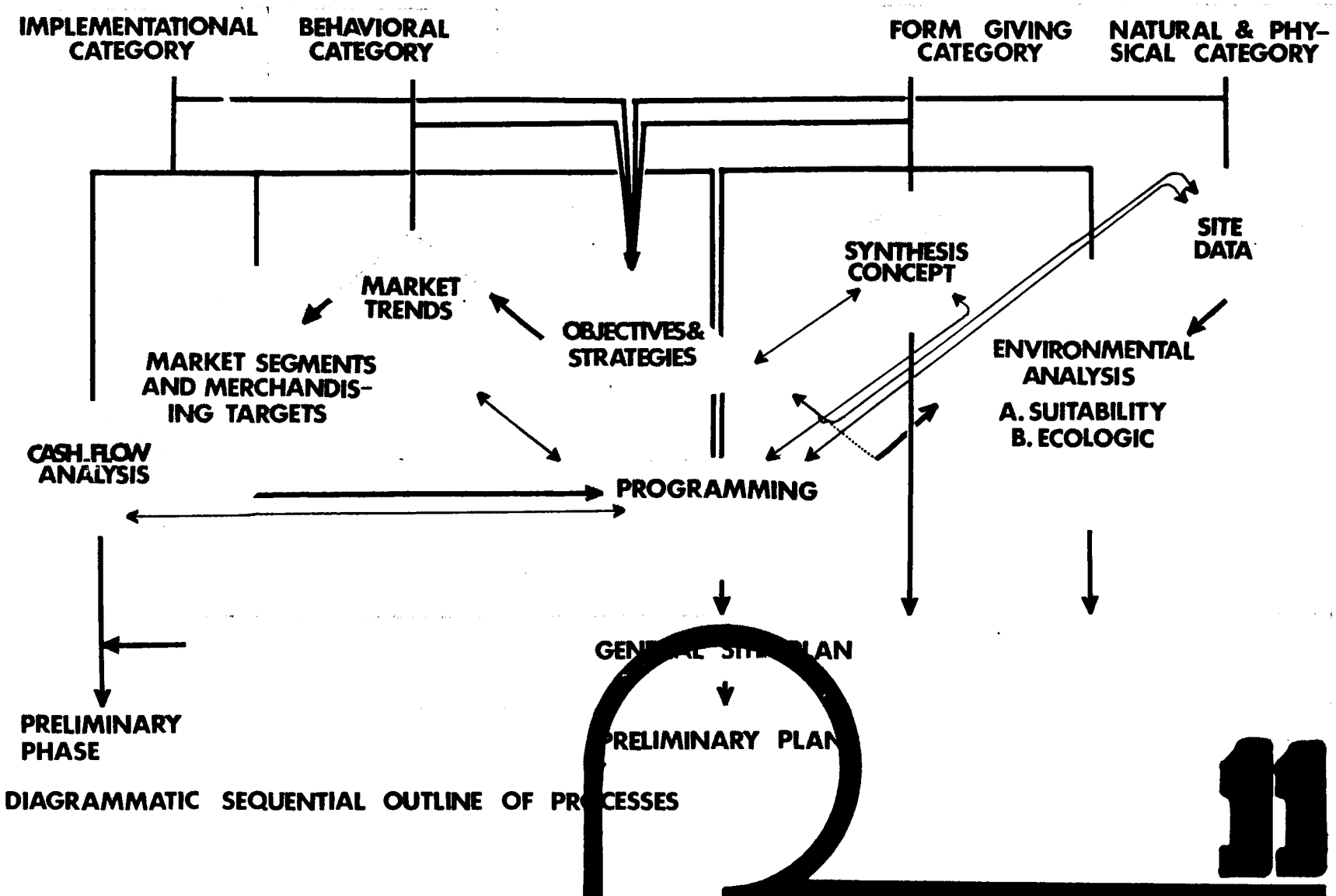
DEVELOPMENT PERIOD (B)	1	2	3	4	5	6	7	8	9	10
BEGINNING INVENTORY	.	.	5.	5.	5.	.	.	.	.	.
PRODUCTION STARTS	25.	20.	20.	15.	.	.	.	.	.	.
PRODUCTION COMPLETIONS	.	25.	20.	20.	15.	.	.	.	.	.
SALES IN UNITS	.	20.	20.	20.	20.	.	.	.	.	.
UNITS SOLD FOR CASH	.	20.	20.	20.	20.	.	.	.	.	.
PRICE PER UNIT	22500.	22500.	23625.	24750.	25875.	.	.	.	.	.
REVENUE FROM CASH SALES	.	450000.	472500.	495000.	517500.	.	.	.	.	.
UNITS SOLD ON LAND CONTRACTS	.	.	.	.	.	.	.	.	.	.
DOWN PAYMENT RECEIVED	.	.	.	.	.	.	.	.	.	.
ACCOUNTS RECEIVABLE ADDED	.	.	.	.	.	.	.	.	.	.
SALES COSTS										
COMMISSIONS PAID	.	67500.	70875.	74250.	77625.	.	.	.	.	.
CLOSING COSTS	.	20000.	20000.	20000.	20000.	.	.	.	.	.
NET CASH GENERATED FROM SALES	.	362500.	381625.	400750.	419875.	.	.	.	.	.
RUNOFF OF LAND CONTRACT SALES										
INTEREST	.	.	.	.	.	.	.	.	.	.
PRINCIPAL	.	.	.	.	.	.	.	.	.	.
PERIOD END ACCOUNTS RECEIVABLE	.	.	.	.	.	.	.	.	.	.
REAL ESTATE TAXES ON INVENTORY	.	1670.	3508.	3675.	1921.	.	.	.	.	.
CARRYING COST OF INVENTORY	.	750.	1500.	1500.	750.	.	.	.	.	.
CAPITAL COST OF IMPROVEMENTS	320625.	269325.	282150.	221230.	.	.	.	.	.	.
TOTAL CASH REVENUE	-320625.	90754.	94466.	174345.	417204.	.	.	.	.	.

