12-1975

# A City Marina, Conway, South Carolina

Jon L. Bourne
*Clemson University*

# A CITY MARINA

# CONWAY, SOUTH CAROLINA

# A City Marina Conway, S. C.

A SIXTH-YEAR TERMINAL PROJECT

SUBMITTED TO THE FACULTY OF

CLEMSON UNIVERSITY

COLLEGE OF ARCHITECTURE

AS PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARCHITECTURE

DECEMBER, 1975

JON L. BOURNE

# Dedication

To Ruby, my mother, for her encouragement and confidence throughout my entire educational process, for her untiring devotion, and especially for her love.

# Acknowledgments

I would like to thank the following persons, not only for their assistance in the preparation of this terminal project, but also for their friendship and guidance during the past six years:

Dean Harlan E. McClure

Gayland Witherspoon

George Means

My deepest appreciation goes to my faculty committee members for their guidance and creative imput:

Jorge Morales, Committee Chairman

Aitken Clark

Don Collins

# Credits

A special thanks to these people of Conway, S. C. for their input into this project:

Phillip Thompson, Mayor

Bri. Gen. Hoyt McMillan

Laverne Creel

S. D. Cox, Jr.

R. S. Winfield

S. E. Hendrick

Evelyn Snider

Bill Graham

Sam S. Matthis

James Miller

Conway Chamber of Commerce

Horry County Development Planning and Tourism Commission

# Contents

# Table of Contents

## Synthesis

## Concept

VISUAL PRESENTATION

# Introduction

# Project Introduction



## Justification

The past necessities of life (food, clothing, and shelter) have been expanded in our modern civilization to include another requirement, recreation. Recreation has taken many forms - the arts, sports, dancing, horticulture, fishing and leisure time, etc.

The lure of open water holds a strong fascination for many of us. Along with this is the yen to retreat from the routines and tensions of our daily lives. A tremendous interest has developed over the past years toward recreation, and especially toward small boat ownership.

Yesterday, some logs with a plank walkway in a protected cove were considered adequate for small craft moorage. In most cases they served their purpose. Today, however, with the increased number of boats, planned marinas must be developed due to lack of sufficient space in natural harbors.

Demands of boat owners have increased in matters of safety, conveniences and attendant recreational facilities. Small craft marinas have become big business and government agencies are participating in the interest of public mental as well as physical health.

The rapid growth of our population has not been followed by the reservation of land for public parks, recreation, and open space. This is particularly true in the development of our natural rivers for recreational purposes.

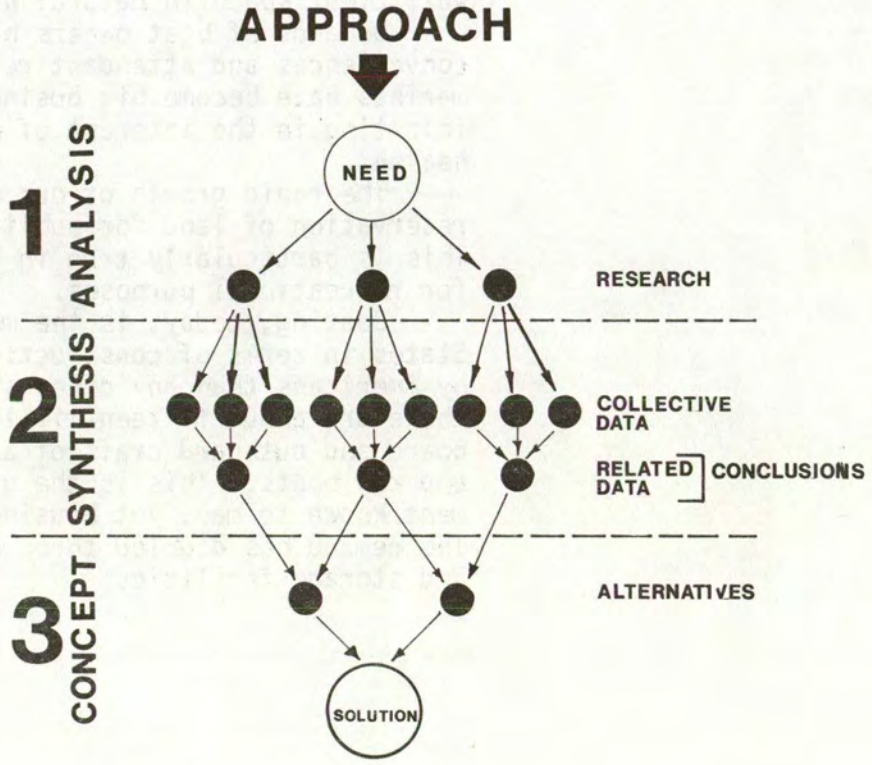
Boating, today, is the most important recreation in the United States in terms of construction. More money is spent on boating by Americans than any other single form of recreation. In the U. S., there are about fifteen million pleasure craft consisting of inboard and outboard craft of assorted sizes, sailboats, dinghies, and row boats. This is the greatest concentration of marine equipment known to man, yet housing for these crafts are quite inadequate. The demand has doubled throughout the nation foor mooring, slips, and storage facilities.

# 2

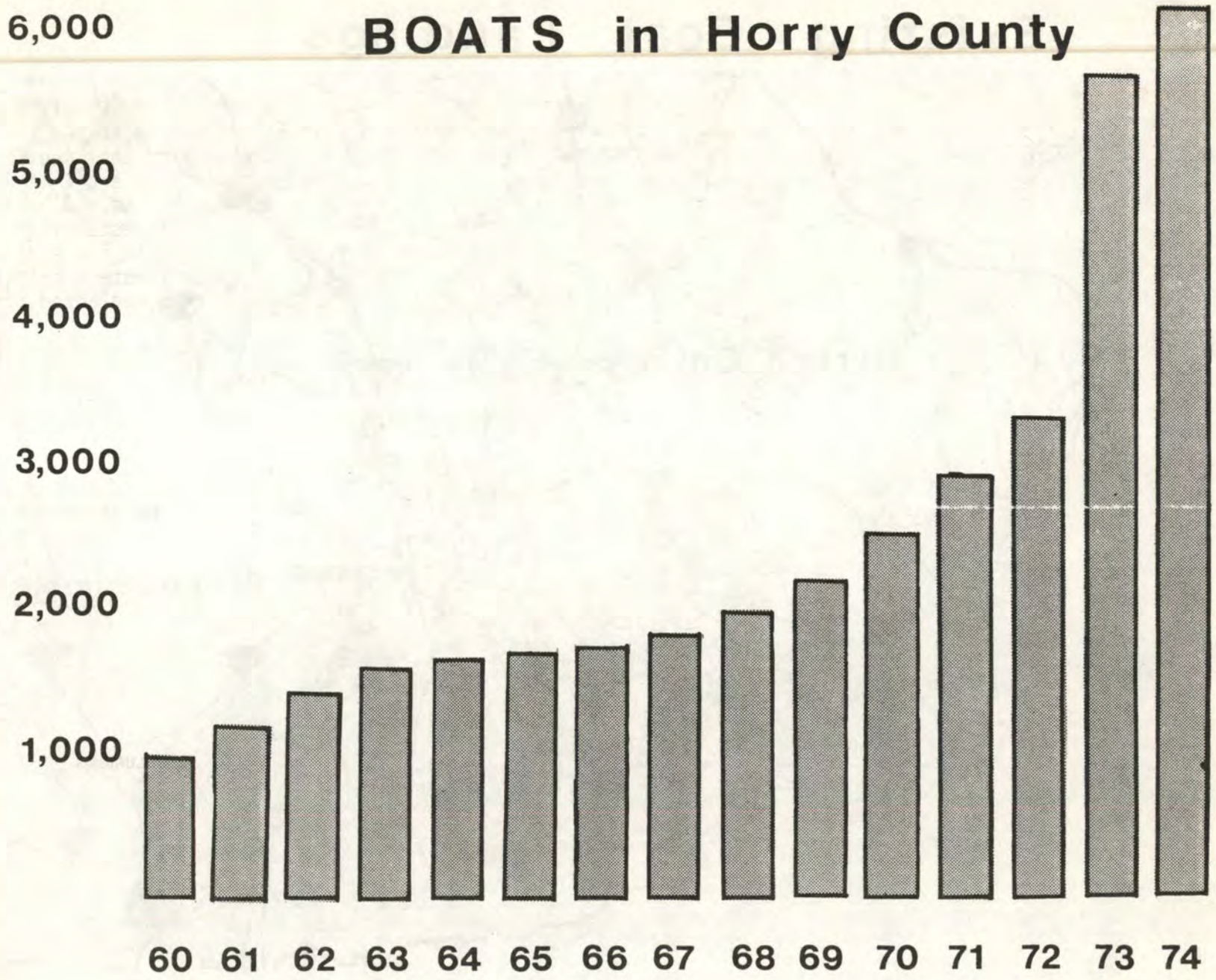
## Intent

The intent of this terminal project is three-fold. First, the demands of the growing population of marine recreation in the Waccamaw Region have to be met. Second, the facility that meets these demands has to compliment the vitality of Conway and the Waccamaw River. Planning and designing a marina and its supporting facilities through a systematic approach will help in establishing this vitality. Third, an awakening of the community to its environment is needed before any action might be taken to create a better city-river relationship. For so long now Conway has neglected its waterfront.

## Approach

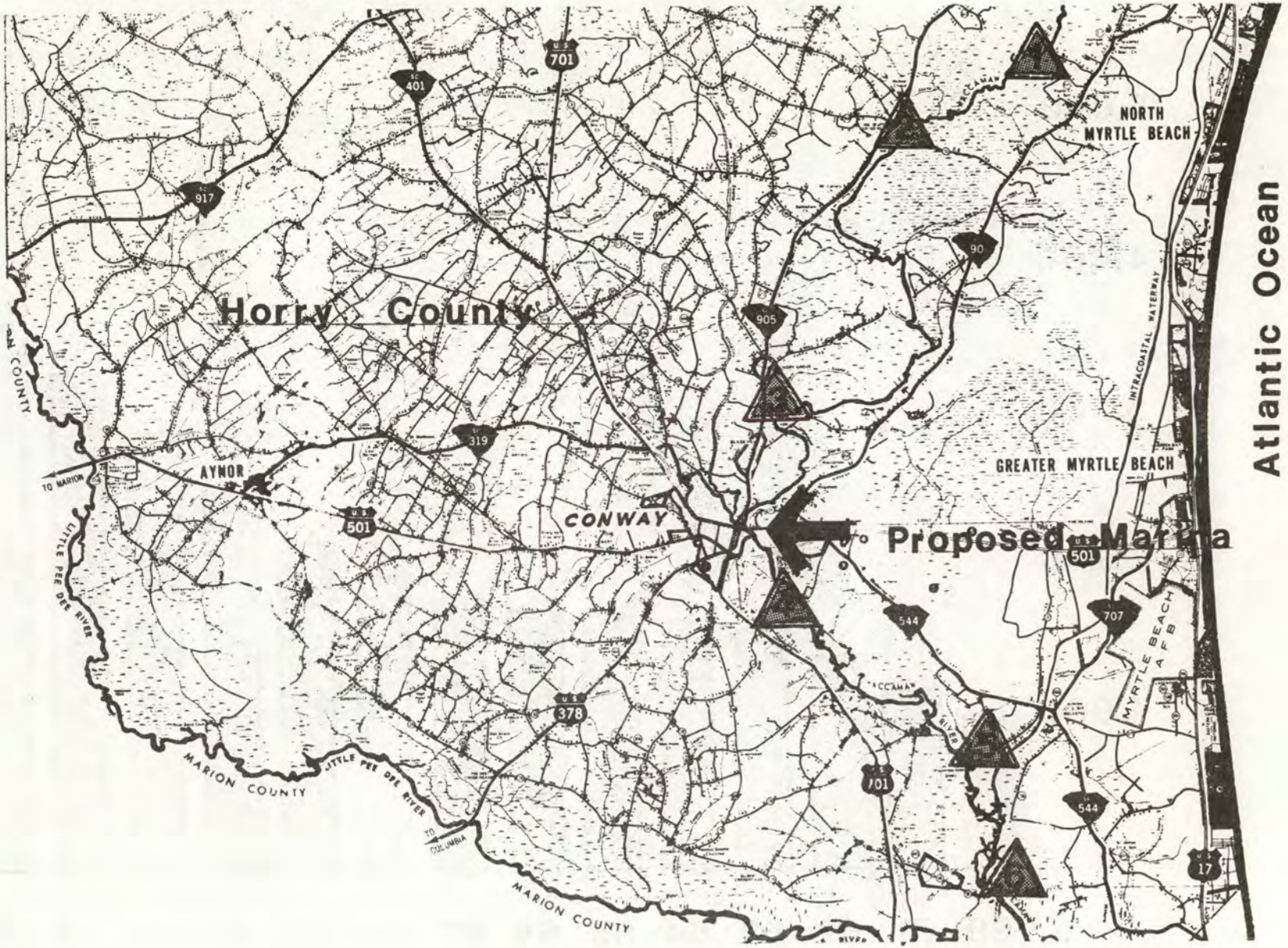


# BOATS in Horry County



4

# Existing Boat Landings



# ANALYSIS

1

# Waccamaw River Character

# Environmental Character of the River 5

## Significance

The Waccamaw River is not typical of most Low Country rivers, there has remained little development with no major urban centers along its banks. Conway (pop. 10,000) is the only city located along the river. The river originates at Lake Waccamaw some 30 miles into North Carolina, and after winding its way for more than 90 miles, it is terminated by the Great Pee Dee River some 30 miles below Conway. This river features along with its sparce development, wild swamps, and abundant wildlife. The Waccamaw River is now under investigation of the South Carolina Water Resources Commission for inclusion in the national system of "wild and scenic rivers". Designation of this river as "wild and scenic" offers two major advantages. First, it assures the preservation of large areas in their natural and unspoiled state; and second, the overall recreation potential of the region will be enhanced. Designated rivers also receive nation-wide attention and attract hunters, fishermen, and wildlife enthusiasts from outside the state. The river winds its way through Low Country wetlands. Because of its many curves that made maneuverability for larger craft almost impossible, the Rivers and Harbors Act of June, 1884, authorized much needed river improvement. This is discussed under River Improvement in the Historical Character section. The following photographs best describe the environment of the Waccamaw River.

JUNCTION OF KINGSTON LAKE WITH WACCAMAW RIVER AT CONWAY

WILD, WINDING, AND WIDE SWAMPS CHARACTERIZE WACCAMAW RIVER

# 8

## Conclusion

With the designation of the Waccamaw River as a "wild and scenic river", there will be an ever increasing number of boaters on the river. The boaters' objectives will be varied from fishing, hunting, skiing, to boat cruising. The river is fast taking on a truly recreational aspect. This increasing recreational populace will need a socialized facility to aid them in their outdoor endeavors. It is for this reason that this terminal project was undertaken.

# Historical Character of the River 9

## Significance

The importance of a river to its community can be just as vital to the growth and character of that community as the urban center of a city is to that city's growth and character. The function of both the river and urban center might change over a period of time, yet their important relationship to the community still exists.

The Waccamaw River is such a river. Its past usage is quite different from its present. Yet, there still exists a strong city-river relationship.

A study of the river's history and trends will give us a feeling of how important the Waccamaw River was to the development of Conway. An historical basis is established for developing the river's present relationship to the city. This present relationship is fully discussed later.

## Introduction

In the time of recorded history, the availability of the means of transportation and communication has been a major factor in the development and progress of civilizations. The principal cities of the ancient world and in modern times have located on, or near, the major trade routes. Accessibility to navigable waters and overland routes has been a primary influence in the growth, prosperity, and well being of population centers.

The inaccessibility of Horry County to outside areas resulted in the isolation of our people and was a dominant factor in developing their character.

# 10

## Early Inhabitants

The first known persons of European descent to explore the Waccamaw River as far as Conway were several young men from Georgetown. They came up the river in February, 1734, to "Bear Bluff". Today great sections of our beautiful river look very much the same as they did then.

The Aborigines, the Waccamaw Indians and other tribes, probably used boats, or flotation of some type, before the first Europeans arrived. We know very little about their use of the Waccamaw River as a means of transportation.

## New Era

In 1828, young Henry Buck from Bucksport, Maine, made his way up the Waccamaw River to the site of the "Upper Mill". He was searching for fine virgin timber and naval stores to supply the needs of the market in New England. He established his home there and built his first saw mill. His house stands and a part of the brick chimney for the "Upper Mill" can be seen today. He developed his biggest saw mill and shingle mill at Bucksville, a few miles down the river. The site of Bucksville is below the sharp turns, narrow places and shallow shoals found higher up the river.

This marked the beginning of a new era in our river traffic. From this time on, we know that seagoing sailing ships (two and three mast schooners) came regularly up the Waccamaw to Bucksport, (located below Bucksville on the river) to Bucksville, and as far up the river as Pott Bluff, about five miles below Conway.

# 12

## Conway Shipyard

In her "Chronological Outline of Horry County History" in the Tricentennial Edition of the Independent Republic Quarterly in 1970, Mrs. Catherine H. Lewis stated that in the 1860's the Waccamaw River was filled with traffic. The "Francis Marion" was a troop ship and is said to have been the first steamboat on the river (Cira 1862).

There may have been earlier steamboats running regular schedules on the Waccamaw River; but there is no existing information. However, good records exist of the steamboats operated by Burroughs and Collins Company as the Waccamaw Line of Steamers.

The operation of the steamboats by Burroughs and Collins Company brought the need for a shipyard to Conway. The company reactivated the old shipyard for the maintenance and repair of its steamboats. Later Burroughs and Collins built their steamboats at this place.

About this same time the "Government" shipyard located near the junction of Kingston Lake with the Waccamaw River, in front of the Perry Quattlebaum residence on Kingston Street was built. It was called the "Government" shipyard because most of the vessels built there were for the U. S. Government.

In 1896 Burroughs and Collins Company organized the "Waccamaw Line of Steamers" to continue the operation of the steamboats.

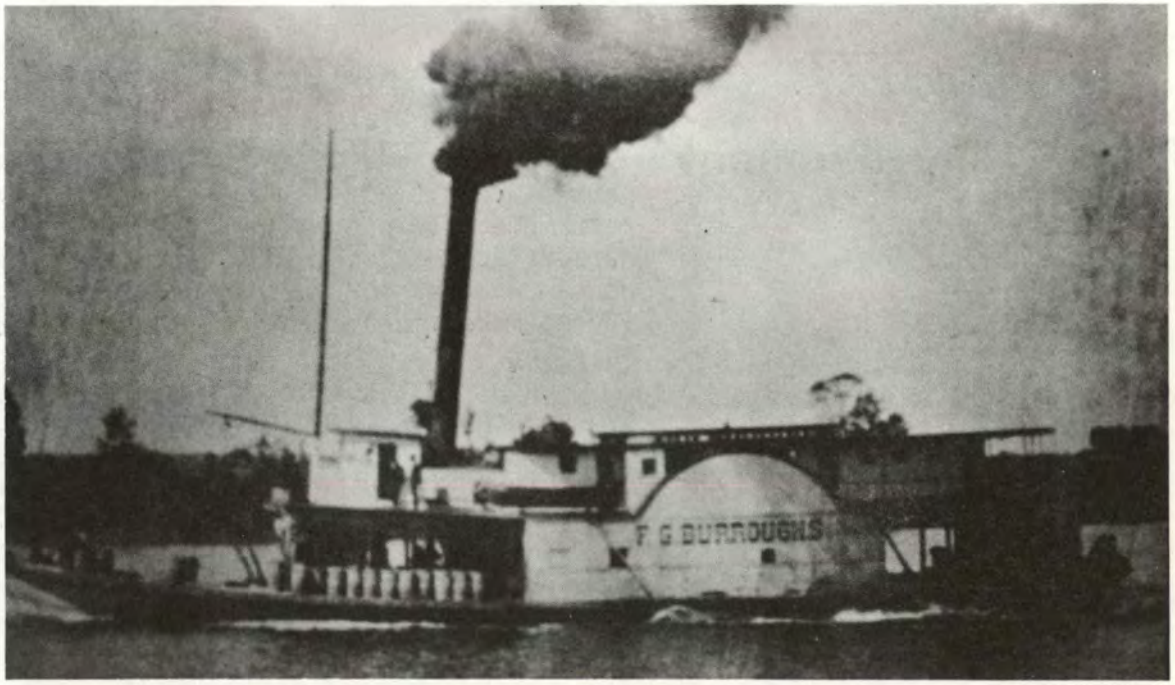
The "Church Perkins" and at least one other sailing vessel were built at the old shipyard at Conway prior to the War Between The States. This shipyard was located on the north bank of the Waccamaw River a short distance above Conway to the north of where the present approach to Seaboard Coastline Railroad turnbridge now stands. Later, this was the site of the Burroughs and Collins Shipyard where a number of steamboats were built.

## River Transportation

In his "Narrative History of Horry County", Dr. J. A. Norton (1876-1950) of Conway wrote as follows:

"The Waccamaw River was the direct means of the arrival of settlers to this section, and for a long time was the only means for getting in and out, or of getting goods in and out of the county. Even up to the time of my recollection the steamboat was the only method employed for freight transportation, all such coming in from or going down to Georgetown and from there by ocean routes to New York and Charleston."

The Waccamaw River, therefore, afforded the most efficient access to our county and was the early "highway" for immigration and commerce.



In spite of heroic efforts by our early citizens, economic progress was extremely slow; especially, during Reconstruction time.

In an article in the Horry Herald of September 9, 1909, the editor, Mr. J. W. Ogilive, wrote that the transportation facilities in 1881 were mostly by water to the outside world. He said that ocean going vessels that came up the Waccamaw River to Pott Bluff, were oftentimes delayed for long periods of time by unfavorable weather conditions. The "Nellie Floyd" and the "Eleanor" were the names of the schooners on the regular line making monthly runs.

In the Horry Herald of October 21, 1909, the editor wrote that in 1881 there were only two settlements in the county of any commercial importance - Conwayborough and Bucksville. Mr. Ogilive also stated that two and three mast schooners came up the Waccamaw River as high as Bucksville and it was a common occurrence to find two or three vessels loading or waiting to be loaded at the wharves at that place.

## River Improvement

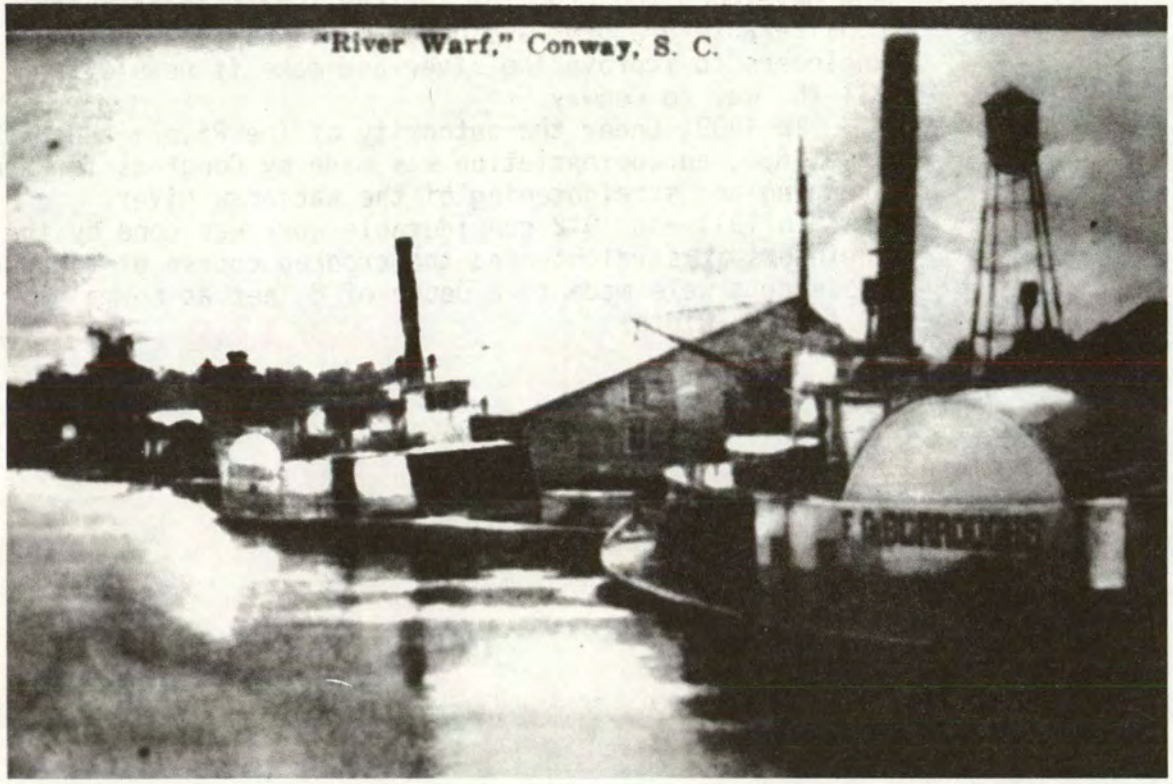
The Waccamaw River had many limitations on navigation in its natural condition. Numerous shoals, sharp bends and narrow places restricted its use by any but the smallest boats. The Rivers and Harbors Act of June, 1884, authorized the maintenance of the Waccamaw River for navigation to Conway. This was the first authority to make improvements on the river to make it more usable for shipping.

Under that authority the river was snagged below Conway in 1881. By "snagged" is meant that fallen trees, logs, and other obstructions were removed by boats especially equipped for this purpose. Also, in 1881 brush and pile jetties were constructed at shoaled areas on the river to narrow the channel and thereby force the river to run more swiftly in those areas and clear or wash away the shoals and sandbars.

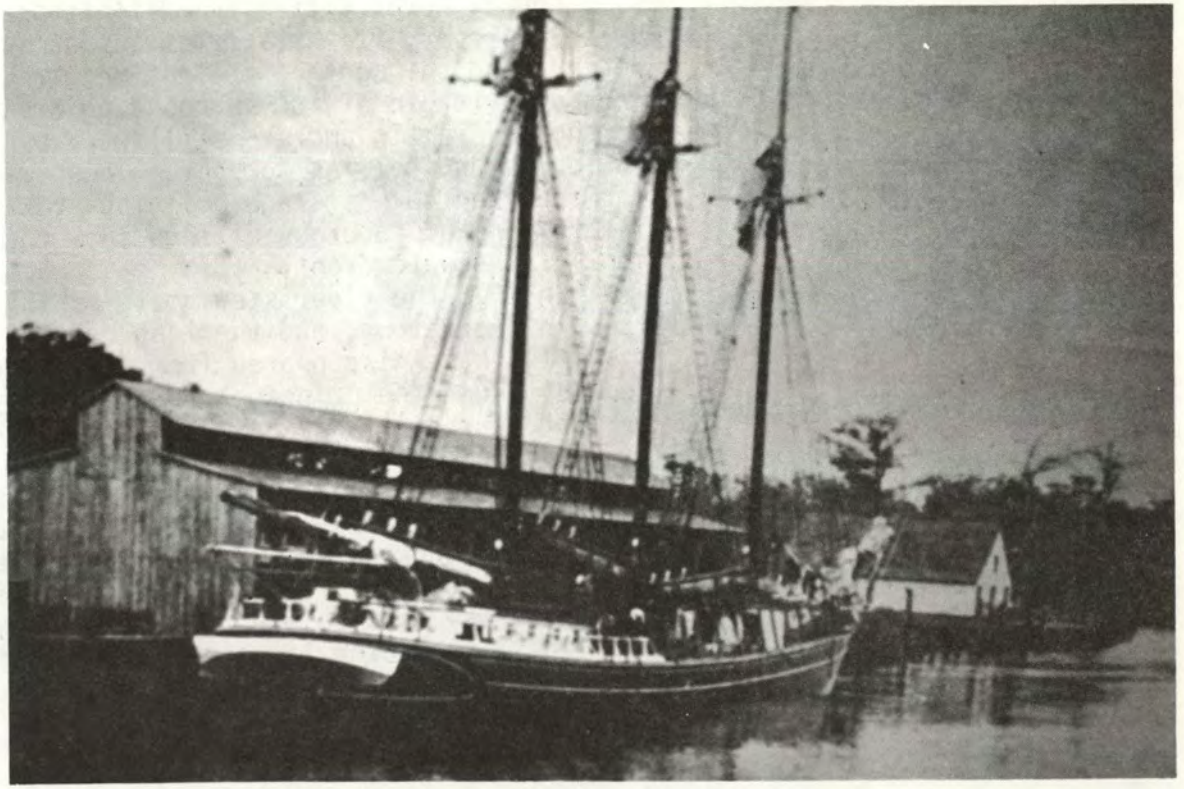
Prior to the early 1880's cargo for shipment to Georgetown, Charleston or other markets was carried from Conway to Pott Bluff on barges, and flat boats where it was loaded on the larger sailing vessels for further shipment. This was inconvenient and inefficient and developed the need for further improvements in the river. Considerable dredging and other work was undertaken by the Corps of Engineers to improve the river and make it usable for steamboats all the way to Conway.

In 1909, under the authority of The Rivers and Harbors Act of June 1880, an appropriation was made by Congress for the first dredging and straightening of the Waccamaw River.

In 1911 and 1912 considerable work was done by the Corps of Engineers in straightening the crooked course of the Waccamaw. These cuts were made to a depth of 8 feet at normal low water and 80 feet in width.




RIVER WHARF AT CONWAY, S. C., EARLY 1900'S



The schooner, "Bayard Hopkins", was chartered by Mr. D. V. Richardson of Bucksport and his partner, Mr. Malone, and made regular runs between Bucksport and New York and Boston.

## Today

In 1975 there remains very little evidence that transportation on the Waccamaw River was the major means of moving people and supplies into and out of the county. Conway and Bucksport were the centers of this important river traffic and at one time both could boast of their active shipyards where large ships were built.

Conway never fitted the definition of a "rip-roaring" river port. However, its waterfront was active and was a center for the receipt and shipment of freight required by and generated by the people living in a wide surrounding area. Today two waterfront warehouses remain and are still used by The Jerry Cox Company and Burroughs and Collins Company. These warehouses were built as the terminal and dock storage buildings for the river steamboat traffic. The remains of numerous pilings show the extent of earlier development of the waterfront.

In 1975 the river steamboats making their regular scheduled runs to Georgetown, and the long raft of logs on their way to the saw mills have disappeared from our waterways. Water transportation does not hold the principal role in Horry County that it held in earlier years. It has been replaced by highway transportation and air transportation to a great extent.

Today the Waccamaw River above Bucksport is primarily used by pleasure craft. The Intercoastal Waterway, including the Waccamaw River below Bucksport, supports a considerable volume of commercial shipping, principally, barge traffic moving in interstate commerce. This waterway is also used by a great number of pleasure craft of all types, including large yachts on their migrations north and south.

## Conclusion

The importance of the river on the city in the past has been briefly discussed. The revival of river activity of another nature toward pleasure instead of commerce brings a new life to our community. This project is based upon this "new river life".

# General Marina Planning

# General Marina Planning



## Introduction

The intent of this section is to discuss in general: marina planning programming, function, location requirements, site selection, facility programming, utilities and services. A detailed discussion of each of these parts pretaining to overall objectives of this project will follow in later chapters.

Planning of a small craft marina can be a complex problem. The planning team usually consists of local boards, state and Federal authorities, engineers, and architects. Planning not only includes consideration of technical items with which the engineer may be familiar, but also various non technical items or details which should be readily available for his use and analysis.

A small craft marina may consist of the development of facilities for one group of small boats under one operation, or it may involve a large basin in which will be located various groups of facilities under separate development, management, and operation. It may be a marina within limits of a larger marina. Small craft marinas will provide moorage berths only; others will provide anchorage areas or a combination of both. Some marinas will be only a few hundred feet across; while others might extend many miles inland or along the shore line.

This section of marina general requirements is directed principally towards the examination of one-operation marinas and their facilities. Harbor planning consists of the following:

1. Project Justification
2. Determination of a Location
3. Acceptance of that Location in its Existing Conditions
4. Projecting Development to Final Phases of Operation
5. Using Location Advantages
6. Providing Corrections for Disadvantages
7. Keeping Project Development Within Reasonable Limits of Demand, Finances, Economics

# 20

## Planning Programming

The basic planning of a small craft marina is an intermediate step between desire, concept, or recognition of the need for the facility. Programming of a project at the start is essential to eliminate much lost time and considerable expense. This is especially true in communities where officials of public bodies or other agencies may not be fully familiar with the most effective procedures. Many original concepts are frequently based on visualization of a successful marina elsewhere transposed to a location where the same conditions and situations do not exist. No two marina locations have the same conditions and situations. Each must be programmed separately.

Preparing a planning program should include investigation, determination, and preparations of the following:

FISCAL

1. Sources of Financing

   Available funds

   Taxing and bonding capacity

   Feasibility

   Possibility of financial aid

   A schedule of funding must be prepared showing the time of availability of funds that could control the acquisition of land or the award of any contract for construction or other developments.

2. Cost Estimates of Property Acquisition, Site Preparation and Marina Installations

   A time schedule for property acquisition and development must be prepared to perform this function effectively.

3. Schedule of Expected Revenue and Anticipated Operating and Maintenance Cost

So that the sponsor agency may be fully advised as to the expectable financial situation of the project after construction as well as the capital cost of the development, it is advisable that operating and maintenance cost estimates be prepared and kept current as the planning progresses.

CHARACTER AND SCOPE

1. Determination of the Type of Marina

This is described in a later section under Marina Function.

2. Determination of the Phasing of the Marina Development, Boats to be Served Immediately and in the Future, and Accessory Facilities

Financing capabilities, available sites, and an operating balance sheet may determine size and type of boats to be accommodated and the necessary facilities for service.

Moorage fees alone may not support operation and maintenance; therefore, revenue producing facilities may be provided to assist in a financial successful development.

Canvasing, surveys of similar installations and obtainable data such as licensing records, boat sales, and user's records are useful in determining the area served by the marina and the number of boaters that might utilize the facility.

## SITE SELECTION

1. Tenative Selection

Tenative site selection for a small craft marina should be made early in the planning process and a continuing re-evaluation of its suitability as the planning progresses.

2. Land Utilization

The site should allow sufficient space for water side and land side facilities, future expansion, and buffer zones to prevent incompatable adjacent development. Site selection criteria is discussed in a later section.

## MASTER PLAN

1. Preliminary Layout Studies

Preliminary studies will be revised as necessary as the phases of the planning progresses. These studies are essential for visualization and evaluation of development, and for preparation of cost estimates.

2. Planning Facilities

A master plan will serve as a basis for construction drawing and the preparation of specifications and other contract documents. Included in the master plan should be the following:

Proposed immediate and future facilities or a phasing program

Outer and inner marina protections

Waterside and landside areas with separations

Moorage location

Tidal, current and flood data

Wind data showing directions and intensities

Automobile and boat-trailer parking

Utilities

CONCLUSION

Following completion of preliminary planning and preparation of master plan, construction drawings and other documents are prepared in the customary manner to complete and conclude the planning program.

## Marina Function

The first considerations in developing a small craft marina must be the reason for its development, its service to the community and its usage - in short, its function. Small craft marinas generally serve the following catagories:

1. Recreational Marina
2. Commercial Marina
3. Fishing Boat Marina
4. Convenience Marina
5. Yacht or Boat Club Marina

6. Emergency and Storm Marina

Of these catagories the fishing boat marina is obviously not in keeping with the overall objectives of this project. It is not applicable for yacht or boat club since this is a public marina. There is little need to consider this marina an emergency or storm marina because of the protection given by the vast wooded areas. Therefore, I will center this discussion on a recreational - convenience - commercial marina.

Few small craft marinas will be exclusively and of the above catagories. Most will involve some combination of these functions.

The tremendous growth in public interest in boating as a recreation during the past decade has necessitated an increasing precipitation by Federal, state and local governments. This has come about partly by legal situations involving the use of coastal or river margin areas. When public funds are used, regulations will tend to direct the usage of the marina and its function. It may be advantageous to combine functions as a public recreational marina and a commercial marina in order to assure adequate revenue for maintenance and future expansion.

CONVENIENCE MARINA

The convenience marina is intended to cover those marinas designed as enroute stopover points where minimal services are provided. Such marinas may serve for overnight stays, temporary tie-up for repairs, and the obtaining of supplies and similar usages.

Location of this type marina should be near population centers for availability of food, fuel, and amusement. Some degree of protection is necessary but moorage facilities can be minimal and services limited. This type of marina will produce no direct revenue and is anticipated to be installed at community expense. The only benefit to the community would be other business generated.

COMMERCIAL MARINA

Sometimes marinas developed by public agencies can be classified commercial. A financially successful marina must have sufficient conveniences and services to make it attractive to potential users. At the same time costs should be kept as far as possible below revenues. An interview with a commercial marina owner (Bucksport Marina, Bucksport, S. C.) revealed that five-hundred moorages are necessary for a financially successful marina.

Protection, moorages, facilities, conveniences and services provided by this type of marina will be dependent on the circumstances of each independent site and situation. The intended function of such a facility will best be fulfilled by an increase in the number of revenue-producing concessions and a reduction of the number of nonrevenue-producing services.

At this type of facility a boat launching ramp or hoisting device is needed together with adequate trailer parking. The greatest value to the operator may be from the increased use of other revenue-producing operations by the additional people attracted.

RECREATIONAL MARINA

In many areas, the early concept of merely a place to tie up a boat has expanded into both a social and recreational center. Here the people in casual attire come on holidays, weekends, and vacations to get away from the heat and tensions of crowded areas, to fish, dance, or engage in a hundred of other activities, and sometimes leaving for a cruise.

Specific recreational functions will be discussed in the Project Proposal Concept later in this study.

Developing a harbor of this type requires the best weather protection, waterside, and landside facilities that are best suited for its function. The people who demand and use such facilities will usually be in a financial position to support them.

Such facilities as a deluxe restaurant, pleasant bar, and varying concessions will be in demand by the patrons. Boat sales, repair facilities, a marine supply store, clothing shops, and other establishments will also be patronized. Water activities such as boating, river excursions, skiing, and swimming should be available. In return, these patrons will demand the most in conveniences, utilities and services, and a well managed, clean, and attractive marina.

A center of this type will also be patronized by the non-boating visitor who will come for atmosphere, a look at the boats, for dinner, and the experience of a river environment.

Financing of this type of marina is usually by public agencies due to the large investment required, necessary service to the public, and sometime a return on the investment.

Of course, a public launching ramp would logically be a part of this marina type. Also when it is a public facility, all areas and utilities must be available for public use; but there may be charges for the use of all facilities and services.

## Marina Location

Location is differentiated from site by indicating a general area for harbor establishment rather than a particular spot.

After determining the specific function, the location has a direct relation with function. The location must be suited to the demand and where it is used whether it is public or private. For example, locating a deep-sea fishing marina thirty miles up a river would be a drastic mistake, but the location might be ideal for a recreational center or a commercial venture.

### TYPE OF WATER BODY

The type of water body will influence the harbor location, whatever the function may be.

In salt water; waves, weather, tides, marine borer, salt air, and other influences effect the protection required, navigation aids, basin planning, and type of design.

In rivers; currents, flooding, and protection from currents may be strong factors in location.

Lakes and reservoirs have their own characteristics that influence location.

The river and its characteristics will be discussed in particular for this project.

## POPULATION CENTERS

Although people will travel many miles on land to get to their boats in a small craft marina, it is obvious that being close to population centers is desirable, the small craft marina should not be located near industrial or heavy commercial areas. The aesthetic quality of an industrial ares is not conductive to the best use of the facility. Also smoke and fumes from industrial operations are injurious to varnish and painted surfaces.

The ideal location is on the outskirts of a city or town with good access. The surroundings should be compatible with the harbor's function.

## FUNCTIONAL LOCATION TO WATER AREAS

The harbor's function should be located near the water body its users wish to utilize.

Emergency havens would be close to traveled marine lanes.

Commercial fishing would logically be located where the craft could easily reach fishing areas. This also applies to leasure fishing as well.

Facilities for sailing craft should be located within easy reach of good sailing courses.

LOCATION CONFLICT WITH HEAVY MARINE TRAFFIC

Location of small craft harbors should be as far away as possible from heavily traveled lanes of marine traffic. Small craft operators sometimes do not know the maneuverability of larger craft or sailing craft. Collisions and swamping could be avoided by locating the harbor away from these traveled areas.

## Site Selection

The site can be described as the immediate land and water areas occupied by the marina and its characteristics and attributes.

LAND AND WATER AREAS

Adequate and suitable land and water areas are essential for a successful marina, whatever the function. The arrangement, type of boats, and quality will determine waterside area requirements. Protection and access installations will also help in establishing these requirements.

The harbor function and facilities to be included will determine the landside areas. For example, an emergency haven may need only a roadway access while a recreational center may require a landside area several times the size of the water area.

Expansion is quite common with a successful marina due to the increase in boating as a recreation and the probable continuation of this trend. The construction of a small craft marina has been demonstrated to generate additional facility requirements. Existing boat owners are attracted initially, but once the convenience is available, many people will acquire boats that require moorage space. An eventual capacity of at least double the immediate capacity requirements is suggested to plan for, as well as, in some locations, accommodations

for visiting boats. It is desirable to acquire adequate landside and waterside areas to permit future expansion of all facilities.

Marsh and marginal land along rivers are excellent areas that can be readily reclaimed for small craft marina sites. This land is generally low priced because of its unsuitability for other uses. These sites may have insufficient water for a marina basin and may be subject to flooding from tides, lake or river overflow. By dredging this site and filling the low areas, a suitable site may be prepared at considerablly less cost than requiring a ready-made site. By dredging the basin a protection against flooding may occur.

Where park and picnic areas are to be included as a portion of the overall project, sufficient land must be acquired at the time of the original property acquisition. These features may help make the financing by governmental agencies acceptable and justifiable to the general public.

## WATERSIDE ACCESSABILITY

Accessability of the marina from the body of water used is a prime consideration. A well protected basin is most important. However, narrow chanels, traveling miles from the used area, time consuming passage through locks, and hazadous access through passages are all to be avoided.

Providing boat moorages within safe, easy, convenient and immediate use of a waterway is a prime purpose.

## LANDSIDE ACCESSABILITY AND UTILITIES

Landside accessability is equally important to waterside accessability for its best use. The function of the facility will direct the degree of ease of accessability. The emergency or convenience harbor needs only minimal access. Good access from well developed travel routes is highly desirable for the others.

Public transportation is not necessary inasmuch as the harbor users will travel by private automobile. At a recreational marina it may be necessary to have some form of transportation, especially for employees, otherwise it may be necessary to provide employee housing.

An attractive approach drive is highly desirable. The accessability must be relatively easy and by roadways adequate to handle marina traffic in addition to other traffic. If launching ramps are available, approaching roadways must be satisfactory to accommodate boat-trailers.

Along with user access to the proposed site the availability of utility and their extension to the site must be considered. Included among these are water, electricity, telephone, fuel and sewer service.

## WATERSIDE PROTECTION

A marina indicates a protector of water-borne craft. Any site selected must be one that has protection or can be protected from the following elements:

Waves, wash from water traffic, wind, tides, tidal flow, floating debris, ice, erosion, river flow and flooding, and the rise and fall of waters.

These elements should be considered from the point of view of moored boats as well as marina protection.

The ideal site would be one where protection against all these would be provided naturally. This would be a rare case, however, a suitable site should offer some natural protection. When not provided by nature, such protection must be provided artifically by breakwaters, groins, levees, and other devices.

Floating debris protection from both outside the marina and that generated within is often neglected. Dirty marinas are certainly to be avoided. Basin flushing methods are highly recommended.

COST OF DEVELOPMENT

Selection of a suitable marina site involves all of the previous considerations, while at the same time cost must be included. Necessity and desirability have determined the foregoing items. In most cases, a compromise between desirable ideals and available funds will determine the final product.

## Marina Facilities

After determination of marina function, location and site selection, it becomes essential to select what facilities would be included in the final project, their size and capacity. This must be done prior to preparing a preliminary site layout.

The facilities and conveniences that normally make up a small craft marina will be listed here. A particular location and site will determine the essential facilities to be included. Others may be elective, depending on the marina's function and selection of the developer.

WATERSIDE INSTALLATIONS

Protection

Protection may be natural or consist of breakwaters, bulkheads, groins, and revetments.

Navigation Aids

Navigations aids are buoys, markers, lights, etc.

Basin Flushing System

The basin flushing system is a method of basin cleaning and periodic change of basin water.

Anchorage Basin

Anchorage basins may be provided because of desirability of lower cost than moorages, because of boat size or type, or because berth moorage is not available.

Open Moorages

Open moorages are the simplest and most common moorages. They may be fixed or floating piers.

Covered Moorages

Covered moorages are more practical in areas of severe weather. However, the cost is greater than open moorages.

Marine Service Station

Inasmuch as all craft use fuel, a marine service station is highly desirable. These are usually leased and depend on whether the traffic warrants a need.

Bathing

Bathing accommodations are provided at some marinas. However, bathing and boating form a hazadous combination. Bathing should be located away from any boat traffic or operations. Swimming pools may better serve the purpose. Should bathing at or near boating areas be necessary, floating separations of areas should be provided.

Water Skiing

Water skiing facilities should be avoided at any marina. Should it be desirable to provide accommodations for water skiing, these should be located away from moorings and bathing. Ski courses should be plainly marked by buoys

with controlled speed limits near any mooring facility.

Skin Diving

This recreation should be handled the same way as bathing.

BOAT HANDLING EQUIPMENT

Launching Ramps

Many craft up to thirty feet in length are brought to water bodies by trailer and launched. One way of doing this is by backing a trailer down a ramp. The car and trailer are parked after this, and the procedure is reversed when the boat trip has been completed. Some marinas provide free use of their ramps. A common practice now is to charge for their use.

Marine Railways

Another means of launching boats is by a marine railway. Tracks extend into the water from shore far enough to float a boat. A power unit on shore operates a cable which in turn pulls a car. The boat is set by hoist onto this car.

Marine Elevators

These take less room than either a ramp or railway.

Derrick and Crane Lifts

Various forms of lifts with booms are used for transfer of boats from land and water by means of a sling. This equipment requires more land.

with controlled speed limits near any mooring facility.

Skin Diving

This recreation should be handled the same way as bathing.

BOAT HANDLING EQUIPMENT

Launching Ramps

Many craft up to thirty feet in length are brought to water bodies by trailer and launched. One way of doing this is by backing a trailer down a ramp. The car and trailer are parked after this, and the procedure is reversed when the boat trip has been completed. Some marinas provide free use of their ramps. A common practice now is to charge for their use.

Marine Railways

Another means of launching boats is by a marine railway. Tracks extend into the water from shore far enough to float a boat. A power unit on shore operates a cable which in turn pulls a car. The boat is set by hoist onto this car.

Marine Elevators

These take less room than either a ramp or railway.

Derrick and Crane Lifts

Various forms of lifts with booms are used for transfer of boats from land and water by means of a sling. This equipment requires more land.

### Dry Docks

Where repair facilities are provided, dry docks are used. These are platforms where boats sit out of the water. They may be stacked when in storage and lowered and raised by cables.

## LANDSIDE FACILITIES

### Administration and Supervision Facilities

A small craft marina is a business, whether public or privately owned. This operation requires a headquarters adequate and suitable for administration and supervision. The logical location of this facility would be where traffic is routed through a central entrance and exit. For security control the administration facility should be in a central location for visual surveillance of the marina facilities.