LAND DEVELOPMENT CASH FLOW ANALYSIS FOR--WATER RESOURCES UNIT STUDY

AGGREGATE RESULTS

DEVELOPMENT PERIOD	1	2	3	4	5	6	Total	% of sales
REVENUE FROM CASH SALES	.	2798000.	2937900.	3005800.	3118200.	1584000.	13,443,900	100%
DOWNPAYMENT RECEIVED	.	.	.	.	.	.		
ACCOUNTS RECEIVABLE ADDED	.	.	.	.	.	.		
SALES COSTS								
COMMISSIONS PAID	.	419700.	440685.	450870.	467730.	237600.	2,016,585	15
CLOSING COSTS	.	149000.	149000.	149000.	149000.	76500.	672,500	05
RUNOFF OF LAND CONTRACT SALES								
INTEREST	.	.	.	.	.	.		
PRINCIPAL	.	.	.	.	.	.		
PERIOD END ACCOUNTS RECEIVABLE	.	.	.	.	.	.		
CASH FROM OPERATIONS	.	2229300.	2348220.	2405930.	2501470.	1269900.	10,754,820	80
LESS CASH OUTLAYS								
CARRYING COSTS--RAW LAND	1650.	.	.	.	.	.	1,650	00
CARRYING COSTS--INVENTORY	.	5000.	10000.	10000.	7250.	2250.	34,500	00
REAL ESTATE TAX--RAW LAND	6311.	.	.	.	.	.	6,311	00
REAL ESTATE TAXES--INVENTORY	.	10387.	21813.	22317.	17456.	5880.	77,853	01
MANAGEMENT + ADMIN. COSTS	175001.	521312.	551400.	541116.	494055.	237600.	2,520,484	19
NEW ALLOCATED CAPITAL OUTLAYS	1069370.	898275.	941050.	821960.	263250.	.	3,993,905	30
NEW GENERAL CAPITAL OUTLAYS	680640.	117852.	166100.	80500.	.	.	1,045,092	08
NET CASH REVENUE	-1932970.	676488.	657860.	930050.	1719470.	1024170.	3,075,068	23
PROJECT DEBT STRUCTURE								
TOTAL INITIAL BALANCE	.							
BALANCE END OF YEAR	1750010.	1262130.	865280.	263740.	.	.		
TOTAL PRINCIPAL PAYMENTS	.	1504000.	1504000.	1504000.	526990.	.	5,038,990	37
TOTAL INTEREST PAID ON PROJ.	105000.	207422.	181013.	133550.	81556.	.	708,541	05
INTEREST ADDED TO LOAN BAL.	.	.	.	.	.	.		
NET CASH FROM DEBT INCURRED	1750010.	1016120.	1107150.	902460.	263250.	.	5,038,990	37
CASH AVAILABLE BEFORE TAXES	-287960.	-18820.	80000.	194960.	1374180.	1024170.	2,366,530	18
CAPITAL COST OF IMPROVEMENTS PRORATED TO UNITS SOLD	.	898275.	930354.	941050.	983825.	351000.	4,104,504	31
GENERAL CAPITAL COST PRORATED TO UNITS SOLD	.	166181.	220327.	256809.	266412.	135336.	1,045,065	08
LAND COST PRORATED TO UNITS SOLD	.	88452.	92875.	95021.	98574.	50074.	424,996	03
TAXABLE INCOME FROM OPERATIONS	-288960.	331288.	339445.	405089.	551364.	487760.	2,114,946	16
ESTIMATED INCOME TAXES	.	159018.	162933.	194442.	264654.	234124.	1,015,171	08
TAX SAVINGS ON OTHER INCOME	138700.	.	.	.	.	.		
NET CASH AFTER TAXES	-177960.	-177838.	-82933.	518.	1109530.	790050.	1,900,098	14
REINVESTED EARNINGS	.	.	.	.	.	.		
WORKING CAPITAL LOAN BALANCE	177960.	355798.	438731.	438213.	.	.		
CASH AFTER TAXES FOR DIVIDENDS OR REINVESTMENT	.	.	.	.	671320.	790050.	1,461,370	11
DIVIDENDS PAID	.	.	.	.	671320.	790050.	1,461,370	11
NET AFTER TAX + DEBT REPAYMENT ON BULK SALES	-1247330.	-754872.	-484430.	-47947.	226103.	30.		
P.V. AT 20.0/0 OF EQUITY RETURNS	-923860.	-408630.	-164762.	92461.	476237.	649967.		
INTERNAL RATE OF RETURN						19.1%		

A MULTI-DISCIPLINARY APPROACH TO DESIGN



DIAGRAMMATIC SEQUENTIAL OUTLINE OF PROCESSES

PRELIMINARY PLAN 11

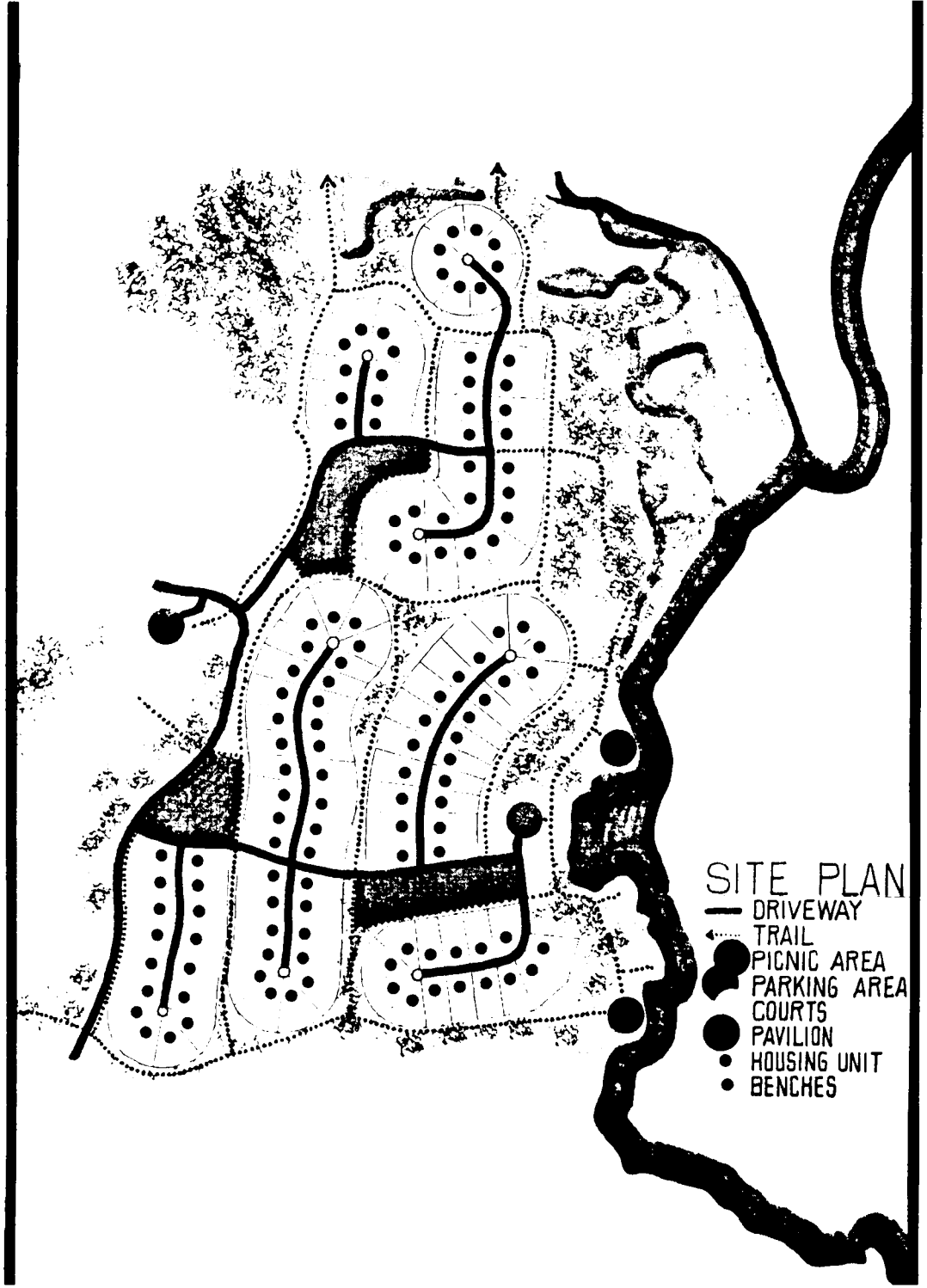
11.1 INTRODUCTION

Although a preliminary plan is not included in the present contract, a description of some partial plans and studies is necessary to communicate the concepts discussed and stress some plan elements that are not traditionally considered. A discussion of two partial preliminary plans and two partial studies follows. These are a recreational housing case study on the western side of Lily Lake, a recreational activities case study on the eastern side of the lake, a study of the architectural elements, and finally, a study of signs in the Lily Lake Forest Recreational Environ.

11.2 A RECREATIONAL HOUSING CASE STUDY

The area west of Lily Lake happened to be the only area in the chalet lots suitability category for which detailed topographic coverage (5-foot contour interval) was completed. However, in any case it would have been the logical choice for the development of a preliminary plan from the general site plan because of its relationship to the shoreline, as well as its diversity of topography.

This area is part of the mid-neighborhood, one of three neighborhoods in the development. The mid-neighborhood would include a number of housing groups--the number determined by the cash-flow analysis. The study area includes two of these housing groups: the northern, composed of four housing clusters, and the southern, with five clusters. The number of clusters, as well


SITE PLAN
DRIVEWAY
TRAIL
PICNIC AREA
PARKING AREA
COURTS
PAVILION
HOUSING UNIT
BENCHES

as the number of chalet lots per cluster, was determined by the locational determinants within the site. These determinants also helped to shape the layout shown on page 140. The layout results from a detailed analysis of drainage-ridge patterns, vegetation coverage, slopes, elevations, as well as an analysis of views from the site--views in summer, in winter, and potential views resulting from selective cutting or pruning.

A description of a preliminary plan for the study area follows.

Each of the two housing groups in the case study area is served by a road that branches into smaller, dead-end roads serving the housing clusters. The chalet lots in each cluster are grouped rather tightly (one-half acre per lot) in an organic pattern, leaving the rest of the natural resource untouched for all club members to enjoy. Each ten-to-twenty lots is served by one septic waste disposal system located in the area of best intrinsic natural suitability. Each chalet lot is also served by a trail that connects the lot to the various recreational activities--the beach, the picnic area, the lake pavilion, the field-game courts, and to the major network of trails leading to the remainder of the club. These trails hug the green corridor system that includes the major forest areas and those ribbons of vegetation determined by edge effect.