### Restaurants and Club Rooms

To any small craft harbor except the emergency haven and convenience types, the restaurant is an essential part. The restaurant may consist of a one-man operation at smaller installations or a deluxe establishment at the recreational center. If the restaurant is to be available for public use, it is quite common to have separate rooms for areas that can be partitioned for various club meetings. Some marinas have a deluxe restaurant for "the carriage trade" with a small coffee shop or snack area for users in casual and working clothes.

### Marine Supply Store

A marine supply store handling boat hardware and food staples has been found to be a real service to marine

users. It is an excellent source of harbor revenue. Frequently, the supply store will handle tackle and bait for fishermen.

General Store and Shops

Particularly at the recreational type marina, general stores carrying a large variety of merchandise and specialty shops handling boating togs, souveniers, and many other items have been widely patronized by the boating populace and visitors.

Public Toilet and Showers

Landside toilet facilities for men and women should be provided at intervals of a 500 foot minimum. Regulations should prohibit boat facilities from being used while in the basin to keep it clean. Toilet conveniences should be provided at a rate of one for men and one for women for every twenty to thirty boats. Showers and dressing rooms are appreciated by boat users. Coin locks are used for a source of revenue and to reduce vandalism.

Automobile and Trailer Parking

Automobile parking is required at all marinas. Where boat ramps are used, adequate trailer parking is needed. Automobile parking should be provided at a rate of one and one-half spaces per boat berth for commercial type and up to two and one-half per berth for recreational type.

Boat trailer parking has to be judged on its own merits for each situation and site. For rough figuring, it can be assumed that an average of six boats per hour launching period would accommodate thirty-six boats.

Moorage Float Storage

For areas that freeze over during the winter months, it will be necessary to remove the floating moorage equipment and store it on the land. However, for purposes of this project, this facility will not be needed.

Boat Sales

A large source of revenue can be obtained from boat sales at the commercial installation. However, at recreational marinas, boat displays can create a point of considerable interest. Well planned and attractive sales rooms are a distinct asset.

Dry Boat Storage

Dry boat storage may be necessary or desirable in freezing areas during the winter months and at other times for numerous reasons.

Boat Building and Repair

Another good source of revenue is boat repair. This must be performed by a competent group and can provide a real service to the harbor user and community. Boat building has gotten away from the single boat builder to the more efficient assembly lines. They produce molded fiberglass, steel and aluminum boats.

Pleasure Boat Gear Lockers

Nearly all boat owners collect gear that is used only intermittently. It is common practice to provide a boat locker for each moorage berth. These lockers are either located at the berth or separated. Sizes may vary for a locker on the pier of 2x3x3 feet to a 4x4x8 locker on shore.

Park and Picnic Areas

Park and picnic areas for a small craft marina built by the government may well help justify the marina's existance.

Location should be away from the harbor activities themselves. When located near moorages, some people who use the park may believe the marina including boats, are public property.

Landscaping

Landscaping can make the difference between a mediocre and a fully successful marina.

Maintenance is a continuing expense. Therefore, perennials requiring minimal care are often desirable. Trees add most to a pleasing touch with groupings of flowers and shrubs. Of course, lawns that require relatively little care add a delightful relief to large stretches of paved parking lots. Landscaping of the recreational and commercial type marina is an integral part of the development.

Utilities

Utilities are basic essentials. The extent provided for harbor users is related to the type of harbor type and function. Included in these are extensions of water, plug-in electrical outlets at moorages, and telephones.

1. Water Drainage and Sewage

Water supply must be adequate for domestic use and fire protection, including sprinkler systems.

Surface drainage can be satisfactorily handled by draining directly into the basin.

When the sewage system can be connected to a

central community system, this will probably be the most satisfactory even though lift pumps may have to be used. Where no such system is available, chemical systems, septic tanks, or a small sewage treatment plant or lagoon will be necessary. Drainage therefrom should be routed away from the basin.

2. Electrical Power Waterside and Landside

In additional to the usual service to buildings, all equipment provided will need electric power. Power outlets are provided for each moorage at many marinas.

3. Lighting Waterside and Landside

Waterside lighting will include all piers, launching ramps, navigation aids, and safety markers. Landside lighting will include roadways, parking lots, storage yards, service areas, and other public areas.

4. Telephone

All administrative and concession buildings require telephone service. Also, security and fire control points warrant telephones. Pay telephones have been found a convenience near moorages.

## Conclusion

This section on general marina planning was included to set a precedent for a systematic approach to designing the Conway Marina. No two marinas are alike because of their location and function; therefore, only general information on marina programming, function, location, and facilities has been set forth. A basis for development of all marina projects has been established.

As a program develops from surveying other contemporary marinas and while different locations are being studied, a constant referral to general marina planning recommendations is necessary to be assured of the proper relationship between function, location, and the facilities of the marina.

# Contemporary Marinas

## Intent

It is the intent of this section to illustrate contemporary marina solutions that show there are no established requirements for a particular type of marina. Each marina illustrated here has different location, site, and functional requirements that pertain to that specific marina. An analysis of even the smallest marina of 50 berths to the largest man-made marina of 6,000 berths will help establish programmatic requirements for my own marina solution. Some examples will show the site and a brief description of location, disadvantages, and advantages. Others will be a simple listing of facilities and their area requirements.

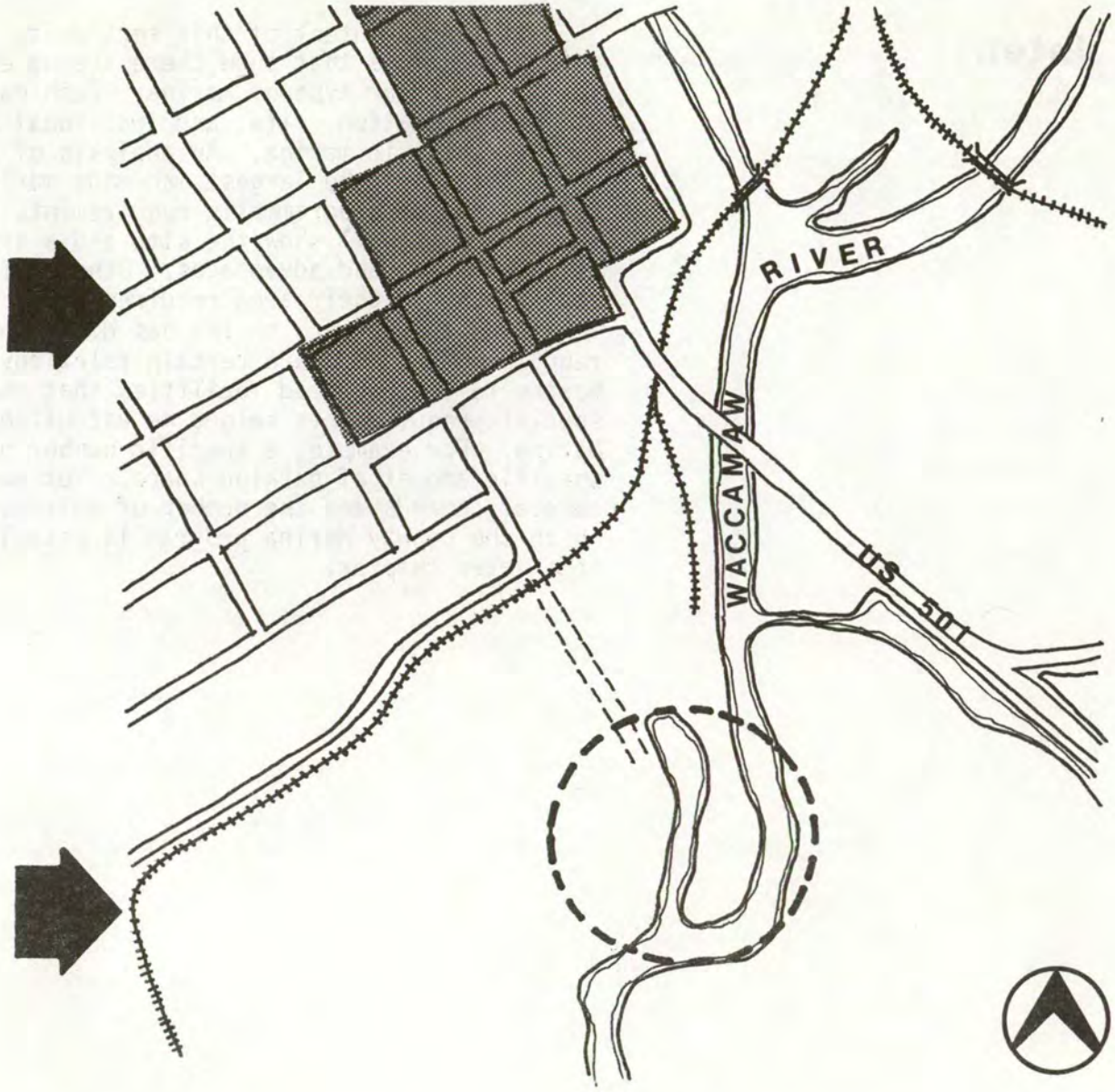
Even though each marina has different location and function requirements, there are certain relationships between the number of berths to the required facilities that can be established. These specific requirements helped me establish my program for the Conway Marina. For example, a specific number of berths will require a specific amount of parking space. Yet each marina has its own special demands and the number of patrons will vary. The method by which the Conway Marina program is established will be demonstrated in a later chapter.

# Conway Marina Existing Conway, S. C.

Location

CBD

Site



## Layout

1 ADMINISTRATION

2 FIXED MOORAGES

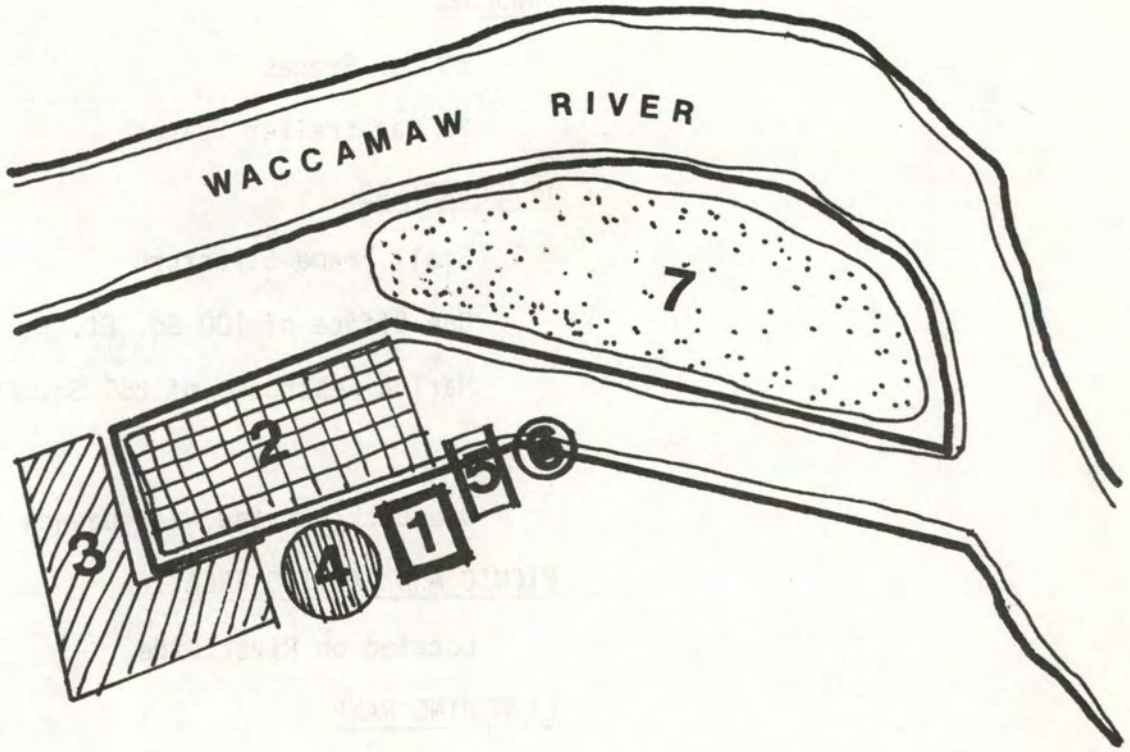
3 CAR PARKING

4 TRAILER PARKING

5 BOAT RAMP

6 FUEL

7 PICNIC AREA




SCALE 0 100 200 300

# 44

## Facilities

BERTHS

50 Berths (all open)

PARKING

50 Car Spaces

25 Car-trailer Spaces

HEADQUARTERS

Small Frame Structure

One Office of 100 Sq. Ft.

Marina Restrooms of 250 Sq. Ft.

FUEL

One Dock Located Near Launch Ramp

PICNIC AND CAMPING AREA

Located on River Side

LAUNCHING RAMP

24 Ft. Wide

Located Near Headquarters and Fueling Dock

## Marina Type

This marina is of the recreational and convenience type. Due to this marina being part of a public park and that it is to be built with public funds, it is doubtful that this constructional operation can be justified by means of a cost-benefit ratio comparison as can those located along the seashore or along large lakes at ports where heavy traffic can be generated either for boat ramp fees or for boat slip rentals. At the location in Conway there will be some distant boat hauling but most of this will be by Conway community people who have a boat. On the Waccamaw River in this area few boats will be no larger than 24 feet and most will be in the 16 feet and under lengths. Therefore, it will be easier for people to trailer their boats rather than to pay a boat slip rental fee, which is in the case for boats in the 18 feet and up size.

## Analysis

The facilities of this marina are limited. No area is allowed for future boat, facility, or parking expansion. Facilities most common to most marinas but not recommended here are:

Boat Sales

Dry Boat Storage

Boat Repair

Restaurant and Bar

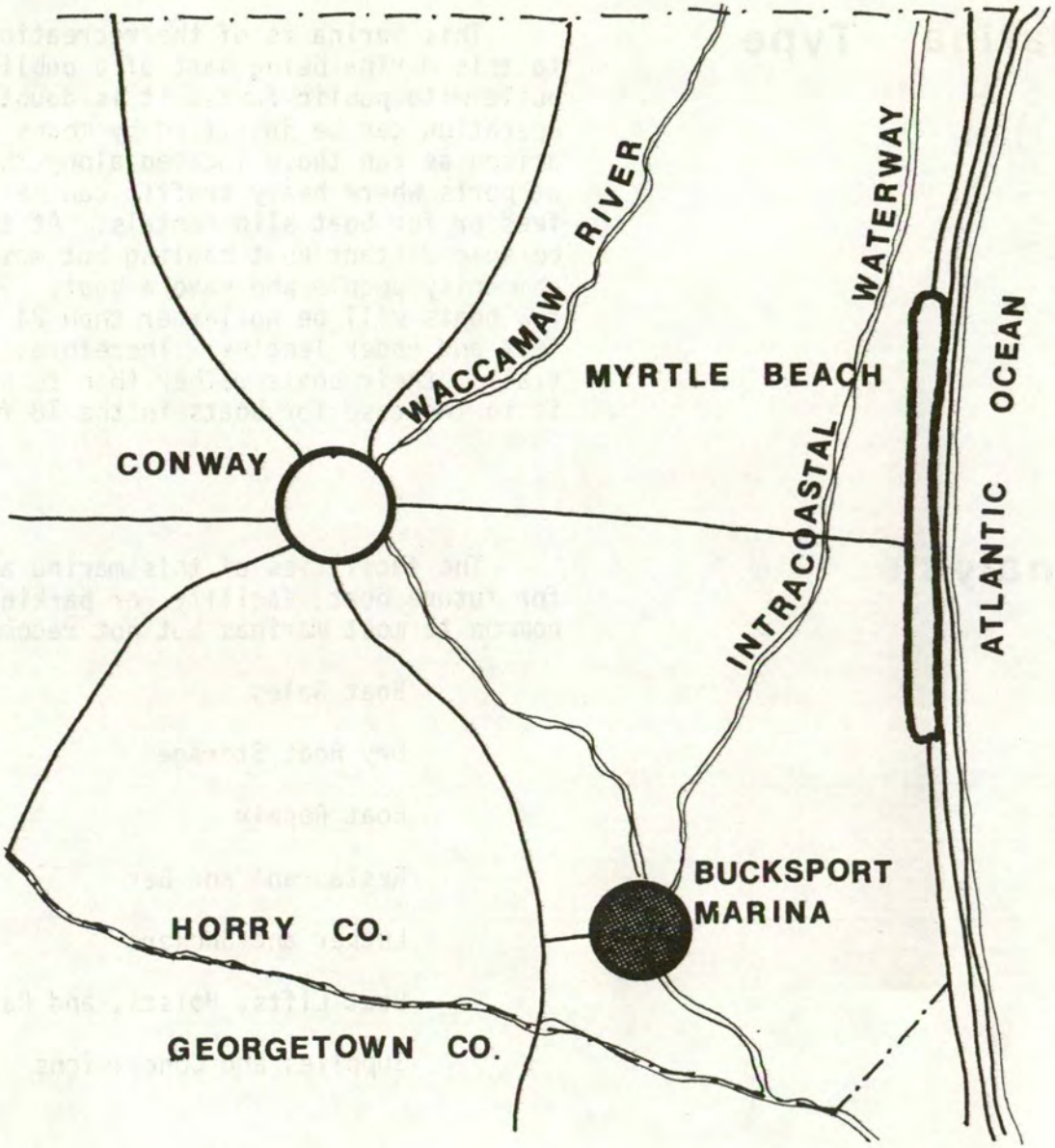
Locker and Showers

Boat Lifts, Hoists, and Railway

Supplies and Concessions

# Bucksport Marina Bucksport, S.C.

## Location



AN AERIAL VIEW LOOKING SOUTH 1973

# 48

## Location

Bucksport Marina is located ten miles south of Conway off of U. S. Highway 701. It is at the apex of where the Waccamaw River joins with the Intracoastal Waterway and several miles above the mouth of the Great Pee Dee River.

## Personnel

For the past three years, it has been owned and operated by Mr. Harold Doster. Mr. Doster operated Harbor Lite Marina, located on Lake Hartwell, S. C. for six years before he took over the operation of this marina. His personnel consists of the following:

Manager

Bookkeeper

Dock-Master

Dock-Master's Assistant

Three Dock Boys

A Full Time Mechanic and Helper

Several Security Personnel

## Facilities

BERTHS

72 Berths (64 floating, 8 fixed) 30' Finger Piers
57' Boat Capacity

SERVICE DOCK

1400' Dock for Transient Craft

| | |
|---|---|
| HEADQUARTERS | 2500 Sq. Ft. |
| Boat Sales | |
| Marine Supplies and Concessions | |
| Two Offices | |
| MAINTENANCE | 1200 Sq. Ft. |
| Located Remote from Marina's Activities | |
| Metal Butler Building | |
| RESTROOMS | 500 Sq. Ft. |
| Bathing and Toilet Facilities | |
| Located Adjacent to Service Dock | |
| RESTAURANT | 2500 Sq. Ft. |
| Owned and Operated Separately from the Marina | |
| FUEL | |
| One Pump Located on Service Dock with 200' hose | |
| PARKING | |
| Ample Parking on Cleared Adjacent Area to Headquarters | |
| UTILITIES | |
| 50 Amp Electrical Service to Each Berth | |
| Water Serving One-Third of the Berths | |

# 50

LAUNCHING RAMPS

One Public Remotely Located from the Marina's Activities

One with a 50 Ton Hydrolic Crane for Maintenance

## Marina Type

Bucksport Marina is a commercial type marina with its revenue primarily from the sale of house boats and yatchs. The sale of supplies, slip rentals, and fuel supplement the marina's income.

## Analysis

Bucksport Marina has relied on, not only the community for renting its berths, but also on people within the state for boat sales. The restaurant is not owned by the manager and is operated separately. There is a cruise from nearby Myrtle Beach that brings many customers to the restaurant. The marina's income is up 66% the first quarter of 1975 over this time in 1974. However, this is due partly from the gasoline shortage of 1974.

Many people use the marina as a departure point for river excursions. There is no charge to the public for the use of the boat ramp. The berths rental fee is $1.25 per linear feet of boat. In June, 1974, the marina collected $3,900.00 from the use of the service dock. There are many transient craft that are on their way south for the winter and north for the summer that find this marina the ideal stopping point for supplies. There are no other marinas for 100 miles in both directions that can handle such craft.

## Future Expansion

Expansion of this marina is going to be staged over the next five years. The owner is quite optomistic in its future outlook. Expansion facilities will include the following:

Additional 428 Berths

Small Motel

Primitive Camping Sites

Public Picnic Grounds

Small Finger Pier to Handle Concession Patrons

Purchase of Five Pontoon Rental Boats

# Wells Marina Ballentine, S.C.

## Location

Wells Marina is located about 35 miles north-west of Columbia, S. C. near Ballentine on Lake Murray.

## Facilities

BERTHS

200 Berths (150 covered, 50 open)

SERVICE DOCK

400' Dock for Transient Craft

HEADQUARTERS 240 Sq. Ft.

Located in Restaurant Building

Two Offices

Marina Restrooms Accommodating Four Persons Each

MAINTENANCE 6000 Sq. Ft.

Located Remote from Marina's Activities

One Office of 100 Sq. Ft.

SHOWROOM 2000 Sq. Ft.

Display Space

Repair Area for Outboard Engines

Storage for Merchandise

FUEL

Four Pumps on One Fuel Dock

DRY STORAGE

Building Remote from Activities

Capacity 100 Boats at 20' Each

PARKING

100 Car Spaces

100 Car-trailer Spaces

LAUNCH RAMPS

Two Ramps (fee $1.50)

RESTAURANT

| | |
|---|---|
| Dining | 450 Sq. Ft. |
| Kitchen | 750 Sq. Ft. |

Capacity 60

## Marina Type

This marina is a commercial type oriented for power boats only. Due to the location back in a cove, sailing craft cannot use its services.

# 54

## Analysis

Parking is inadequate. There are no lockers nor storage areas for the boater. Owners cannot reach their craft while it is in dry storage. Access for the craft to the maintenance shop is via boat trailer only, as no hoist or rail system is provided. No electricity or water connections are provided for the boats. Since there is no general food supply close by, boaters are forced to bring their own food.

## Future Expansion

Future expansion is in progress. More boating slips, however, are not the new expansion; rather, townhouse/garden apartments are being planned.

# Johnson's Marina Chapin, S.C.

## Location

Johnson's Marina is located about fifteen miles north-west of Columbia near Chapin on Lake Murray.

## Facilities

BERTHS

150 Berths (all covered)

SERVICE DOCK

400' Dock for Transient Craft

HEADQUARTERS 130 Sq. Ft.

Located in Showroom Building

Marina Restrooms Accommodating Three Persons Each

SHOWROOM 1000 Sq. Ft.

Display Space

Merchandise Storage

MAINTENANCE 4000 Sq. Ft.

Located Near the Showroom and Restaurant

RESTAURANT

Dining 1,300 Sq. Ft.

Kitchen 1,200 Sq. Ft.

Capacity 100

PARKING

50 Car Spaces

75 Car-Trailer Spaces

FUEL

Four Pumps

Accommodates Four Craft up to 20'

LAUNCHING RAMPS

Two Ramps Each with a Pier Alongside

LAUNCHING HOIST

One Hoist on Wheels

Capacity up to 60'

Fee 10 Cents Per Linear Foot of Boat

## Marina Type

This marina is a commercial type oriented for power boats only. Due to the location back in a cove, sailing craft cannot use its services.

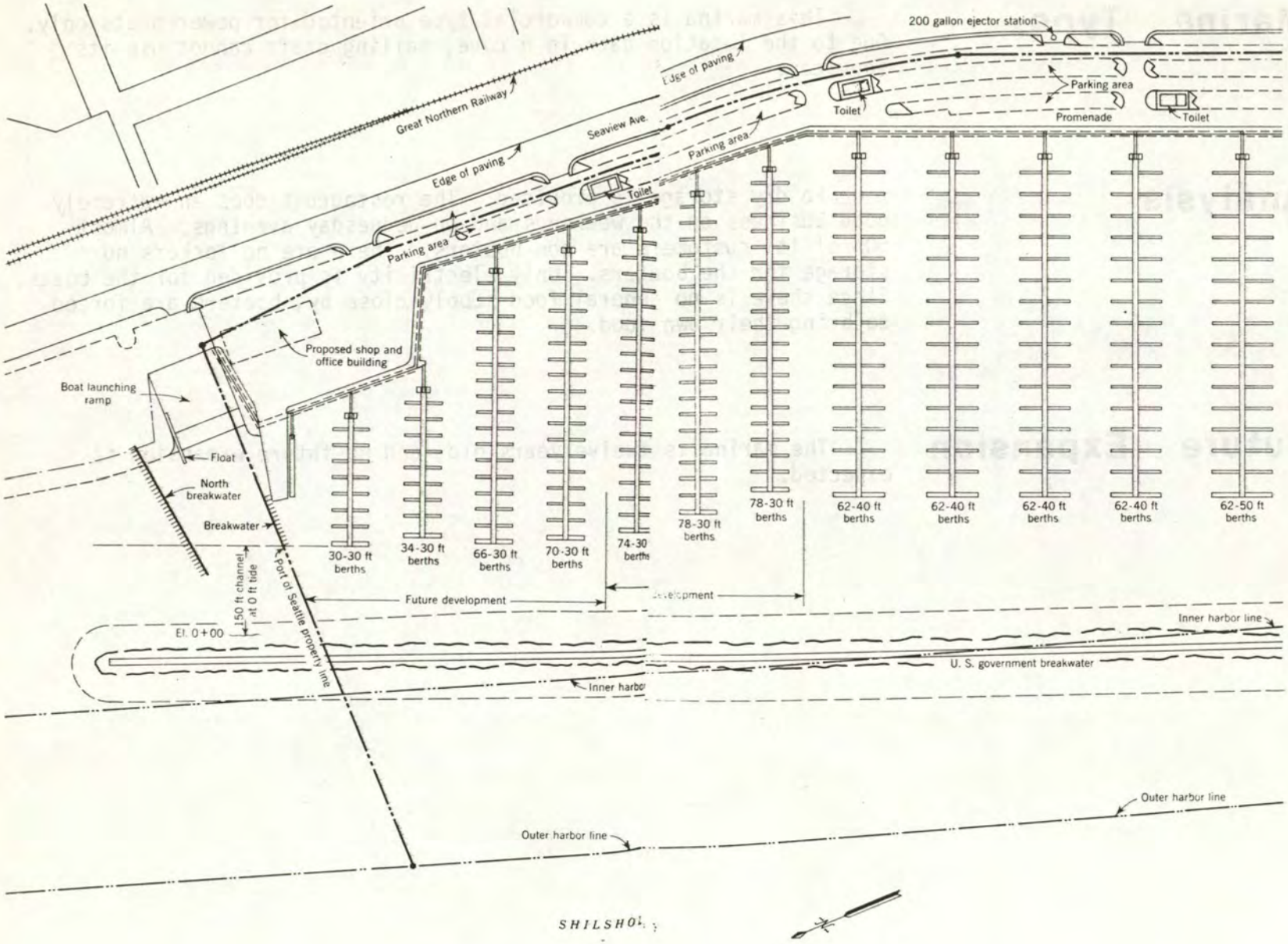
## Analysis

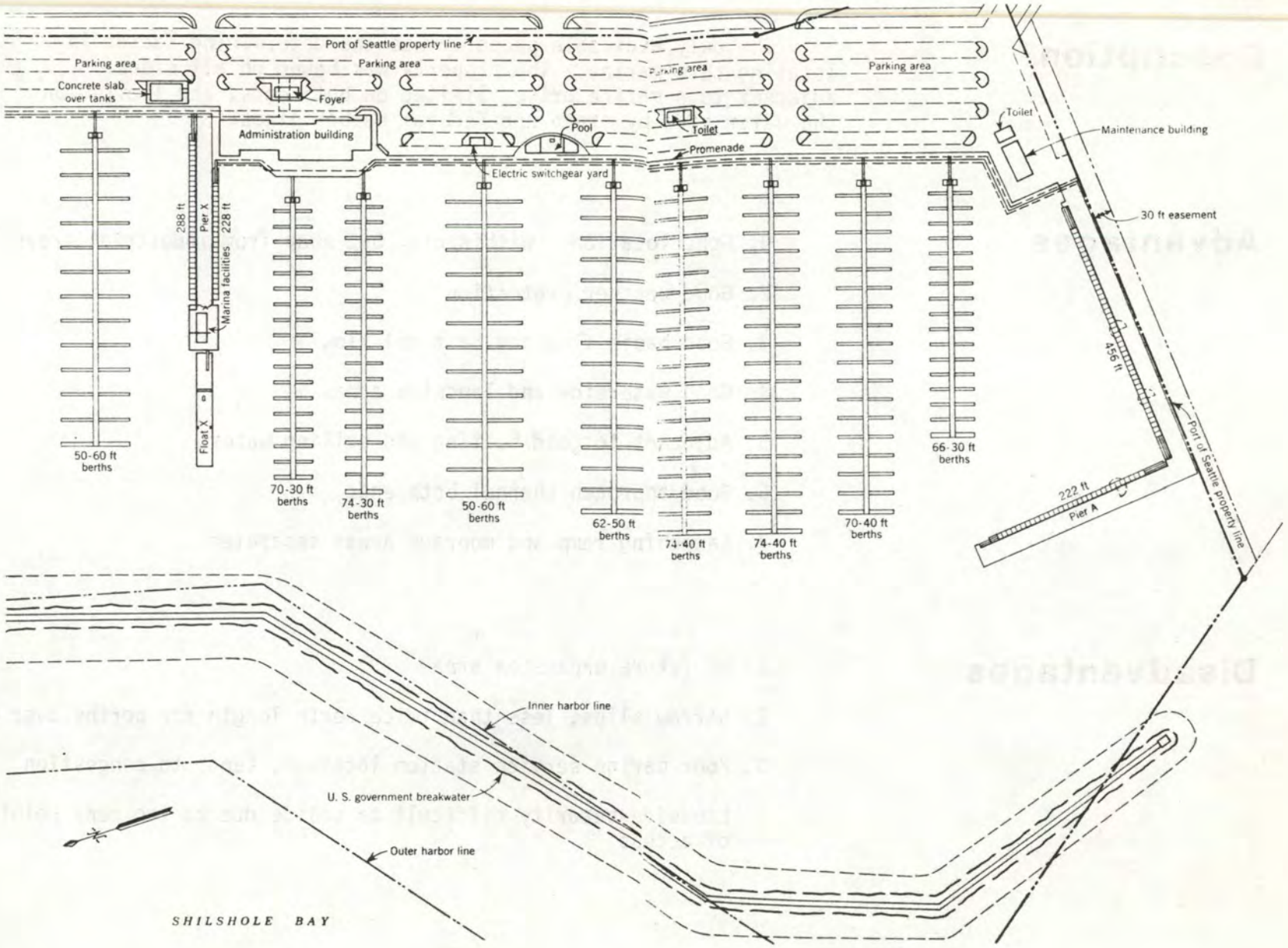
No dry storage is provided. The restaurant does an extremely good business on the weekends and on Wednesday evenings. Almost 60% of its customers are non boaters. There are no lockers nor storage for the boaters. Only electricity is provided for the boats. Since there is no general food supply close by, boaters are forced to bring their own food.

## Future Expansion

The marina is twelve years old, and no future expansion is expected.

# Shilshole Bay Marina Seattle, Washington




Port of Seattle property line
Parking area
Parking area
Parking area
Parking area
Concrete slab over tanks
Foyer
Administration building
Pool
Toilet
Promenade
Toilet
Maintenance building
Electric switchgear yard
30 ft easement
288 ft
Pier X
228 ft
Marina facilities
Float X
50-60 ft berths
70-30 ft berths
74-30 ft berths
50-60 ft berths
62-50 ft berths
74-40 ft berths
74-40 ft berths
70-40 ft berths
66-30 ft berths
456 ft
222 ft
Pier A
Port of Seattle property line
Inner harbor line
U. S. government breakwater
Outer harbor line
SHILSHOLE BAY

# 60

## Description

The only available property was the determining factor in locating this marina. The property was bound on all sides: adjacent to a marine drive, limited on both ends, and limited on the water side by state and Federal harbor lines.

## Advantages

1. Good location - within city but away from industrial areas
2. Good weather protection
3. Good basin flushing by tidal flow
4. Good waterside and landside areas
5. Adjacent to good boating and sailing waters
6. Good approach channel both ends
7. Launching ramp and moorage areas separated

## Disadvantages

1. No future expansion area
2. Narrow slips, less than twice berth length for berths over 40'
3. Poor marine service station location, tends to congestion
4. Landside security difficult to police due to too many points of access

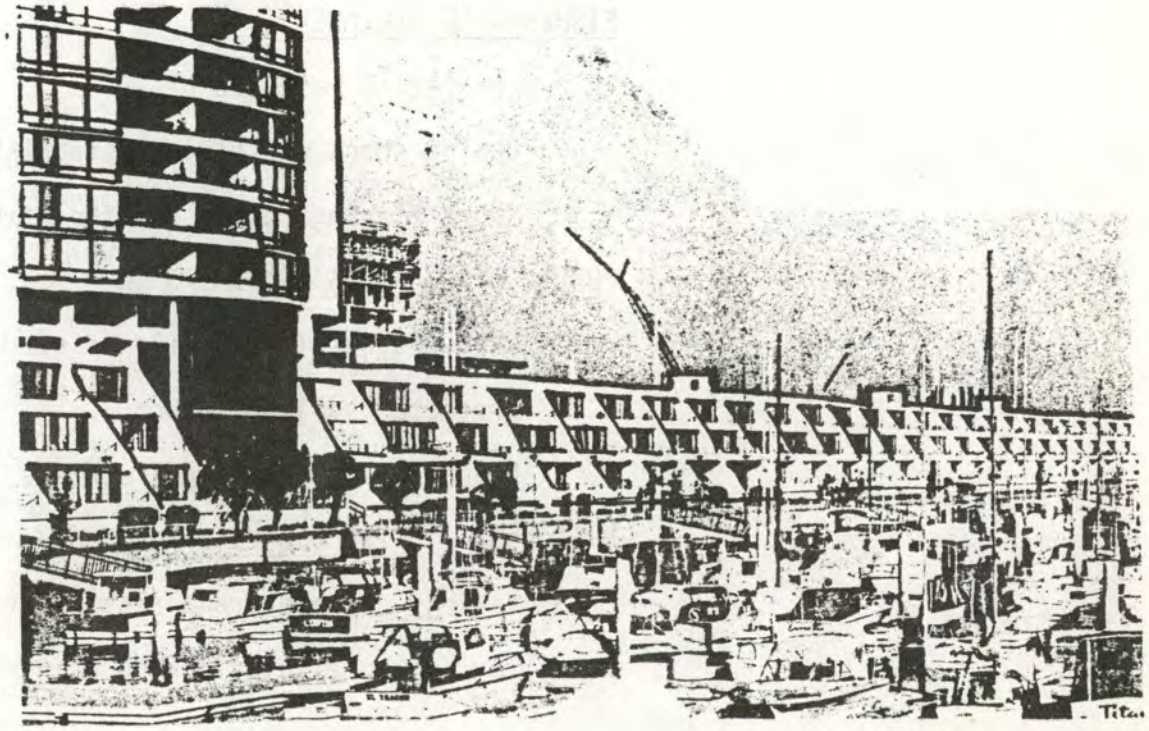
# Marina del Rey Los Angeles, Cal.

## Description

Marina del Rey, less than eleven years old, has a population of 12,000. This marina is designed for a capacity of 6,000 pleasure craft. Today, it is recognized as "the world's largest man-made small craft harbor".

The marina started as early as 1887 and more than half of its 804 acres is water. Of what remains, two-thirds is roads, parking lots, office and commercial development which leaves 138 acres for housing. The marina is operated as a regional facility by Los Angeles County.

At the heart of all this are 5,794 boat slips, two miles of main channel, three miles of side basins and olver seven miles of concrete bulkhead. It is a unique and successful joint venture effort of Government and private enterprise.



## Facilities

PUBLIC LAUNCHING RAMP

- Offers the finest accommodations for the launching of boats
- Commercially operated sling
- Dry boat storage facilities available

BOAT RENTALS

- Sail and power boats available for rental
- Sporting and charter boats available

FISHERMAN'S VILLAGE

- Located on main channel
- Quaint shops and eating establishments
- Sport fishing center for the harbor

PUBLIC BEACH AND SAILING LAGOON

- Features one-fourth mile of sand beach
- Protected sailing lagoon
- Rental boats and dinghy storage located near beach

RESTAURANT, HOTEL AND MOTELS

- Variety of waterfront restaurants available
- Tourist hotel overlooking main channel

YACHT CLUBS

Many yacht clubs and boating clubs located within the marina

Wind and weather conditions permit year round racing

Series of off shore buoys create numerous racing courses

MARINE FUEL DOCKS, REPAIRS

Two fuel docks located in the main channel

Two boat haulout yards with machinery and hull repair facilities capable of handling up to 90 tons

HARBOR SERVICES

Harbor patrol, U.S. Coast Guard Base, sheriff and fire department sub station

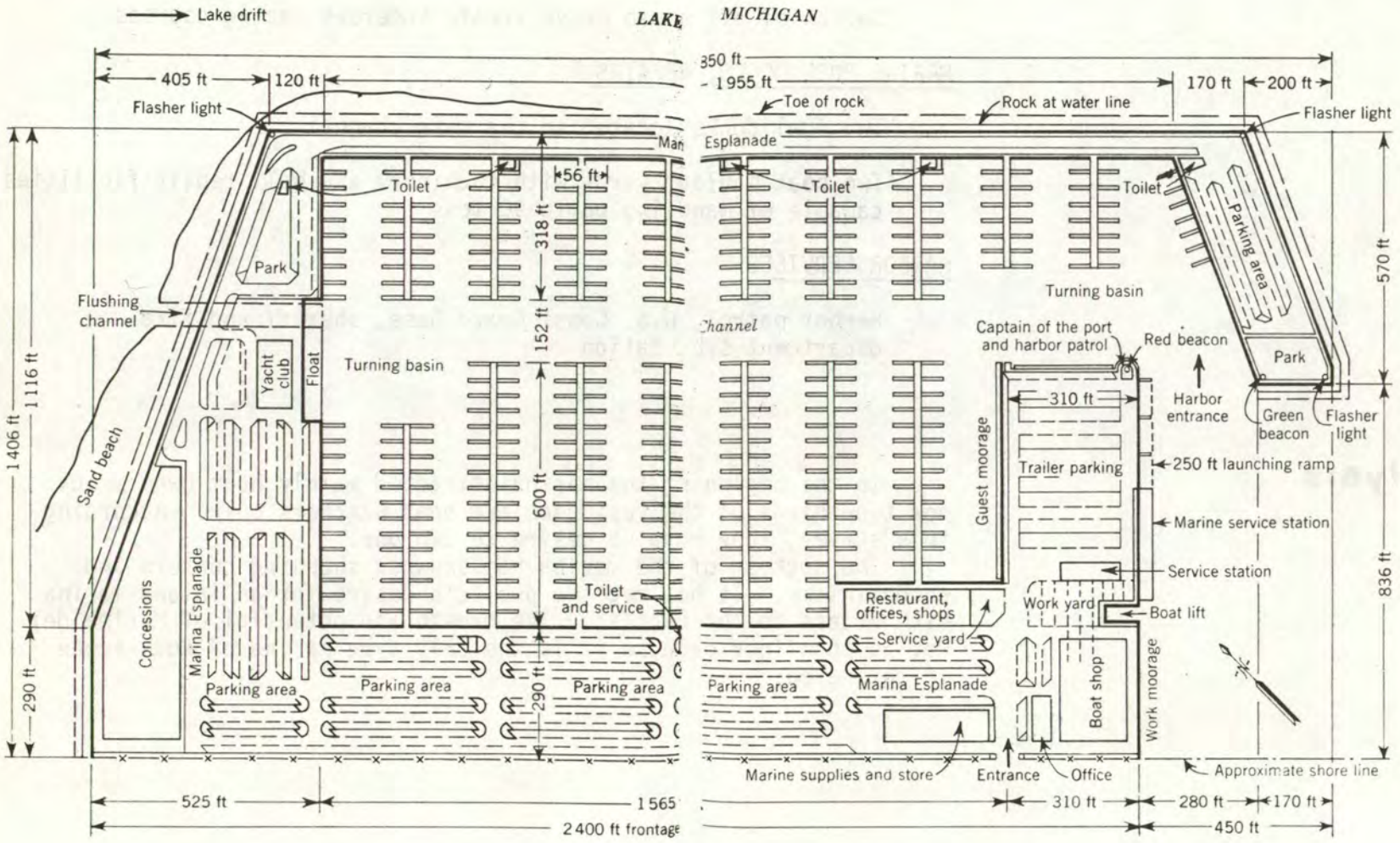
## Analysis

In the beginning the marina attracted mainly boat owners but now two-thirds of the residence are boat watchers only. According to a survey, they have no desire to own one.

The success of the marina has spawned shopping centers and condominiums. It has met the public's desire for an inland marina with access to the Pacific. The growth and potential of Marina del Rey is undefined because it is the only type marina of such scope in this area.

# Marina Project

# Lake Michigan



## Description

Available public lake frontage determined this harbor's location. Landside access was by a sort roadway from an arterial city street. Available frontage limited the length. Permissable extension into lake waters determined the depth. Adequate material could be dredged to provide landside and espanade fills. Main walkways were anticipated as earth filled groins with concrete sides and deck. Roof extensions and partly covered moorages would be provided where necessary. Finger or wing piers were floating type that could be easily removed and stored shore side during the heavy winter freeze.

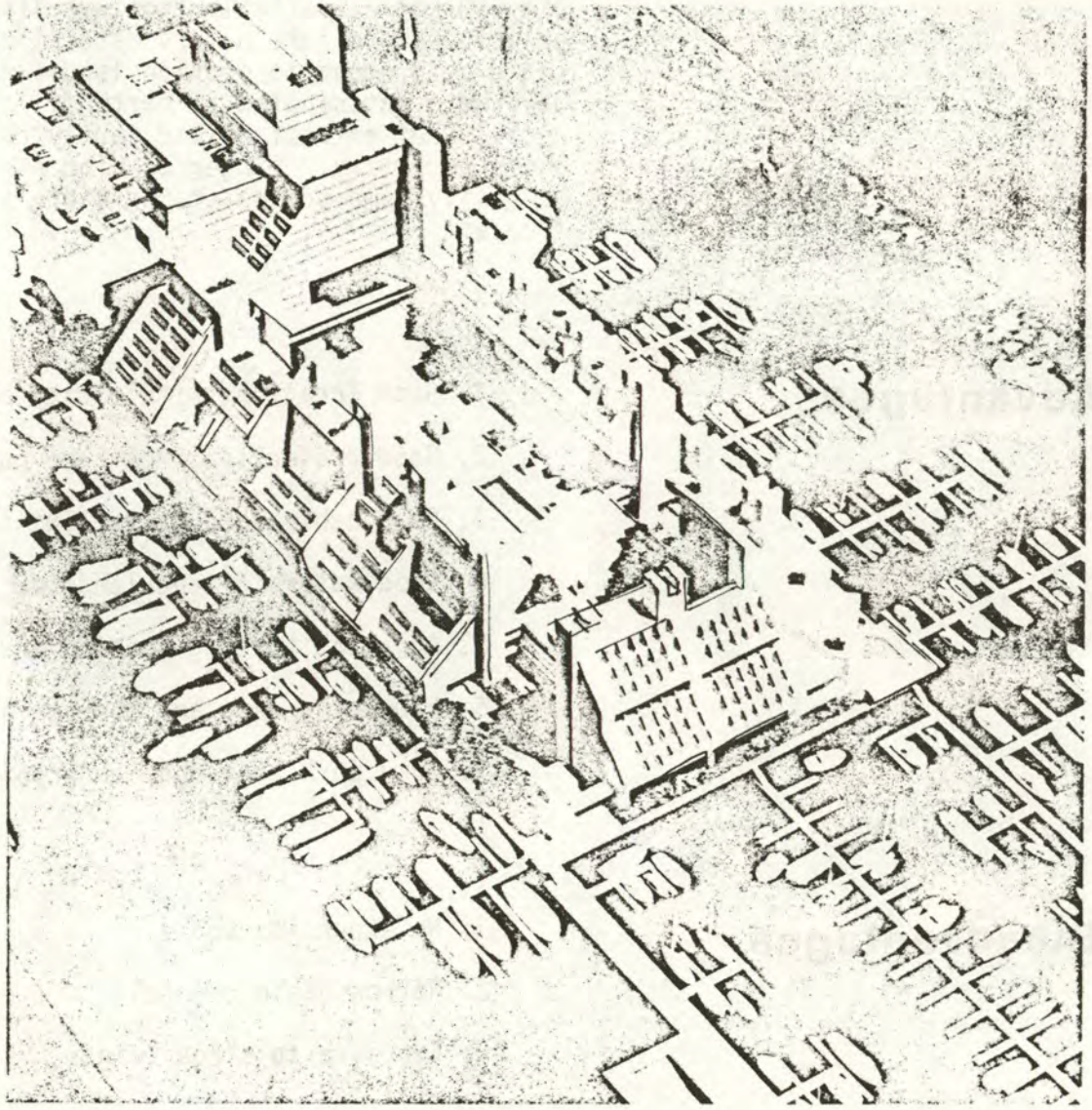
## Advantages

1. Good location, within city but away from industrial areas
2. Good protection from lake waves
3. Reasonably good basin flushing by use of a flushing channel
4. Good waterside and landside areas
5. Adjacent to good boating and sailing waters
6. Launching ramp and moorage area separated
7. Some park area and landscaping

## Disadvantages

1. No expansion space
2. Narrow basin channel
3. Exposure to strong winds

**Stamford Landing** **Stamford, Conn.**



## Site

(14½ acres on Long Island Sound, with some 5.2 acres of existing land supplemented by an additional 9.2 acres required through land fill)

## Program

(A community environment that adds structural beauty to the shore line) Particular attention has been given to pedestrian and traffic circulation, and respect for the site in terms of orientation, views and landscaping, graphics, and special interest. The program required: a 300 unit commercial and recreational motor hotel; 200,000 Sq. Ft. of ultra-modern office space; condominium high quality apartments; conference and convention facilities; 100,000 Sq. Feet of rental shop, 100,000 Sq. Ft. of space retained for either offices or apartments; recreational facilitated, a 600 boat marina; parking for 1,500 cars.

## Design Solution

The projects size suggested a straightforward circulation system (both for access and service) that would separate private cars, service vehicles and pedestrians. Required retail space is located along the second level throughout the project offering a natural possibility for social interaction. An important requirement was flexibility. The owners wanted the ability to tailor individual condominiums, as well as office and retail space, to individual owners needs and programs. The structural system reflects this need and provides the capacity to create space where and when it is wanted. Floors can be set back, projected out,or omitted altogether to allow sunshine to penetrate and permit spectacular views of Long Island Sound. The basic arrangement of a central parking block connected by bridges to the architectural spaces along the water avoids the typical large scale appearance of high-rise towers emerging from a multilevel parking slab. The architecture is organized to capitalize on the visual interest generated by the marina.