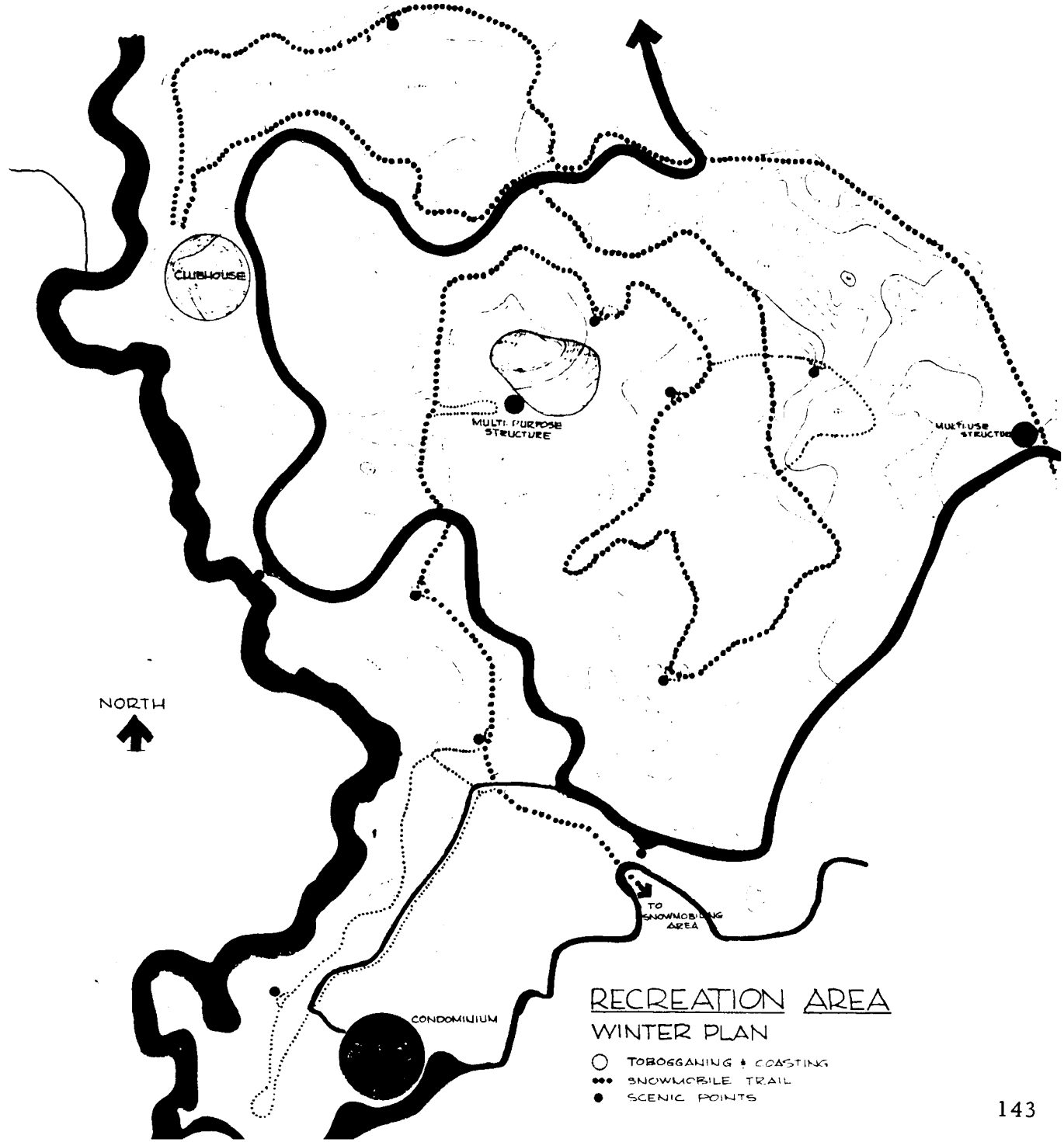
The clusters and the green corridors in this partial preliminary plan follow the guidelines discussed in the synthesis concept chapter and applied in the general site plan. This partial plan is intended to illustrate and stress the continuity of the cluster-green corridor concept throughout the design in a hierarchy of detail that fits one level within another. Or, perhaps in simpler words:

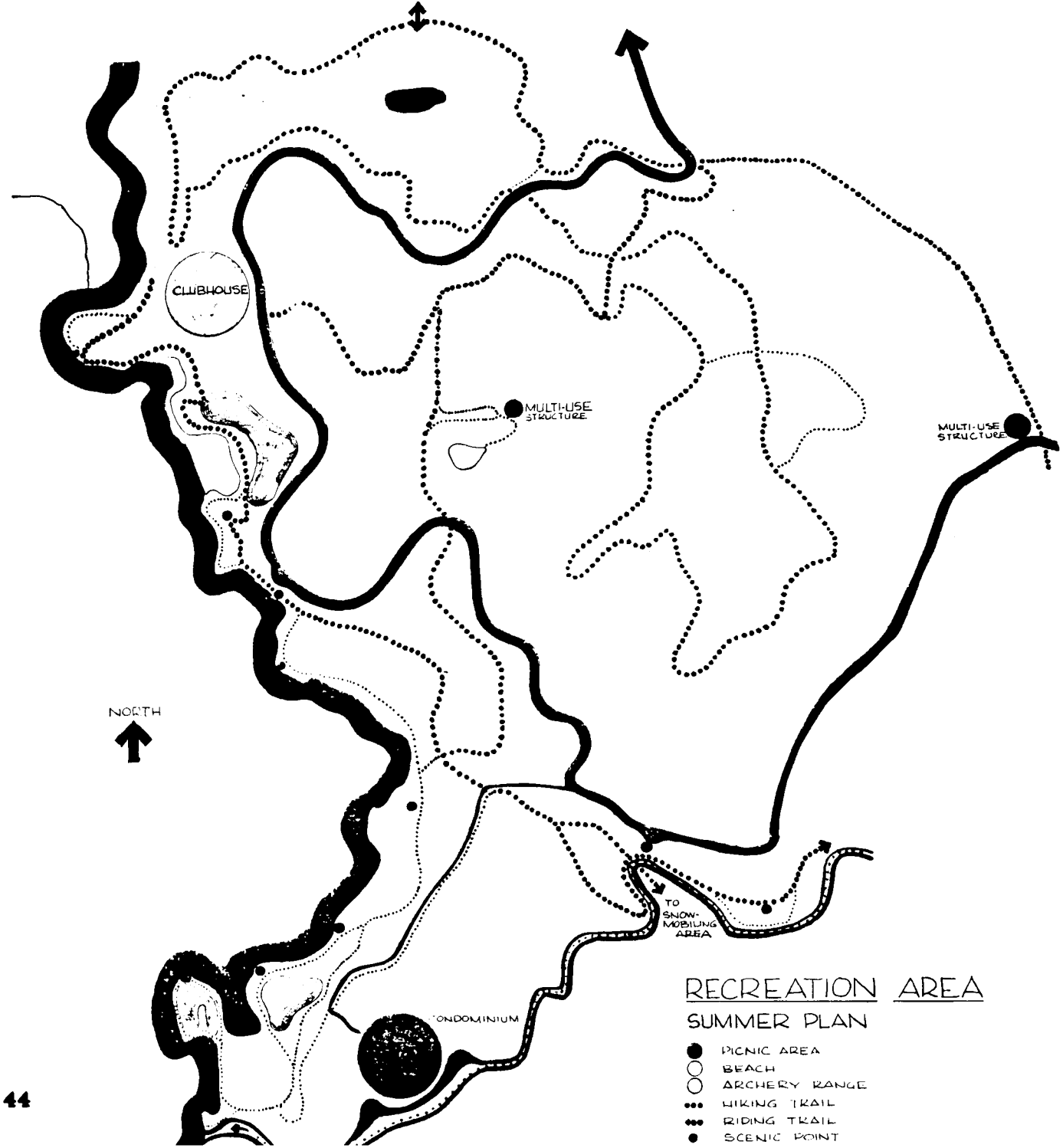
Big fleas have little fleas
Upon their back to bite 'em;
Little fleas have lesser fleas,
And so ad infinitum.

11. 3 A RECREATIONAL ACTIVITIES CASE STUDY

While the smallest detail in the corridor system is the trail leading to each individual chalet, the "big flea" is the major forest area that stretches along the whole eastern shoreline of Lily Lake. This forest area encompasses the maximum diversity of vegetation and topography, and contains the upstream stretch of Lily River. It includes most of the recreational activities in the club ranging from the river hiking trail in the extreme north, to the snowmobiling area in the extreme south. The partial preliminary plan covers only the mid-section of this major forest.

As in the recreational housing case study, the forest area was analyzed in detail with studies of drainage-ridge patterns, vegetation coverage, slopes, elevations, as well as an analysis of views. A preliminary plan was developed then to locate the recreational physical components included in the program in proper functional relationships in the areas with maximum intrinsic natural suitability. The general layout of this area was portrayed in the recreational activities category description (page 113). The more specific description of the area's trail layout is presented in two versions--one for summer and one for winter.


CLUBHOUSE