# Conclusion

These different marinas were selected because each facility serves a different type of purpose. No two facilities were designed the same way, and each were started under varying programs. All of the surveyed marinas have one dominant programmatic item in common: that being, a need for a boating facility. The design was of each marina's own owners choosing. Economics also lent itself to influence the design and function of the complex. Especially important to the larger facilities which must operate on a profit basis were economics and profit. Some facilities offered more services to the boater than the privately owned and operated ones.

The most important conclusion which can be obtained from these analyses is the fact that no two are alike in their form or their functioning. Therefore, there cannot be any direct establishment method for which a basis of a marina design can be obtained. The background experiences that each marina teach is the largest aid.

# Physical River Limitations

# Physical Limitations of the Waccamaw River69

## Flood Elevations

| Flood | Elevation (a) |
|---|---|
| Standard Project | 16.50 |
| Intermediate Regional | 12.90 |
| September 1928 | 12.75 |
| September 1945 | 10.55 |
| October 1924 | 10.45 |
| February 1973 | 8.35 |
| July 1961 | 8.05 |
| March 1959 | 7.75 |
| Standard Flood Level | 7.00 |

(a) Feet above mean sea level datum

## Standard Project Flood

The flood that may be expected from the most severe combination of metorological and hydrological conditions that are considered reasonably characteristic of the geographical area in which the drainage basis is located, excluding extremely rare conditions. As used by the Corps of Engineers, Standard Project Floods are intended as practicable expressions of the degree of protection that should be sought in the design of flood control works, the failure of which might be disastrous.

## Intermediate Regional Flood

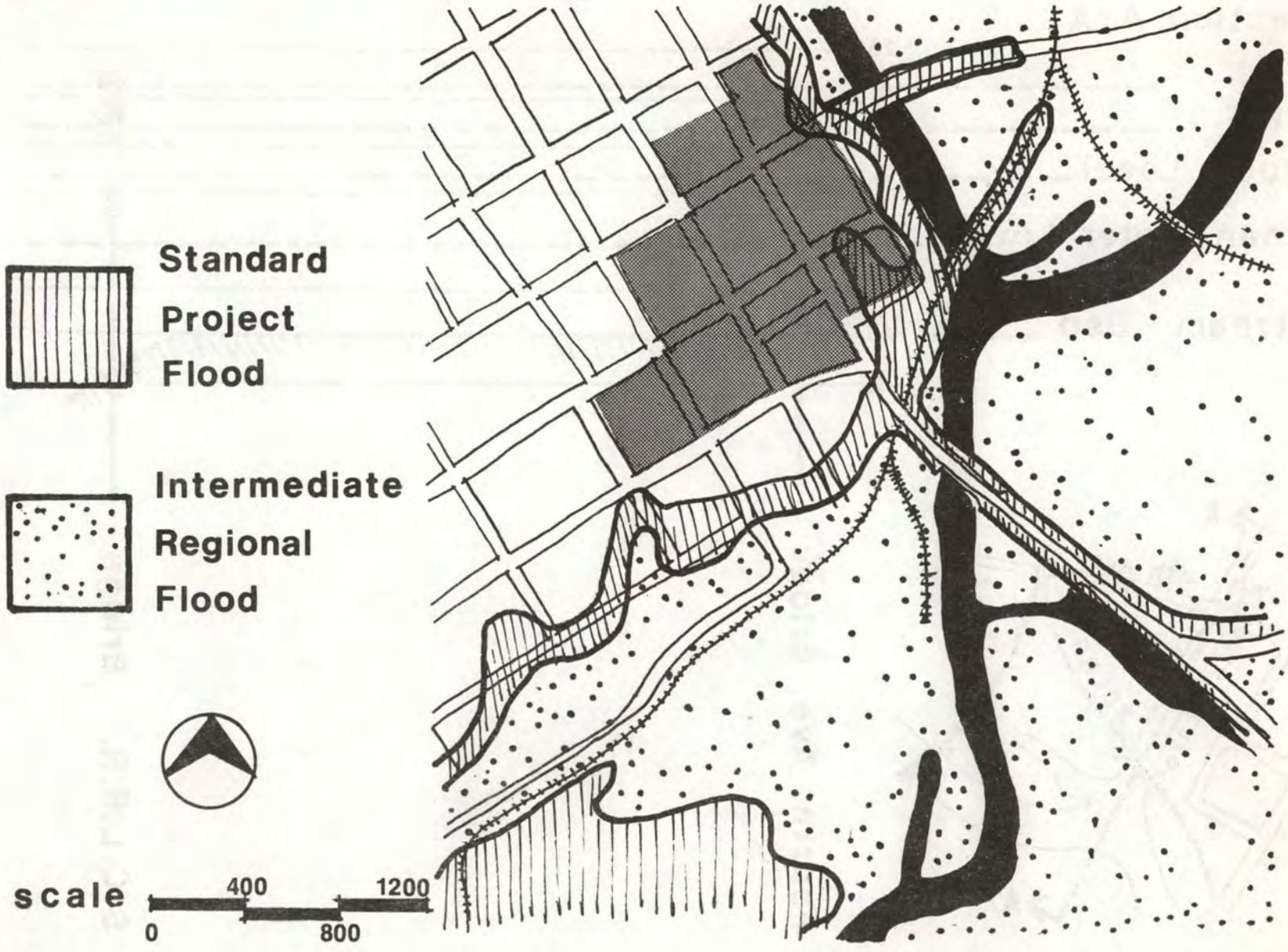
A flood having an average frequency of occurrence in the order of months in one-hundred years although the flood may occur in any year.

## Analysis

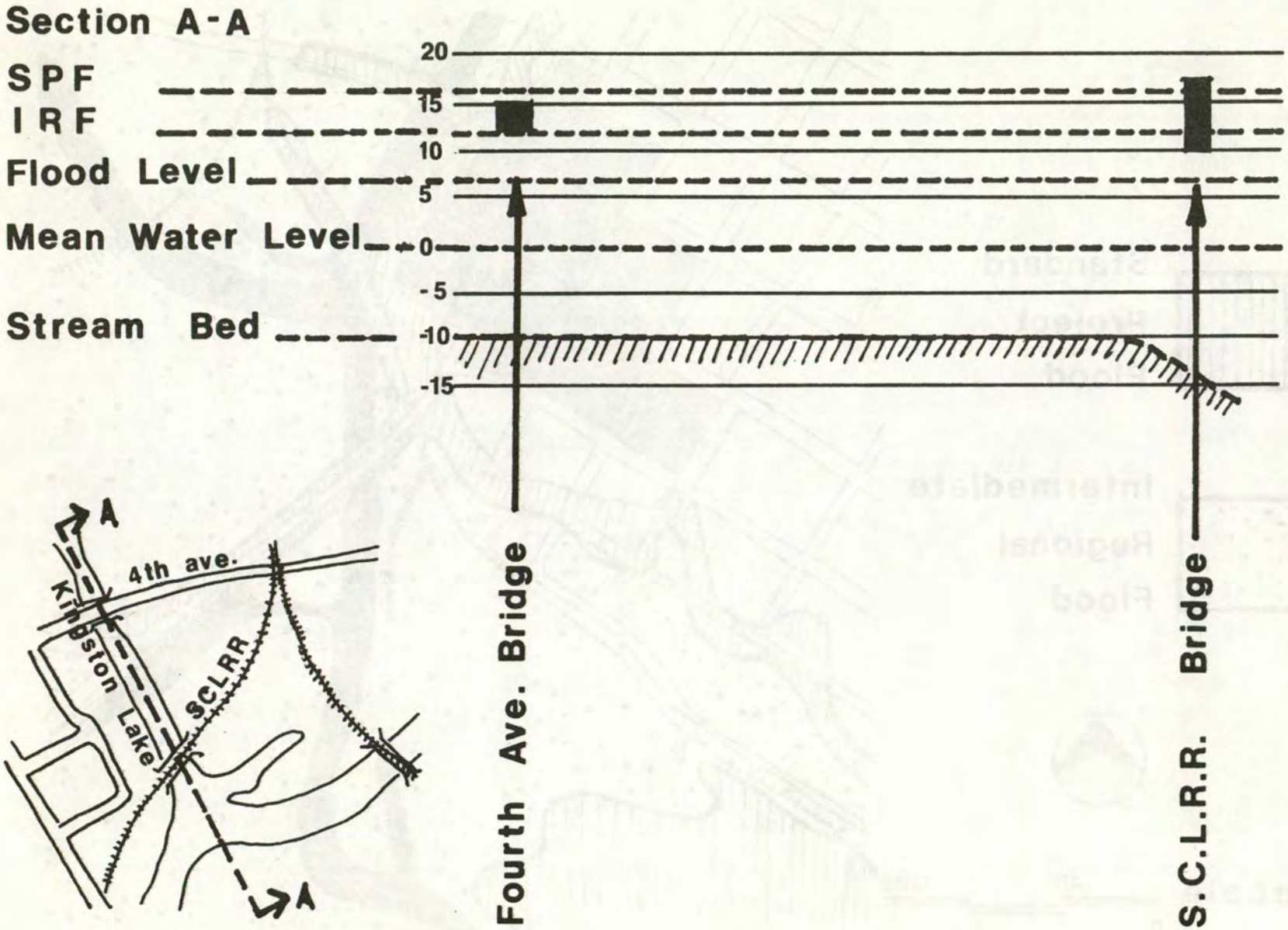
Floods of the same or larger magnitudes as those that have occurred in the past could occur in the future. However, as can be seen from the following flood chart, since the dredging of the intracoastal waterway in the 1930's and the completion of the Crabtree Watershed in 1963, flooding has occurred only 1.35 feet above flood state of 7 feet above mean sea level.

Another way to look at the one-hundred year flood or intermediate regional flood is that the flood has about a 25% chance of occurring during the usual home mortgage period of any home in the I.R.F. plain.

Therefore, an elevation of 10 feet above mean sea level or 3 feet above flood stage will be the minimum set elevation of all premanent facilities of this project.


Standard
Project
Flood
Intermediate
Regional
Flood
scale
0
400
800
1200

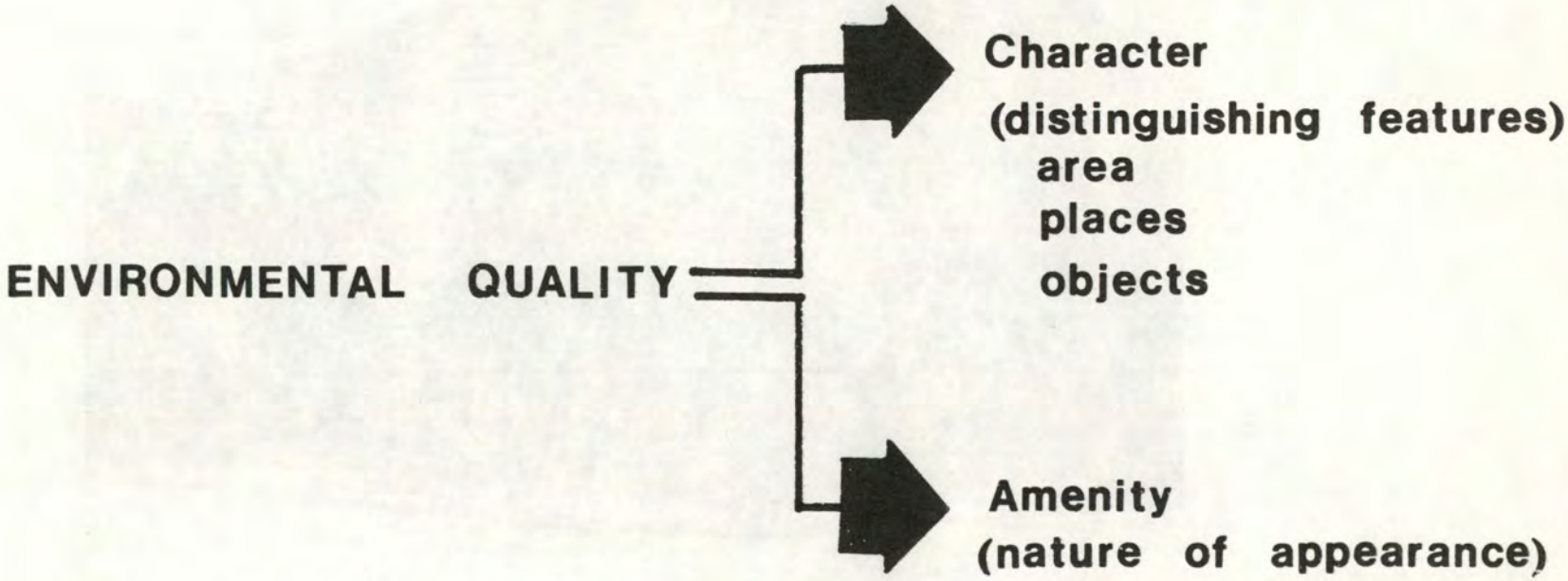
# River Profile of Kingston Lake



# Environmental Quality of City and River

# Environmental Quality of City and River 73

There are two words that are used in specific when defining environmental quality: character and amenity. Areas, places, and objects are the distinguishing features that give character to an environment. By amenity, we mean the nature of appearance or aesthetics. Illustrated in this section will be photographic examples of the environment. These will set the feeling, give scale and establish a working context for the design of the marina.



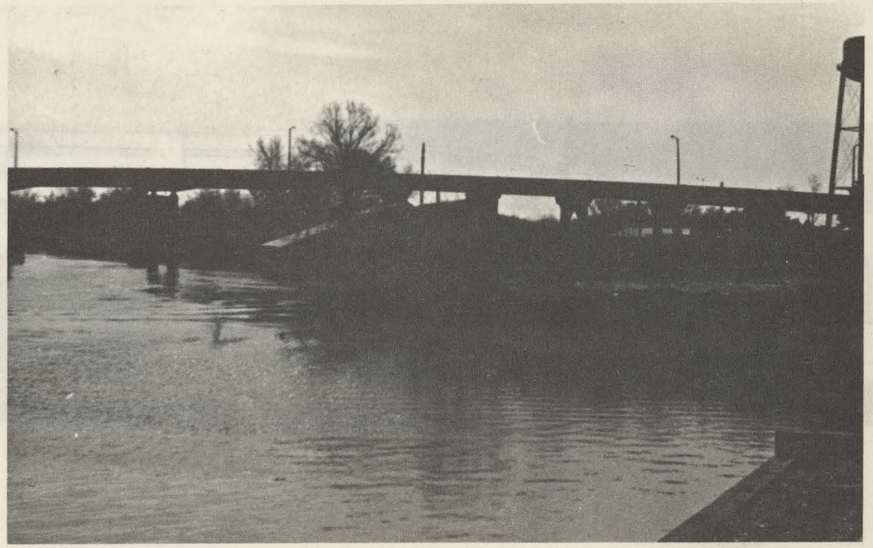

Before one begins to evaluate the site, and before selecting the best possible location, an environmental quality study must be undertaken. Along with this study will be an analysis of riverside elements such as form, function, and access. This analysis will establish shape, size, scale of structures, and spaces. Also the principle usage of land buildings along with pedestrian, vehicular, and rail access will be established.

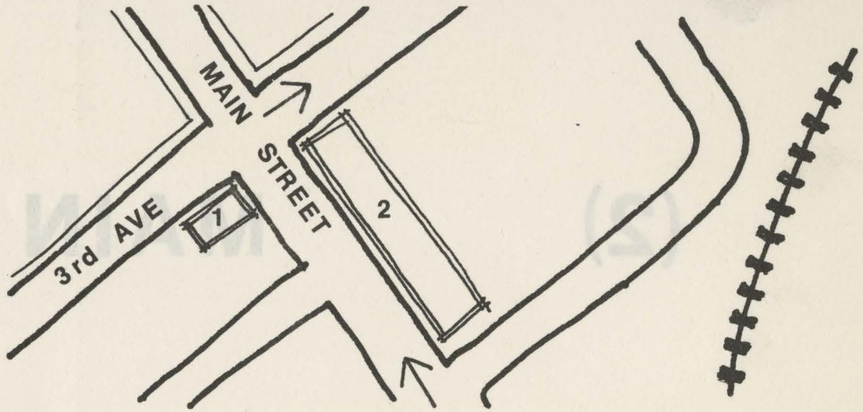
74

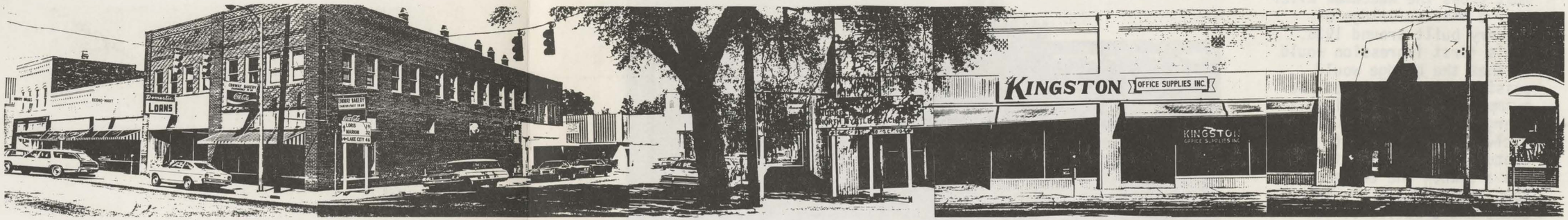
(1)


This building, constructed of brick with vaulted record rooms of massive arched masonry, was erected in 1824-1825 as a court-house for Horry County. It is a typical Mills' design, having been erected under the administration of Robert Mills, then Commissioner of Public Works.

If one approaches the town of Conway from the east on U.S. Highway 501, he first must cross the Waccamaw River over a massive bridge of masonry built around 1936. One's first impression would be that the bridge would possibly lead back into the swamp setting from which it emerged. Rather, one finds a cluster of early 20th century buildings that resemble a town. The center of town begins where the bridge ends, and a series of low one story structures appear on his right. On the next two pages is a sample of one block of commercial buildings. Next, turning down 3rd Avenue to the right, one is led into a more peaceful setting after passing a few commercial stores.





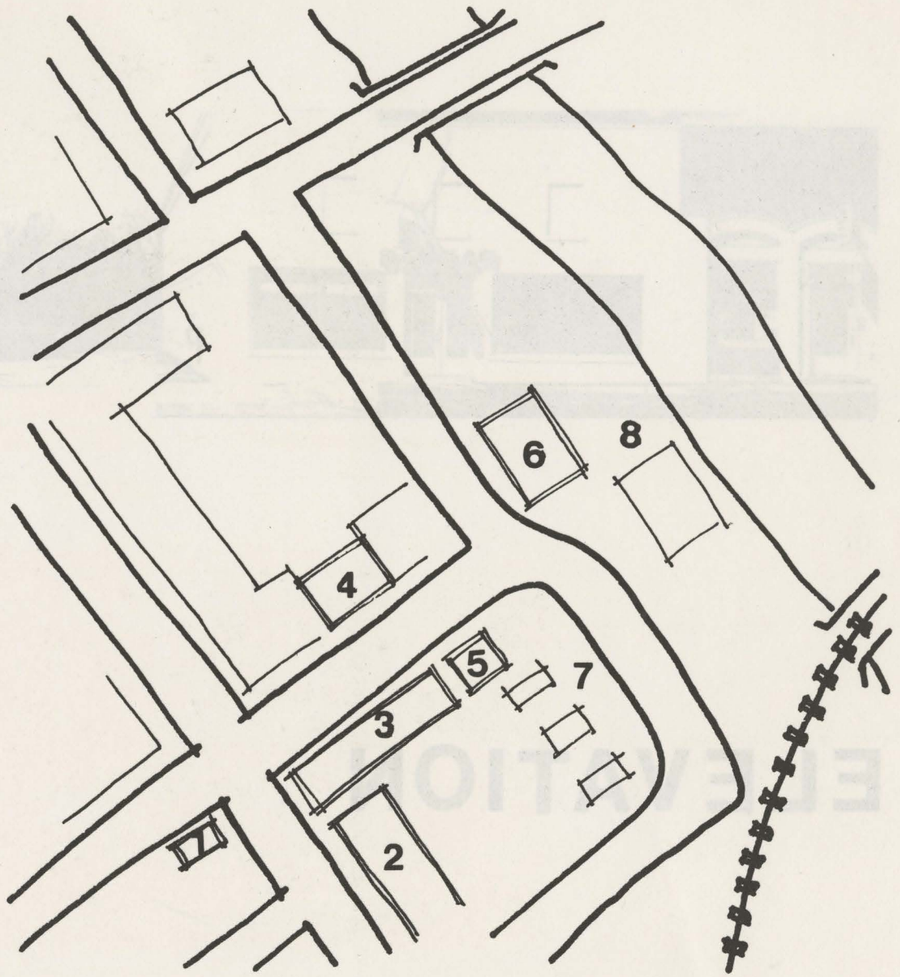



# (2) MAIN STREET

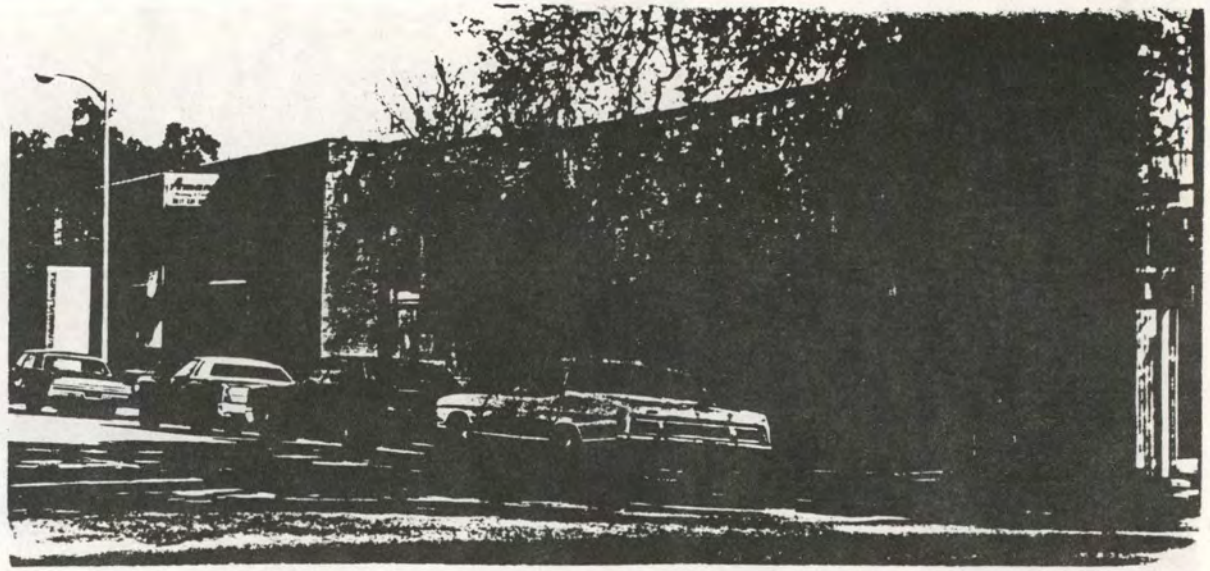

# ELEVATION (2)

# 78

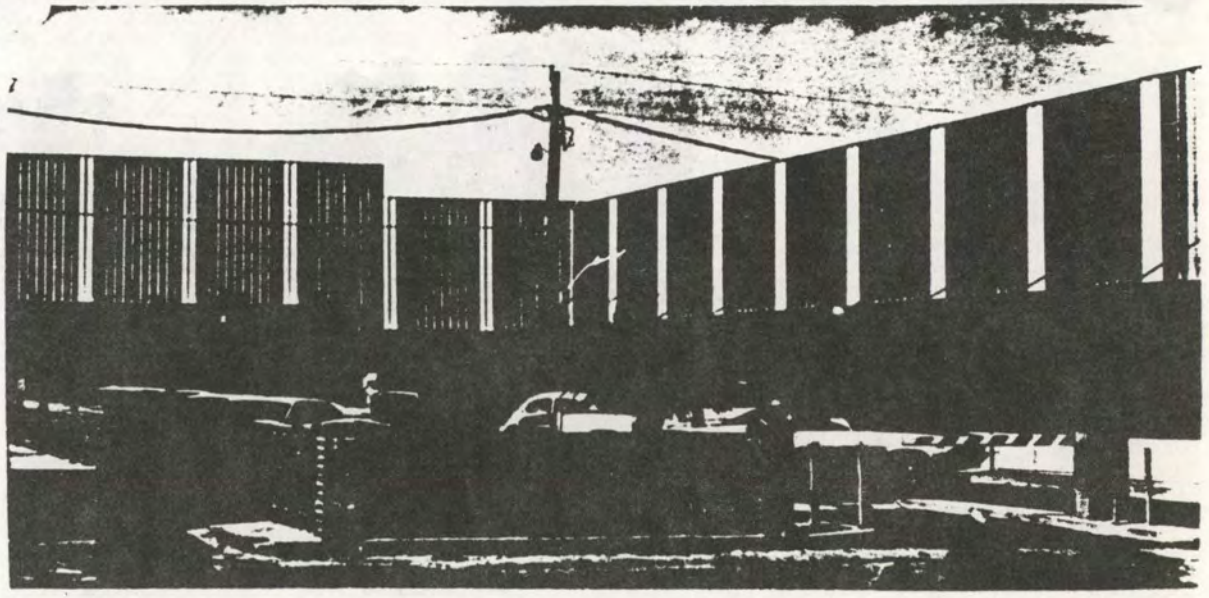
These photographs are of the low one story commercial buildings. Number 3 is an example of the retained early 20th century character. While number 4 located directly across the street from number 3 is an example of a contemporary attempt to unify the older buildings.