MULTI PURPOSE STRUCTURE
NORTH
TO SNOWMOBILING AREA
CONDOMINIUM
RECREATION AREA
WINTER PLAN
TOBOGGANING & COASTING
SNOWMOBILE TRAIL
SCENIC POINTS


CLUBHOUSE
MULTI-USE STRUCTURE
MULTI-USE STRUCTURE
NORTH
TO SNOW-MOBILING AREA
CONDOMINIUM
RECREATION AREA
SUMMER PLAN
PICNIC AREA
BEACH
ARCHERY RANGE
HIKING TRAIL
RIDING TRAIL
SCENIC POINT

The winter version includes a limited stretch of snowmobile trails that originate at the club house and penetrate southward toward the snowmobile area in the southern portion of the site. These trails are designed for maximum enjoyment by the proper vertical and horizontal alignment of the curvilinear trail. The well-marked trails which are laid in a one-way system with occasional loops, are divided into a number of sections, each with a specific destination--a picnic shelter or a snowmobile shelter with a fireplace. One of these structures also serves the tobogganing and coasting slopes, as indicated in the winter plan, page 143.

The summer version includes the snowmobile trails that are used for horseback riding, a canoe trail that offers an outstanding experience in the meandering Lily River, and a network of hiking trails. The trails connect the club house, picnic areas, beaches, scenic spots, and the archery range with its natural backdrop of steep slopes. Those trails provide for the development of the functional continuity prescribed in the cluster-corridor concept.