(3)

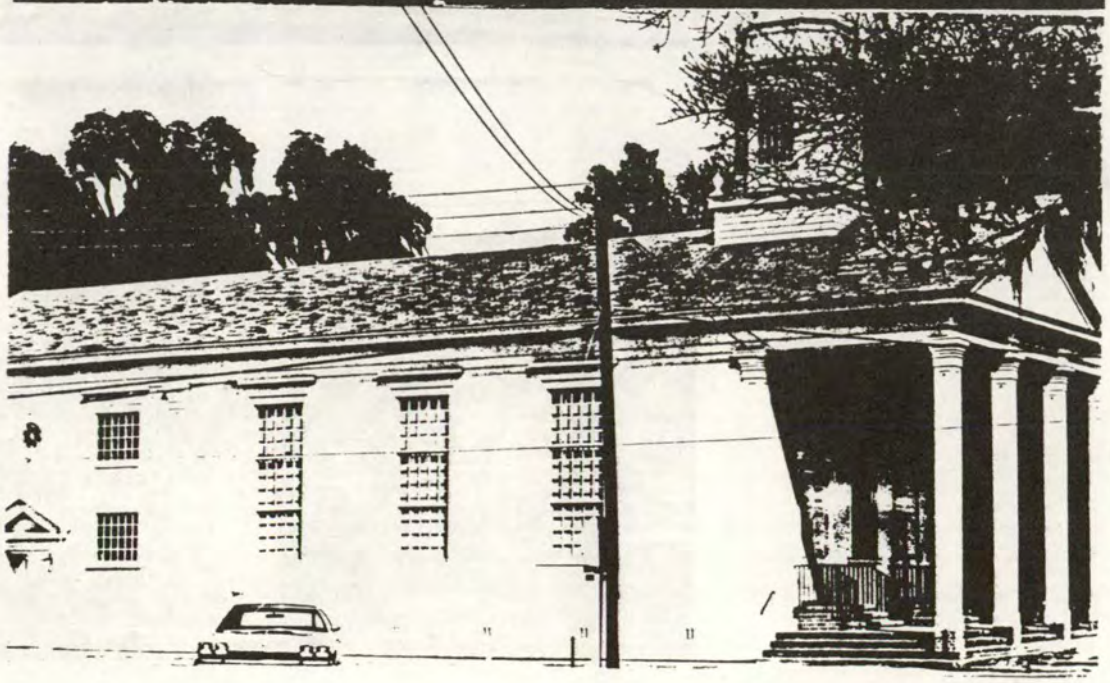


(4)



(5)

(6)



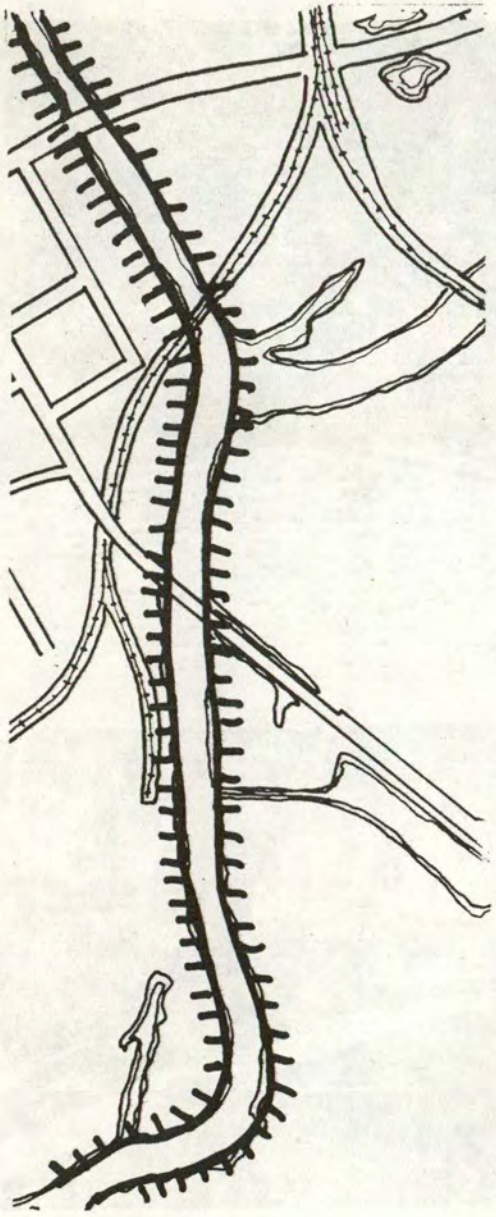
# (7)

Photograph number 7 shows later 19th century homes that overlooked the Conway shipyard and docks of the 1800's. The character shown here has remained as it was in those days. A peaceful walk sheltered by a continuous canopy of foliage sets the character by which the entire town has built around. Conway is noted for its huge old oaks that were preserved as the town grew.

Photograph number 8 located across from these old homes shows the walled cemetary of the Presbyterian Church and is a contemporary solution that retains this old quality. This street will be the connecting link needed to bring the pedestrian to the river's edge and across the proposed pedestrian bridge to the Conway Marina.

# (8)

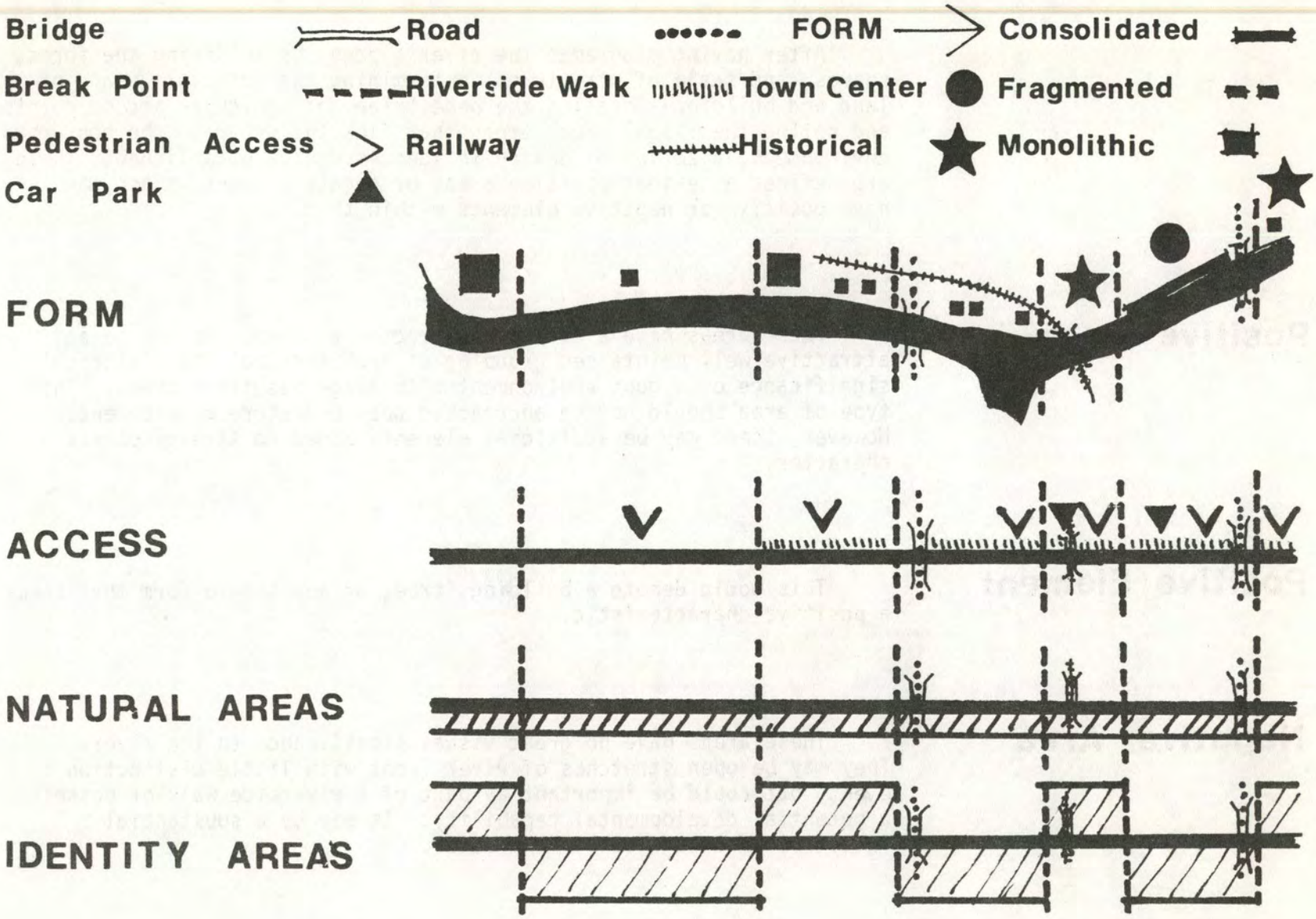
# Analysis of Riverside Form, Access, Function



After the environmental quality of the city has been established; that is, an historical area along the river much the same way it was when the river was being used by steam boats a hundred years ago. This combined with low structures of the early 20th century used today for retailing, make up the city's quality along the river.

Following is a diagramatic sketch of the river, its form, function, access areas, and land usage. The defined study area is marked on the following map. It begins with the existing site on the south end, and ends with a highly prestigious residential area of old river homes north of the 4th Avenue bridge. This study produces the major important design influences. These influences will be defined in the following section.

**STUDY AREA**


Bridge
Road
FORM
Consolidated
Break Point
Riverside Walk
Town Center
Fragmented
Pedestrian Access
Railway
Historical
Monolithic
Car Park
FORM
ACCESS
NATURAL AREAS
IDENTITY AREAS

# Physical Design Influences of the River's Edge

After having diagramed the river's edge; establishing the forms, shapes, and scale of structures, determining the principle usage of land and building; locating the pedestrian and vehicular access points; and noting the visual break areas that link the urban to the non urban environment, a series of design influences can be established. These are defined as either positive areas or negative areas. Each may have positive or negative elements within them.

## Positive Area

These areas have a definite character to them. It may be an attractive well maintained grouping of architectural and historical significance or a good environment with large beautiful trees. This type of area should not be encroached upon by future development. However, there may be additional elements added to strengthen its character.

## Positive Element

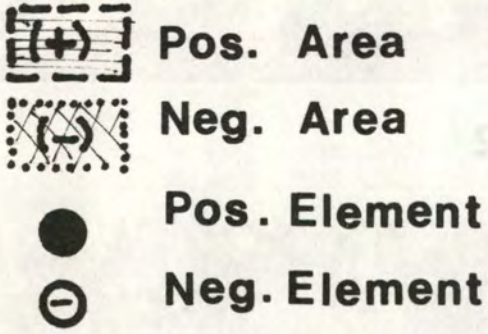
This would denote a building, tree, or any single form that takes a positive characteristic.

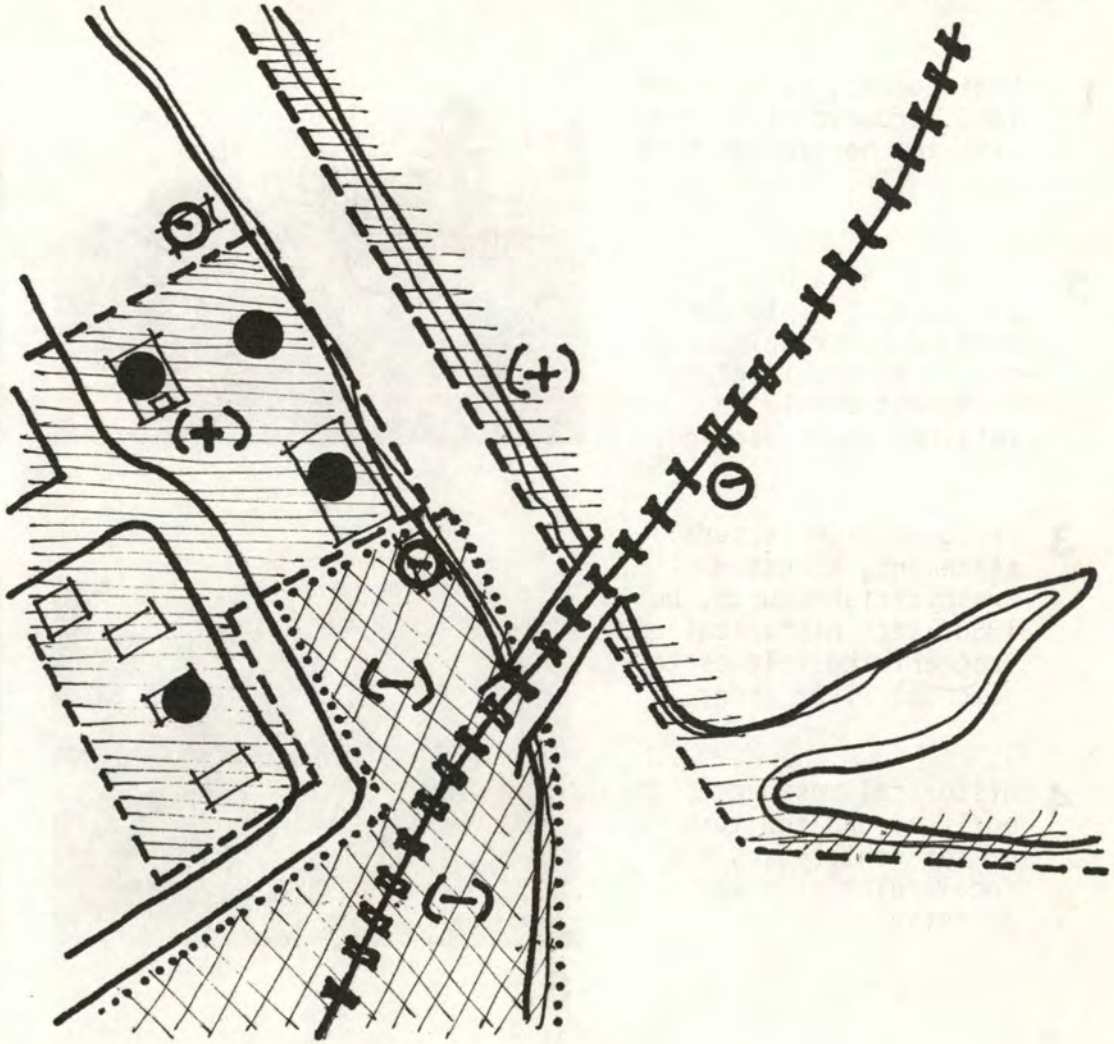
## Negative Area

These areas have no great visual significance to the river. They may be open stretches of river front with little distinction or event, but could be important as part of a riverside walk or possess a potential developmental capability. It may be a substantial industrial frontage out of character.

## Negative Element

This would denote a house, building, railway or any single form that encroaches upon a positive area. They may be found in either a positive or negative area.



# Areas of Positive Environmental Significance

**1** Undisturbed, quiet swamp land, organic river form with low horizontal tree line.

**2** Peaceful area with large oak trees. A pleasant ambling river walk would help. Non-architectural statement should be retained and preserved.

**3** Profound architectural statement, Kingston Presbyterian Church, built 1858, sets historical environment and relates to peaceful river front.

**4** Historical residence built around the turn of the century was the focal point of river activity.

1

2

3

4

# Areas of Negative Environmental Significance

5

6

**5** CHURCH PARKING LOT AND AN OPEN STRETCH OF RIVER FRONT
A scheme for landscaping or development of small scaled shops would enhance this area.

**6** SEAFOOD MARKET AND PARKING LOT
A scheme for landscaping and uplifting the face of the embankment is needed. This is a possible location for small shops.

7

8

**7** OLD SHIPYARD AND AN OPEN STRETCH OF RIVER BANK
This is an area with little distinction. It could be developed with landscaping, shops, and a continuation of walks.

**8** RAILWAY BRIDGE
A typical design of railway bridges whose function conflicts with the visual quality of its immediate environment. A possible link for development.

# SYNTHESIS

2

# Location Analysis

# Marina Location Comparison



After studying the present location of the existing Conway Marina project and reviewing the general requirements for a Marina location, a decision was made to investigate an alternate location. This comparison is based on the following requirements:

1. Type of water body

   Currents, flooding, protection

2. Population centers

   Central business district influence

   Industrial influence

3. Functional location to water areas

4. Location conflict with marine traffic

5. Accessability

## (1) Type of Water Body

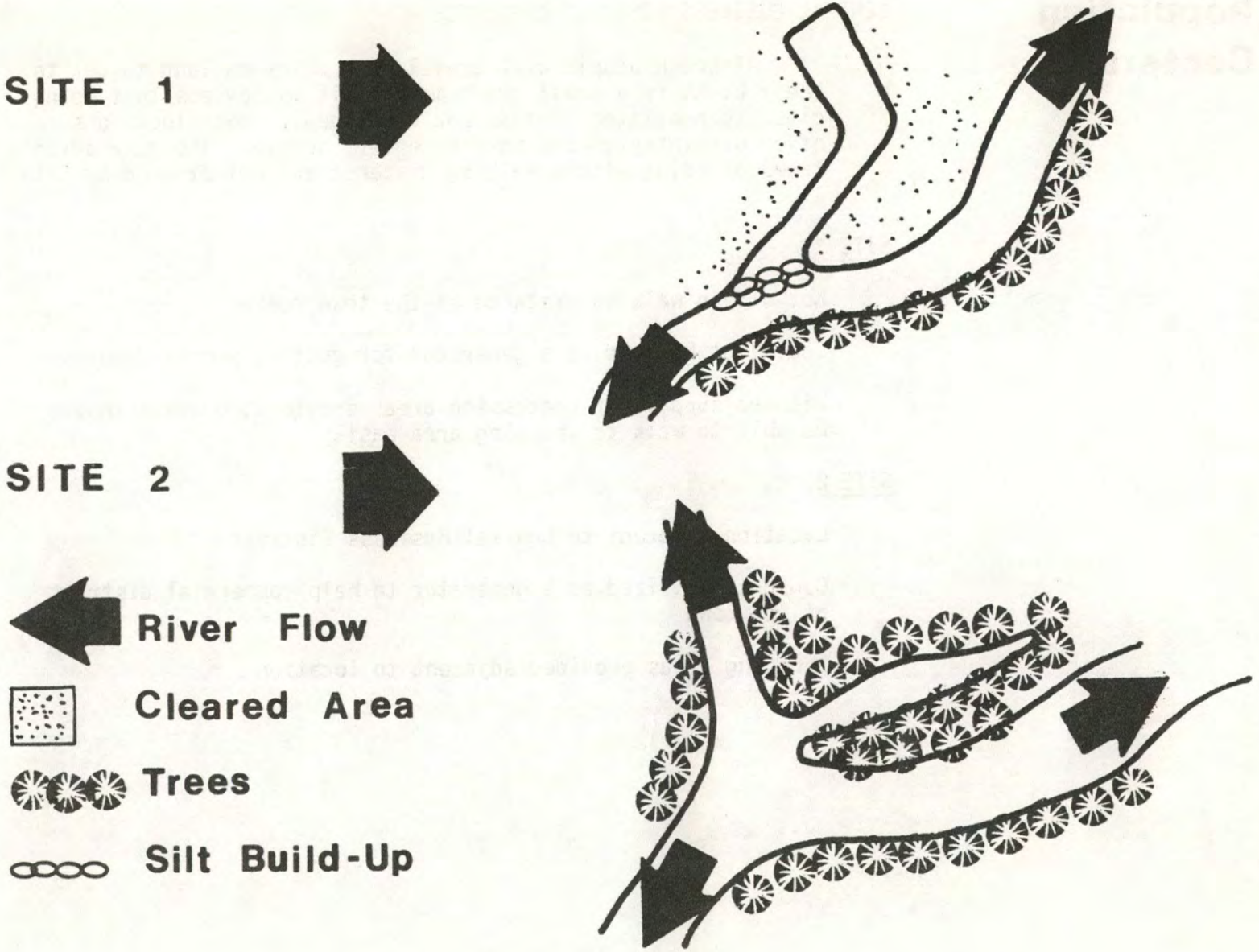
The type of water body will influence the marina location whatever the function may be. River currents and the direction of river flow, flooding, and protection from these elements as well as natural forces such as wind, rain, and snow must be considered in the location of a marina.

SITE 1 (existing Conway Marina)

Site 1 has a poor relation to the current of the Waccamaw River. The diagram on the following page illustrates how a silt build-up will gradually occur at the basin channel opening. This will take continuous dredging or perhaps a small retaining levee to correct this problem. The existing basin is fairly protected from open water; however, no trees were left to break the wind. The finished elevation of 8 feet is too low because of flooding. Flood level is 7 feet with frequent flooding averaging over 8 feet.

SITE 2 (proposed marina location)

Site 2 is located at the mouth of Kingston Lake and the Waccamaw River. This area offers larger advantages over the previous site. One, there are two river currents that could be used in keeping the basin channel free from silt build-up. Two, with the large area of undeveloped swamp land, a natural protection for the basin could be achieved. Also, dredging and clearing will aid in the protection from floods.


SITE 1
SITE 2
River Flow
Cleared Area
Trees
Silt Build-Up

## (2) Population Centers

CENTRAL BUSINESS DISTRICT INFLUENCE

Although people will travel many miles on land to get to their boats in a small craft marina, it is obvious that being close to populated centers would be ideal. Both locations offer proximity to the town's center, however, the many advantages of being within walking distance are not offered by Site 1.

SITE 1.

Not within walking distance of the town center

Could not be used as a generator for getting people downtown

With no supply for concession areas provided, boaters should be able to walk to shopping area easily

SITE 2.

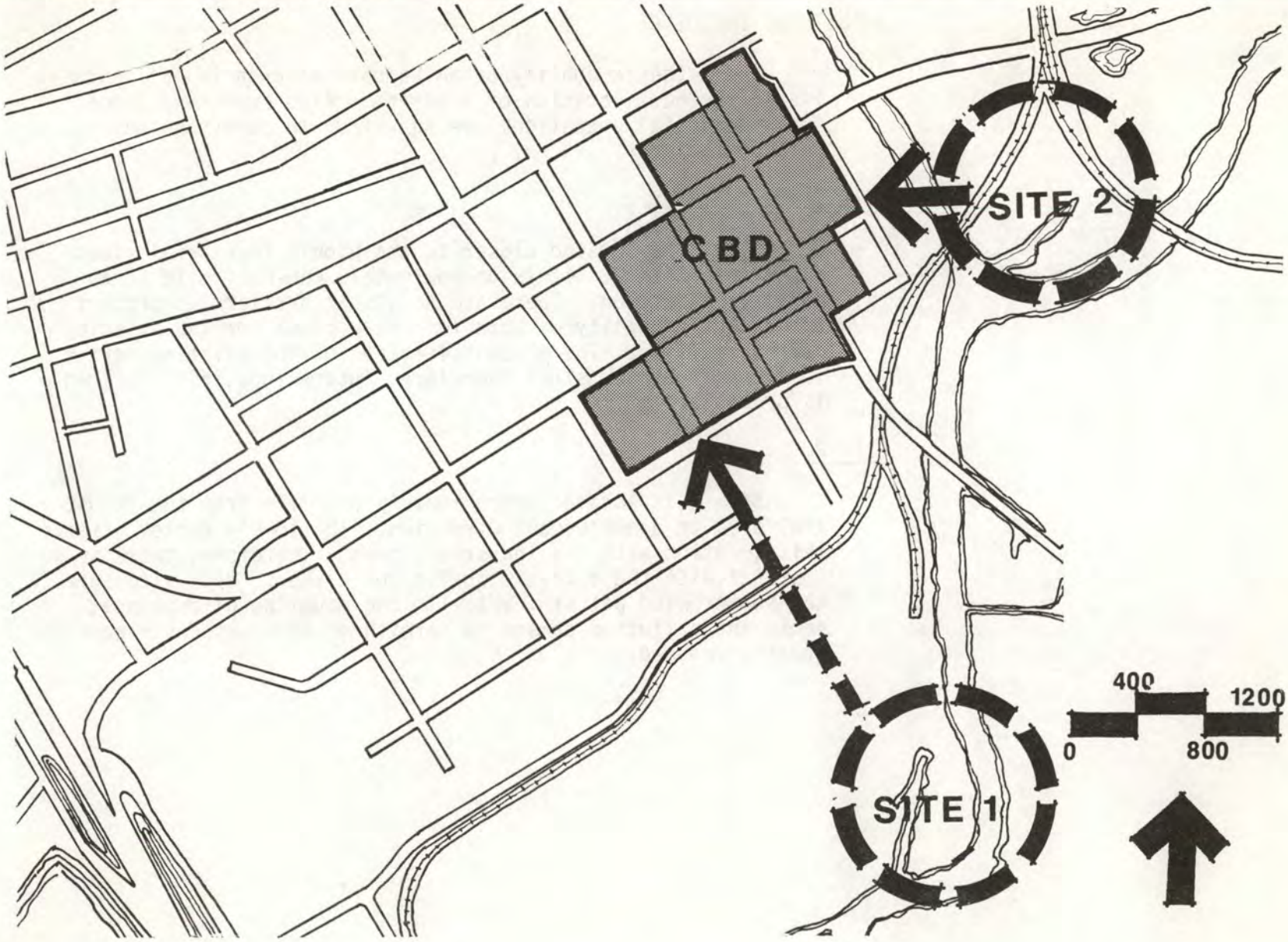
Location adjacent to Central Business District

Could be utilized as a generator to help commercial district of the town

Shopping areas provided adjacent to location

# CBD Generator





INDUSTRIAL INFLUENCE

The asthetic quality of an industrial area is not condusive to the best location of a marina. Also smoke and fumes from industrial operations are injurious to varnishes and painted surfaces.

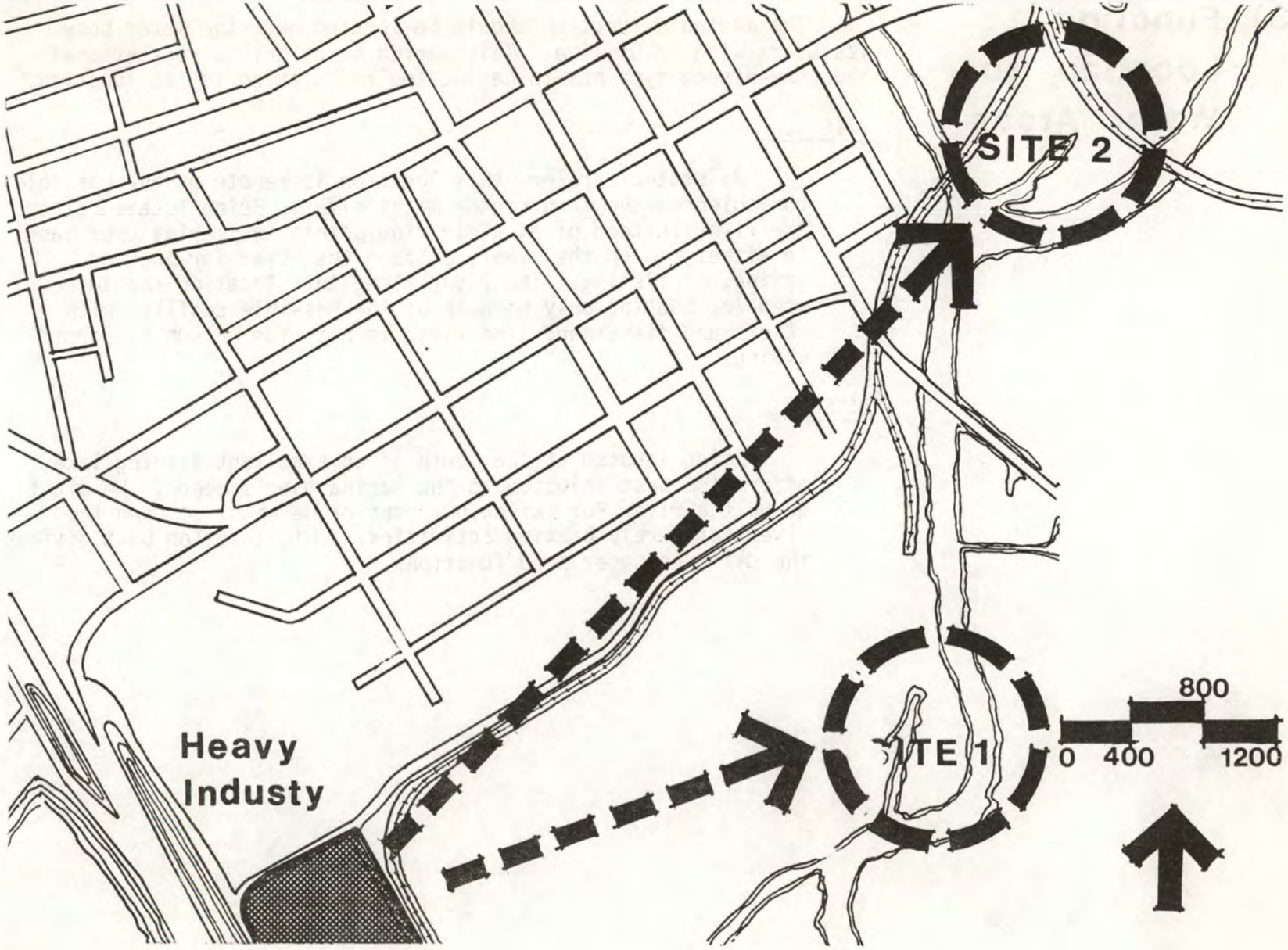
SITE 1.

Site 1 is located closer to the highly industrial steam plant than Site 2. It is approximately one-half mile in an easterly direction. There are no visual barriers to protect the asthetic quality of both the steam plant nor the existing marina facility. The present location of the existing marina is zoned light industry; therefore, future industrial influence is probable.

SITE 2.

Site 2 is located approximately one mile from the industrial area in a north-east direction. The town's center bisects this location with the industrial area. Therefore, there is no conflict with the asthetic quality of either. Both sites are in the summer wind pattern, yet with the doubling of distance, smoke and pollution damage to varnish or other wood surfaces is greatly reduced.

# Industrial Pollution



## (3) Function Location to Water Areas

The marina's function should be located near the water body its users wish to utilize. This marina being both a recreational and convenience type has to be located in relation to its function.

SITE 1.

As stated earlier, this location is remote of any possible conveniences the town center might offer. Being located along the river instead of at a dividing point, the marina user has to either, go up the river, or down the river for boating, skiing, or fishing. The river along this location should be used for boating only because of the possible conflict with skiers and fisherman. The river is not wide enough to permit skiing.

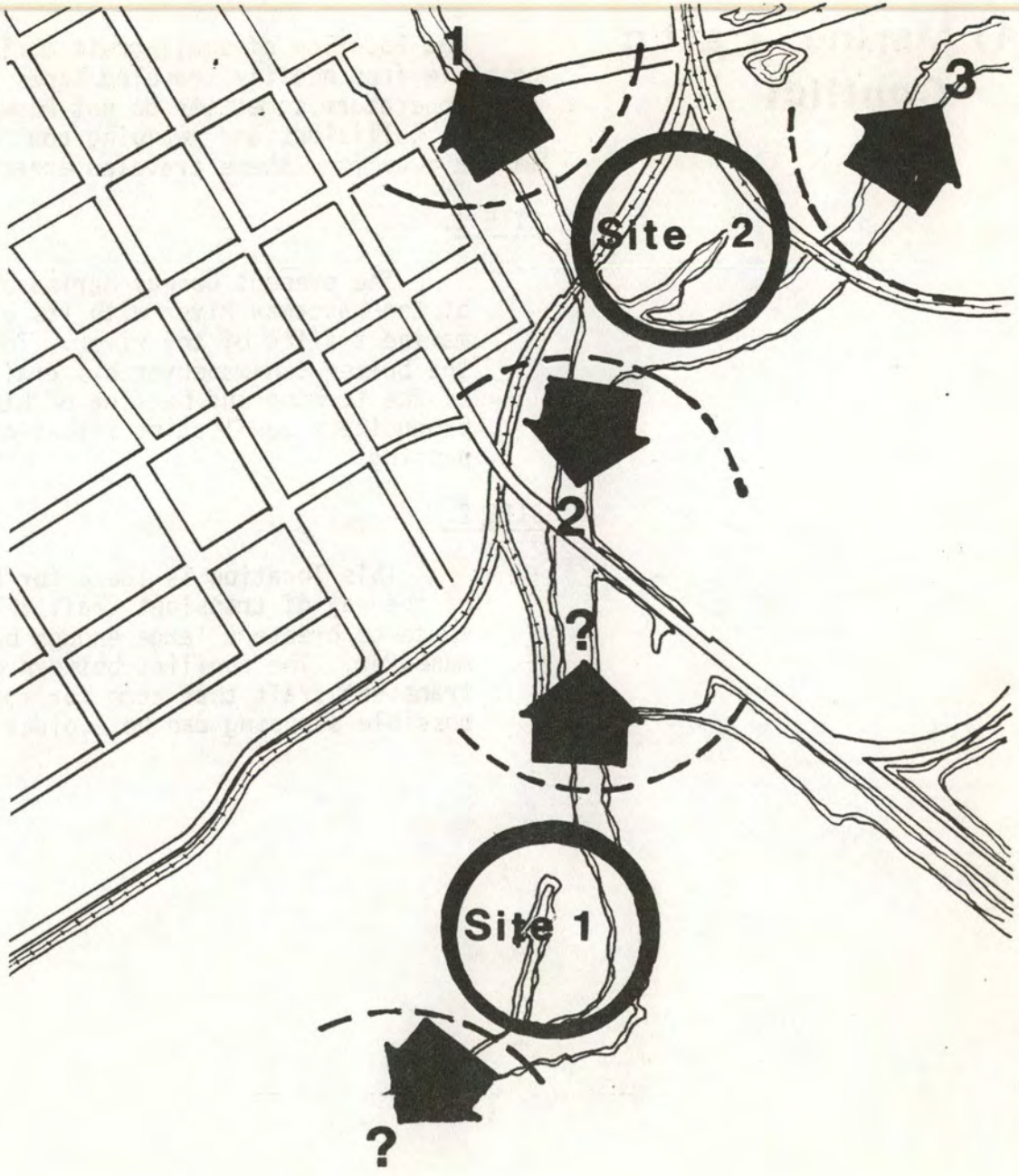
SITE 2.

Being located at the mouth of an excellent fishing lake offers the best solution to the marina user's needs. He might go up the river for skiing purposes or he might go down the river for purely boating activities. This location best divides the different user need functions.

**1** Fishing

**2** Boating

**3** Skiing



## (4) Marine Traffic Conflict

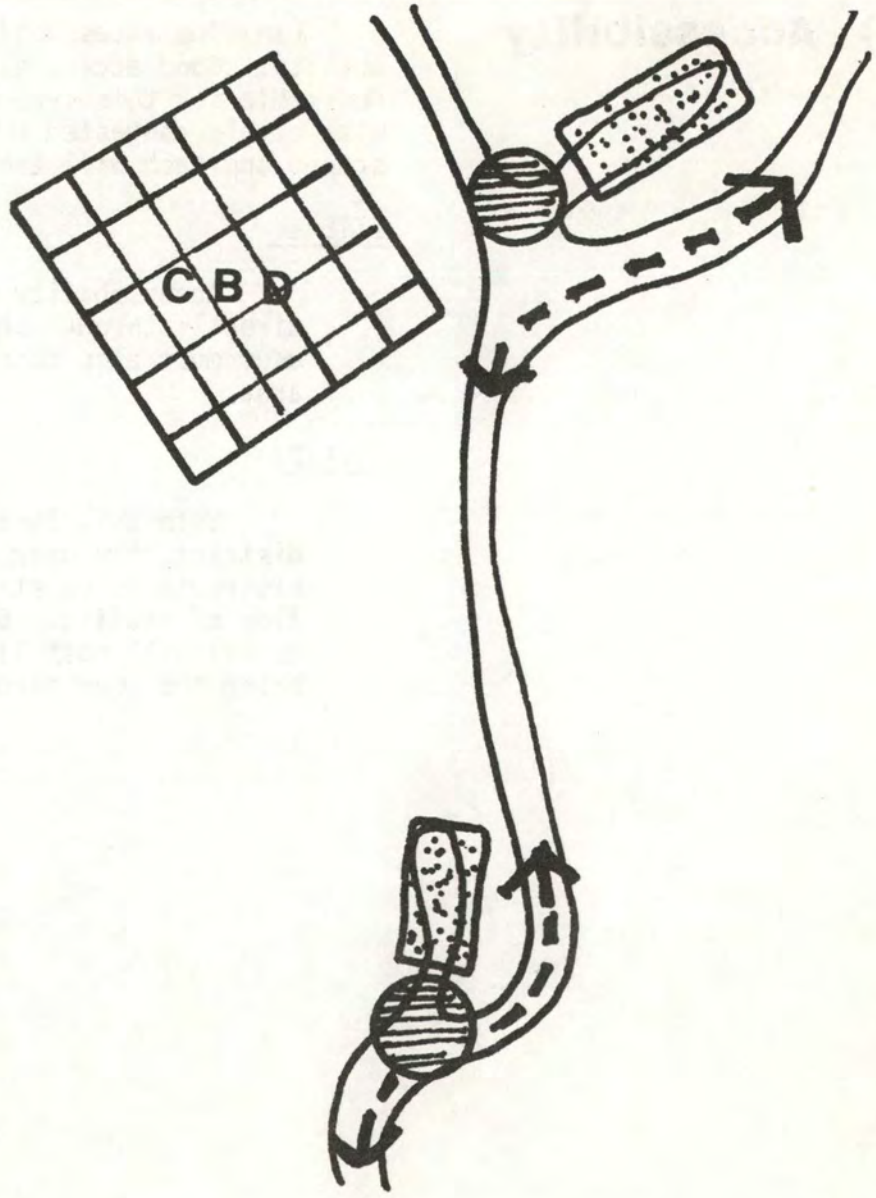
The location of small craft marinas should be far away as possible from heavily traveled lanes of marine traffic. Small craft operators sometimes do not know the maneuverability of larger craft. Collisions and swamping could be avoided by locating the marina away from these traveled areas.

SITE 1.

The present Conway Marina basin is located directly off of the Waccamaw River with its basin channel leading into the marine traffic of the river. There is little space in which the boater can maneuver his craft. This forces him to do most of the turning and backing of his craft in the river itself, producing a conflicting situation with other boats that are passing.

SITE 2.

This location is ideal for keeping the marina boater out of the way of transient craft. The site also offers ample space to create a large enough basin in which the boater might maneuver. The conflict between the permanent boats and the transient craft that come for fuel, supplies, food, and possible shopping can be avoided on this site.




Marine Traffic

Basin

Maneuverability Area

## (5) Accessibility

Landside accessability is equally important as waterside accessability. Good access from well developed traveled routes is highly desirable for this type of marina. As little as possible conflict with highly congested urban areas is also desirable. A well landscaped approach will enhance the asthetic quality in any marina.

SITE 1.

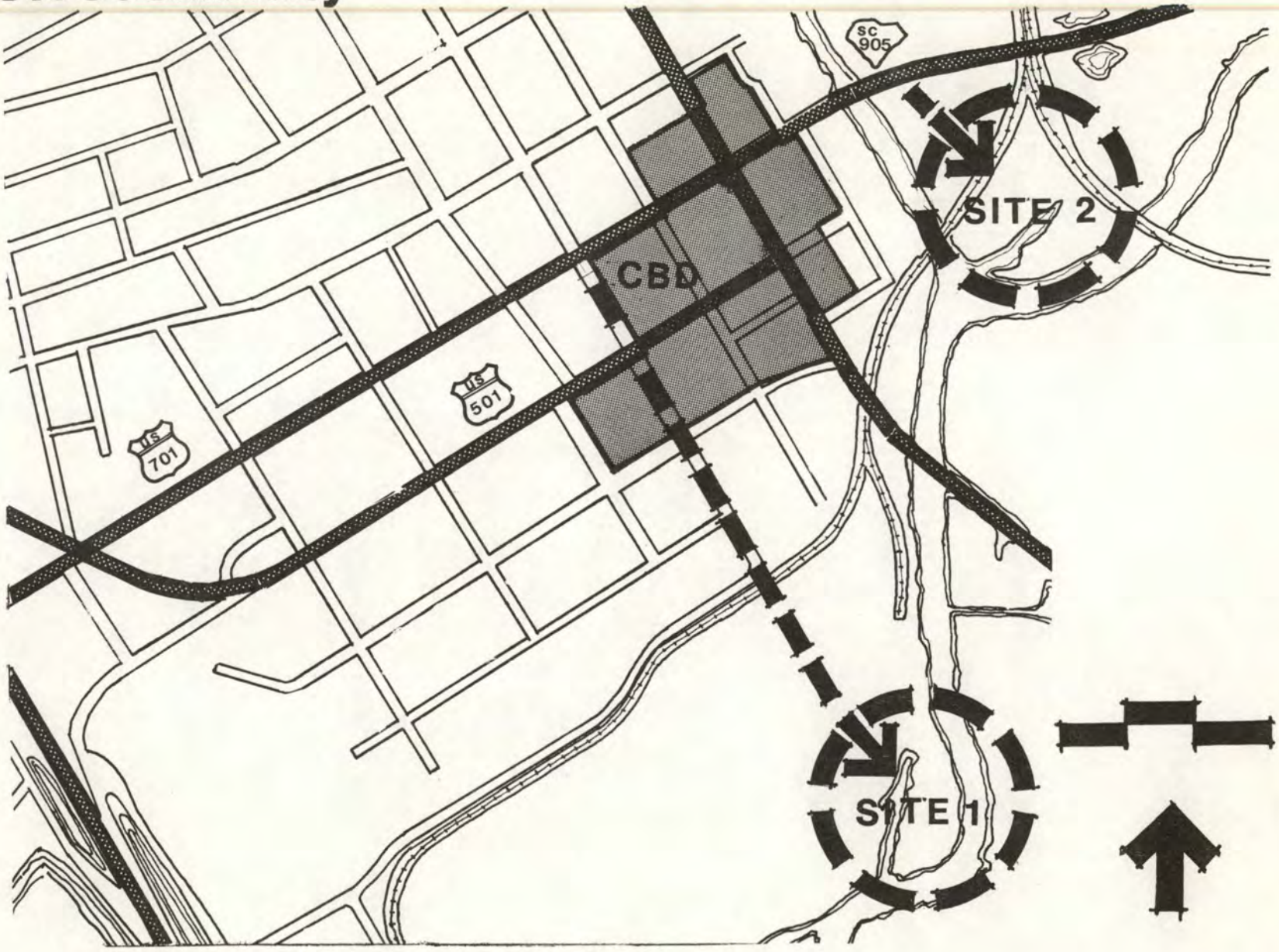
Accessability to this location from all directions is directly through the central business district. The marina user must also come through a rather unpleasing industrial area.

SITE 2.

With this location being adjacent to the central business district, the user has to come through the town's center. Yet, his route is on streets that are capable of handling a large flow of traffic. Boaters coming from the eastern part of the county will most likely use Highway 905. This road will not bring the user through the urban center.

# Accessibility





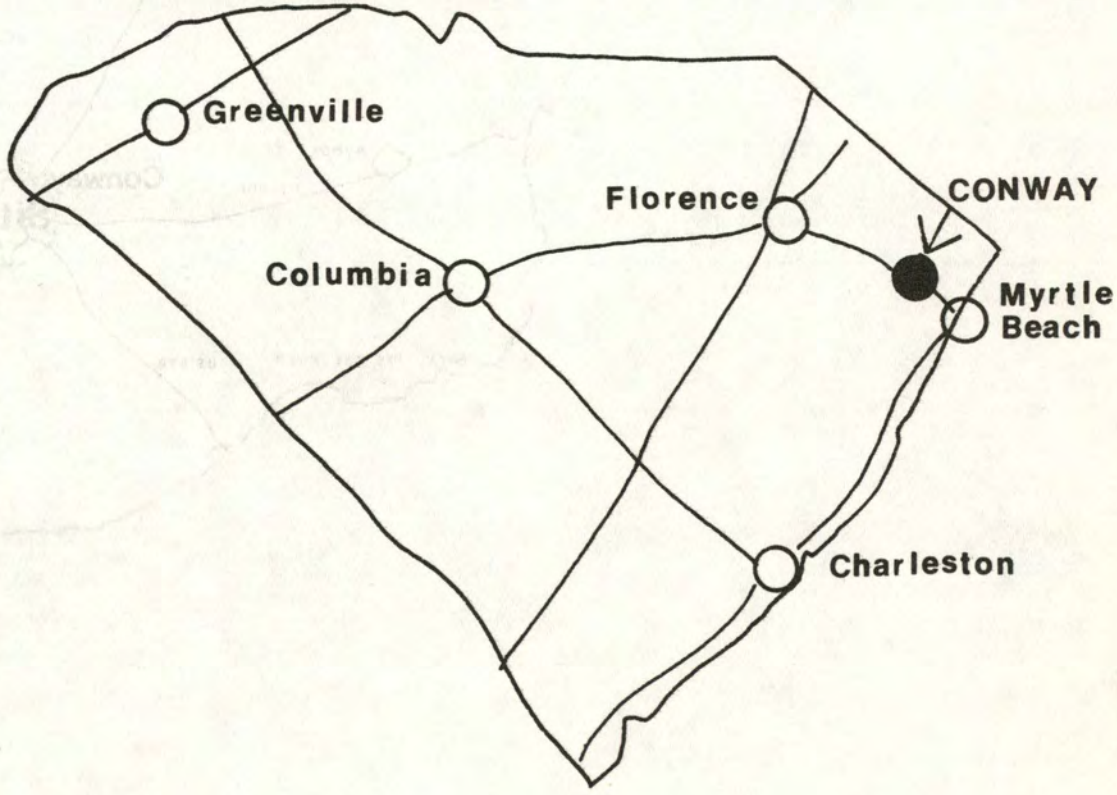
# Site Study

## Location

Conway, S. C., is located in Horry County in the Northeast corner of the state. It has a population of 6,000 persons out of the county's population of 66,000. (1970 census). Out of the county's 66,000 persons, over 6,000 had registered boats in 1974.