11. 4 PARTIAL STUDIES

The functional continuity in design needs to be strengthened by visual continuity. The homogenous totality that is one goal of the cluster-corridor system concept could be easily lost if the architecture--color, texture, form--and signs in the development--were not consciously integrated. In an effort to stress the importance of these two elements--architecture and signs--and to offer some examples of proper integration, the following two

partial studies were performed. They should be reviewed in that context and not viewed as total or finished studies.

11.5 ARCHITECTURE

The architecture in the development can be divided into two categories: structures built by the individual owners, and those built by the developer. Visual continuity in the first category must be ensured through regulation, and this study included an review of the by-laws of "owners association" in a number of existing recreation developments. Such by-laws include building regulations for both structure size and cost, some landscape regulations for cutting trees or planting, and some visual regulations covering colors and materials.

This partial study focuses primarily on the second category which offers the greatest opportunities for visual continuity for two reasons. First, the development includes a multitude of structures that will be built by the developer, such as the two club houses, the condominium, the stable, the beach houses, picnic shelters, etc. The architectural character of these structures alone could greatly increase the sense of visual continuity within the development. Second, and perhaps most importantly, a considerable number of people in the market sample questioned in the attitudinal studies indicated that they would prefer to buy partially finished components and construct their units themselves. The component units which owners could buy and assemble could be of similar architectural character and thus ensure a strong visual continuity not possible without component systems.

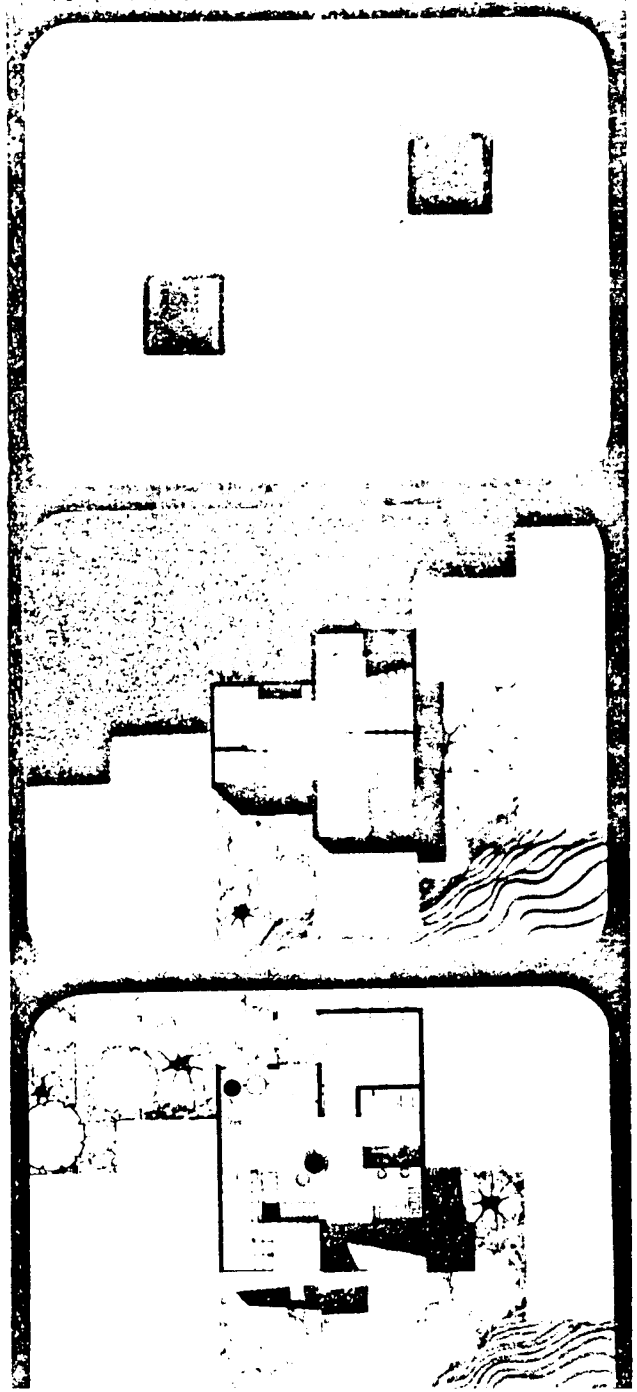
To maximize the opportunity for visual continuity, a structural system was needed which provided: (1) strong visual character, and (2) small units that could be grouped into an organic pattern to fit the varying patterns of vegetation and slopes. Small units would also offer the individual more diversity in arrangement while maintaining continuity.

A folded-structure unit with a characteristic roof profile was developed to fulfill both requirements. The specific unit described here is made of honeycomb pannels--a product of the client company--but could be made of any other economical wood product. The unit is shown on page 148 . Figure D, on the same page, shows a model of a communication booth (information center) built with two of these units. The booth houses an information map and several signs. It could also house a telephone booth, mail boxes, or any other type of communication use. Another illustration of one of the alternative uses of this structural unit--the condominium--is shown in plans in Figures B and C on page 148, and in a delineated perspective on page 149. Each condominium unit includes a prefabricated bathroom, kitchenette box unit, and is assembled from a number of prefab units that could be added or deleted through time in accordance with the family cycle of the owner. The units fit together in an organic pattern allowing pockets of vegetation to integrate the architecture in its natural surroundings. The structure's folded form together with the color and material choice maintains visual continuity. [1]

---

[1] It should be noted that the prefab units designed here do have significant market potential and could prove to be a secondary profit center for the client.

ANARCHITECTURE



THE LILY LAKE CONDOMINIUM ---------- PERSPECTIVE

SIGNS
Chalets

11. 6 SIGNS

A second design element that can enhance visual continuity is the sign system. Signs are traditionally provided for directional communication in large areas containing a diversity of activities. In this project they guide the users to their destinations--"To Bog Ecologic Trail," "To Supper Club," etc. --and provide other important information--"One-Way Snowmobile Trail; Stay on the Trail," etc. It should also be noted that a sign system can be a valuable sales device in telling buyers the kinds of facilities that are available within the project. But, signs should be considered in another equally important capacity. Signs can be attractively designed components which improve the total feeling of visual quality and continuity in the project. A partial study was undertaken to design a sequence of guide signs for the Lily Lake Forest Recreational Environ--shown on page 150--that could be assembled as in the model on page 148 . Through the coordination of size, color, form and graphic design, the signs will provide an added sense of visual quality as well as visual continuity. Signs and architecture together will in turn enhance the functional continuity of the development in one homogenous totality.

11. 7 CONCLUSION

This chapter on partial preliminary plans and studies is presented primarily to explain and emphasize the application of one basic concept: continuity--both functional and visual--throughout

the cluster-corridor system design, and the architecture and sign system design. It also demonstrates the effectiveness of a structured sequence of analysis in the development of a comprehensive design which meets both natural and cultural requirements.

11.8 FURTHER APPLICATIONS OF THIS MULTIDISCIPLINARY DESIGN PROCESS

A real estate project may be considered "feasible" when it has been determined that there is a reasonable likelihood of satisfying explicit objectives with a plan of action which fits a context of specific constraints and limiting resources, both cultural and natural. The concept of "satisfying" must be organized not only to score the fit of project features (physical components) with intangible requirements of social and esthetic standards, with the conflicting self-interests of developer, consumer, and general public, and with the more tangible decision points of financial ratios, timing, and construction; but also to score the fit between the requirements of the project features and between the natural characteristics of geology, topography, soils, hydrology, and ecology.

The infinite number of constraints upon decision makers in the design of a real estate development require a structured design process. Specification of ecological values, political constraints, or consumer preferences is a natural extension of modern design methods. The definition of relationships for each general classification of constraint suggested by this study is a simple graphic shorthand of many of these infinitely complex relationships.

The design process presented in this study organizes the infinite number of constraints and factors through a sequence of analyses and identifies the critical point at which decisions may be made. The development process is a cycle of "stop and go" thinking. At the critical points it is necessary to review and judge what is being proposed against some context of objectives and constraints. This is the "stop" process. Thus, there is an extending cycle of planning and of testing alternatives intended to solve the problem. The decisions made at each stop provide the "take off" point for the next "go." The analysis, evaluation, and decision making at each critical point in the design effort leads to a final product that systematically considers the broad range of cultural and natural constraints.

The multidisciplinary design process presented in this study lends itself to almost any design study for real estate development on a wide range of scales. The level of detail and therefore expense of such a study will be a function of the money to be at risk, the foreseeable impact on the public interest and the level at which the analyst finds himself in the pyramid of decisions from conception down to execution of a project.

A successful design produces a by-product of a cumulative data bank of techniques, people, and the natural world with which the developer tampers. Unfortunately, in real estate there is a tendency to regard the successful patterns of recreational development as a static product prototype repeated without change indefinitely and imitated until the market is glutted. In fact, however, the successful project is a synthesis of adaptation to a unique set of constraints.

It is unlikely that it would be equally satisfying in another time and place. Instead the transferable asset is the increasing ease with which the designer can recognize, specify, and neutralize the constraints of the next project which must achieve its own synthesis of constraints and objectives.

It is the process of problem-solving in this multidisciplinary approach which is applicable to future developments and not the budget or the checklist which is significant in the Lily Lake Forest Recreational Environ Demonstration Project.