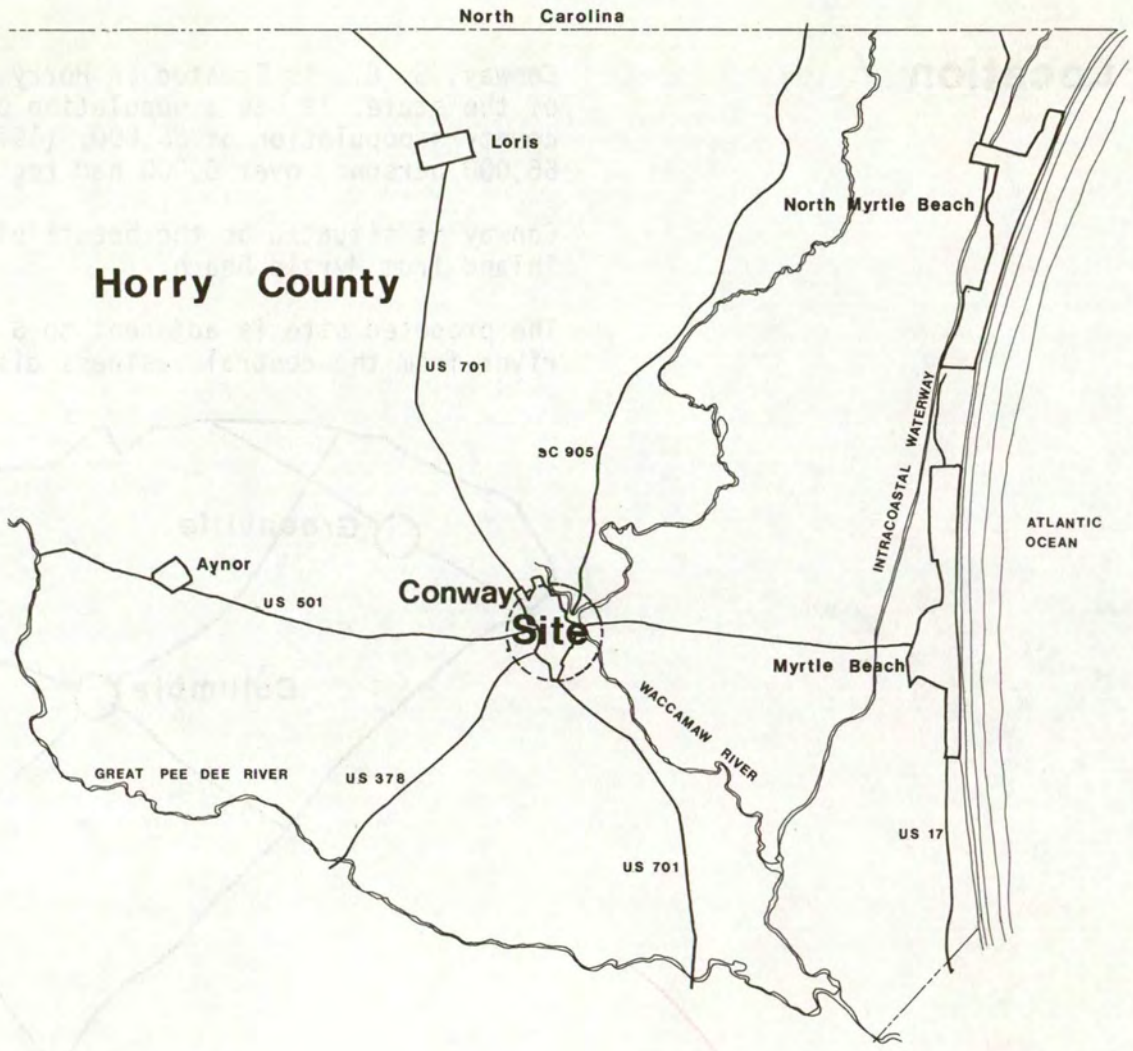
Conway is situated on the beautiful Waccamaw River, 15 miles inland from Myrtle Beach.

The proposed site is adjacent to S. C. Highway 905 and across the river from the central business district.



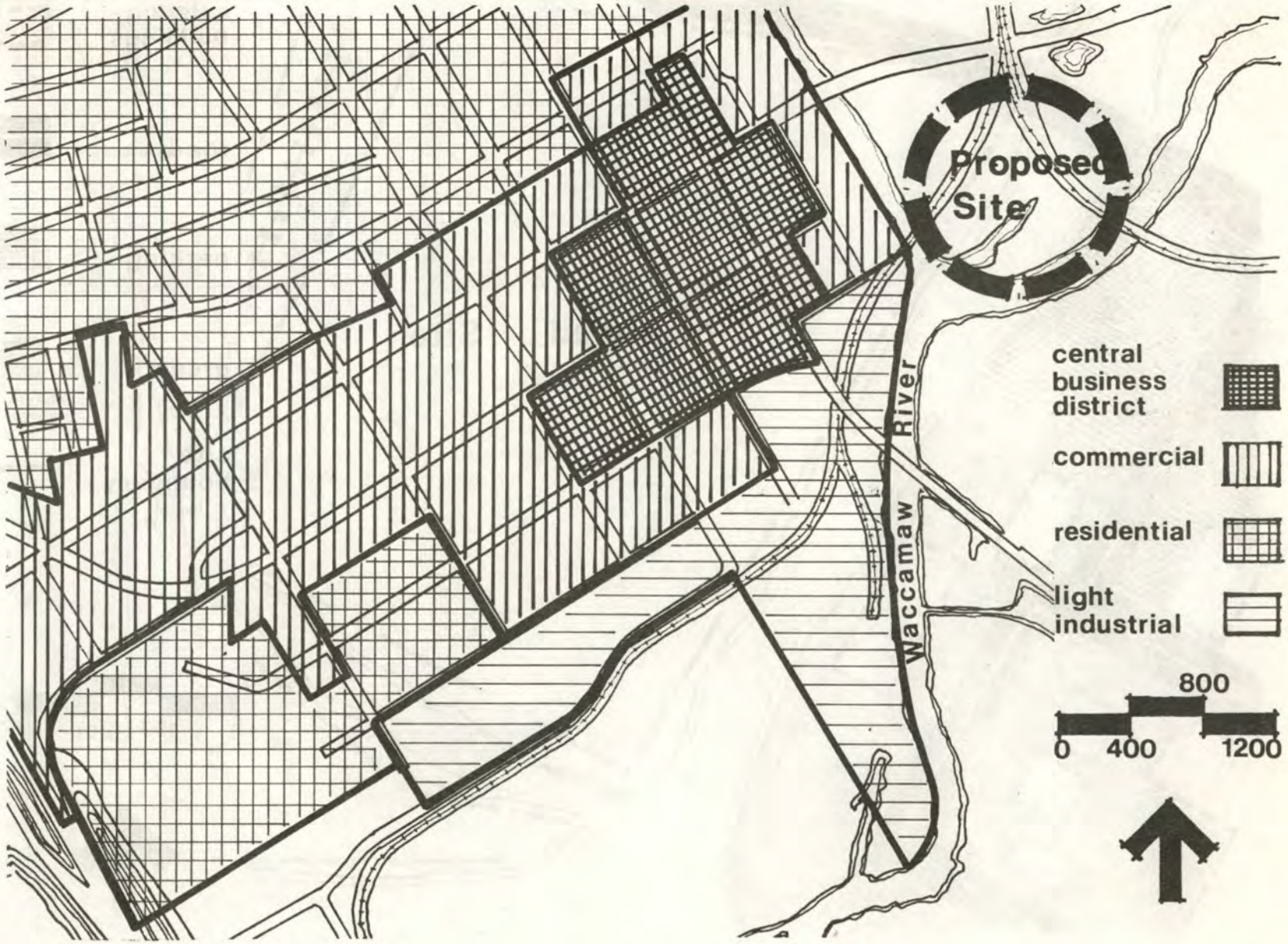
# 104

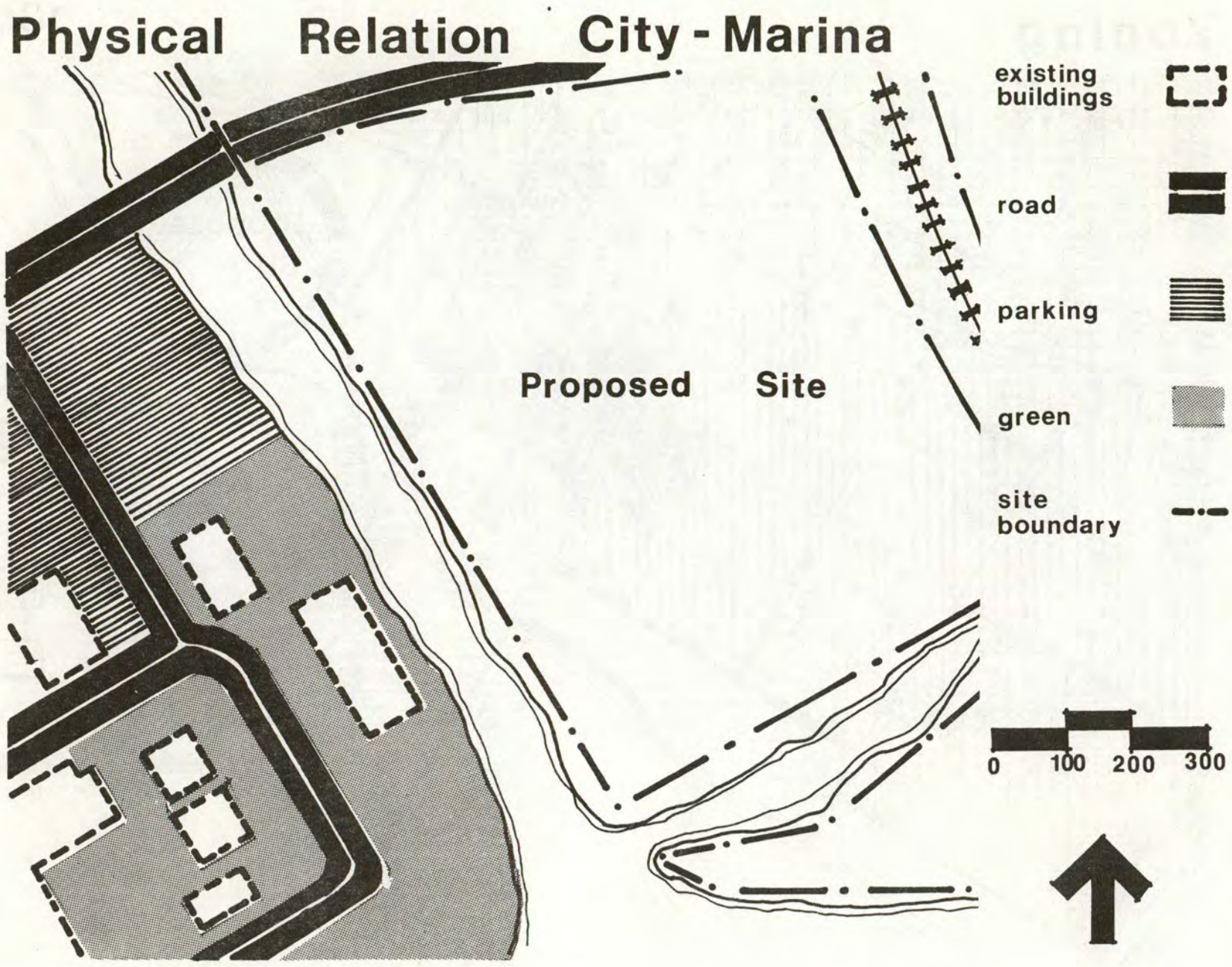
## Horry County



# Zoning

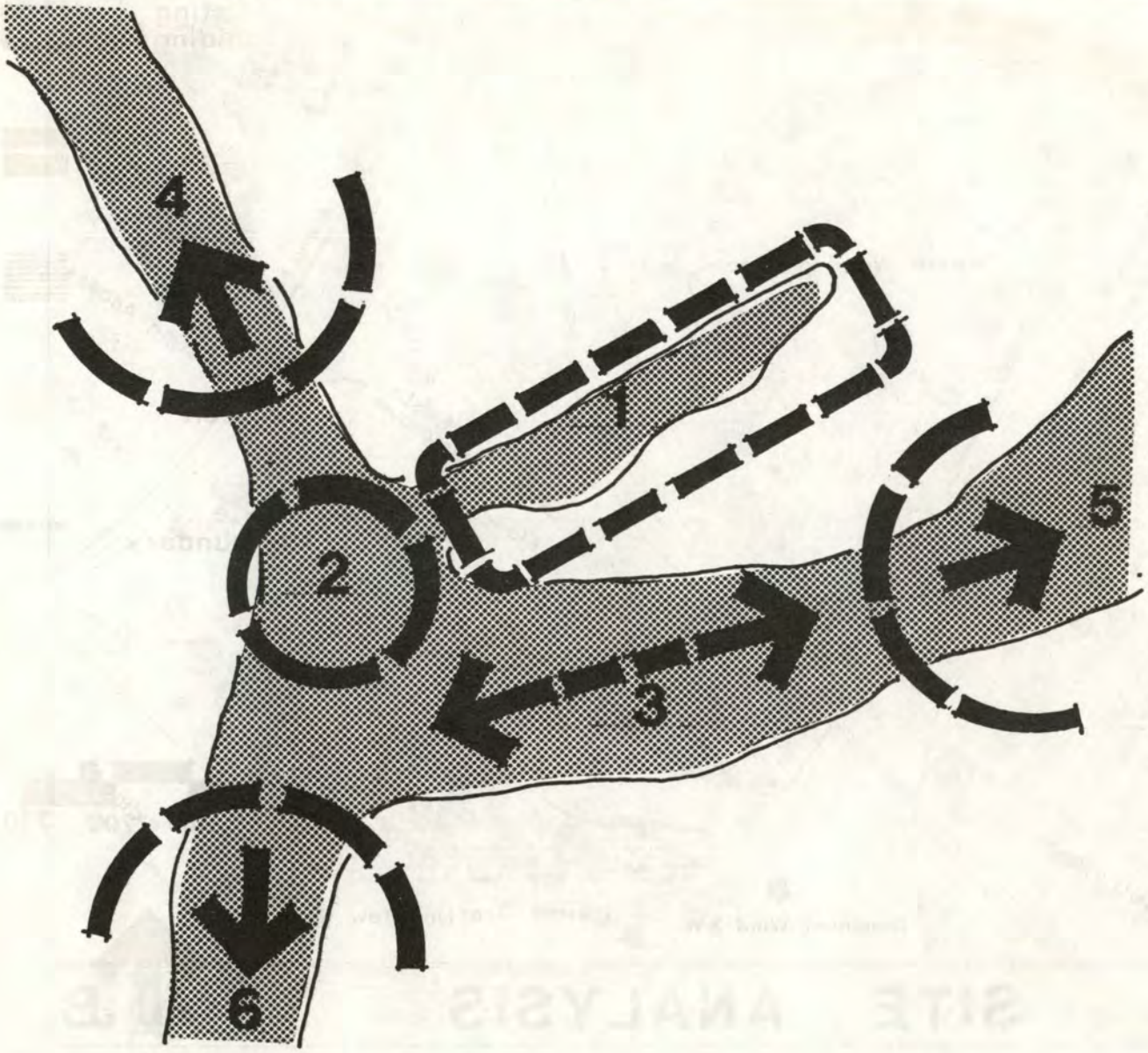



Proposed Site
Waccamaw River
central business district
commercial
residential
light industrial
800
0
400
1200


Physical Relation City - Marina
Proposed Site
existing buildings
road
parking
green
site boundary
0
100
200
300

# Functional Location






moorings 1

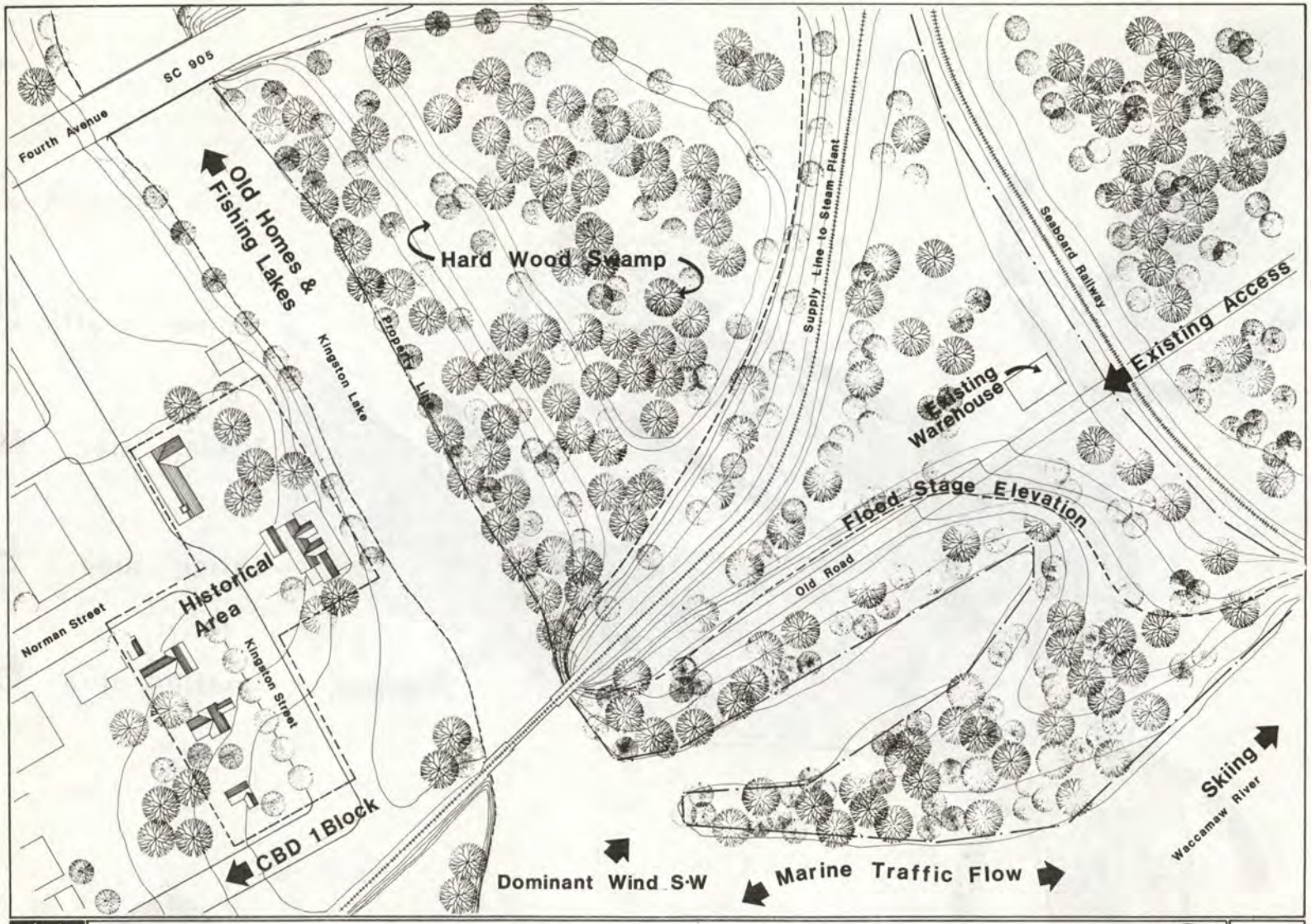
basin entrance 2

marine traffic 3

fishing area 4

skiing area 5

boating area 6




CONWAY MARINA

# SITE ANALYSIS

JB

# Program

## Introduction

As stated in the conclusion to the chapter on Contemporary Marinas, there are no two marinas that have the same influences of location, site, size, and user needs. Therefore, the following chart of eight marinas taken from "Time Saver Standards" along with the first four case studies led to the development of the proposed facilities for my project. By comparing square footage to the number of berths approximation was made for my facilities. Also, using the existing program for the Conway Marina the number of berths, parking, and administration requirements were tabulated. An additional retail square footage was added to help finance the marina and also aid in bringing the town's people to the marina complex itself.

# Programmatic Requirements

| | | | |
|---|---|---|---|
| **CAPACITY** | 50 BERTHS | FLEXIBLE TRANSIENT CRAFT DOCK | |
| | 10 @ 24 ft.<br>16 @ 18 ft.<br>24 @ 16 ft. | 10 @ 50 ft. for house boats<br>plus expansion room | |
| **PARKING** | 50 CAR SPACES<br>25 car-trailer spaces | PLUS EXPANSION ROOM | |
| **ADMINISTRATION** | 2 offices at 250 sq. ft. ea.<br>toilet | | 500 sq. ft.<br>100 sq. ft. |
| **SHOWERS LOCKERS TOILETS** | 400 sq. ft. each, men & women | | 800 sq. ft. |
| **RESTAURANT** | 100 people @ 25 sq. ft. each<br>Dining 55%<br>Kitchen 45% | | 2500 sq. ft.<br>1375 sq. ft.<br>1125 sq. ft. |
| **LOUNGE SNACK BAR** | COMBINED | | 1000 sq. ft. |
| **OBSERVATIN** | Exterior | | 1000 sq. ft. |
| **SHOWROOM** | | | 1000 sq. ft. |
| **MARINE SALES** | | | 1000 sq. ft. |
| **GENERAL STORE** | | | 500 sq. ft. |
| **MAINTENANCE** | | | 2000 sq. ft. |
| **RETAIL SHOPS** | | | 4000 sq. ft. |
| **FUTURE DRY STO.** | 50 boats @ 20 linear ft. each | | 1000 li. ft. |

# Marina Comparisons



| MARINA | NO. BOAT BERTHS | CAR PARKING SPACES | CAR-TRAILER PARK. SPACES | OFFICE | MEN'S RESTROOM | WOMEN's RESTROOM | SERVICE DOCK | FUEL PUMPS | MAINTENANCE | KITCHEN | DINING | SALES & SUPPLIES | SHOW ROOM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONWAY | 50 | 50 | 25 | 100 | 250 | | | 1 | | | | | |
| BUCKSPORT | 74 | Unlimited | | 200 | 500 | | 1400 | 1 | 1200 | 2500 | | 2500 | |
| WELLS | 200 | 100 | 100 | | 4 persons ea. | | 400 | 4 | 6000 | 750 | 450 | 240 | 2000 |
| JOHNSONS | 150 | 50 | 75 | | 3 persons ea. | | 400 | 4 | 4000 | 1200 | 1300 | 130 | 1000 |

# Social Activities Buildings floor space sq. ft.

| MARINA NUMBER | NO. BOAT BERTHS | Lounge or Lobby | Dining Room | Kitchen | Food Storage & Preparation | Dish washing and stor. | Dance or assembly room | Office | Men's toilet, showers & locker room | Women's toilet, showers & locker room | Enclosed lounge | Loading platform | Snack bar | Kitchen & food storage | Chart room | Cloak room | Women's restroom | Men's restroom | Observation deck |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 230 | 680 | 720 | 325 | 168 | 144 | 550 | | 1050 | 540 | 760 | | | | 144 | 96 | 132 | 300 | 760 |
| 2 | 250 | 784 | 780 | 325 | 140 | 286 | 550 | | 1050 | 500 | 740 | 100 | | | 140 | 96 | 286 | 228 | 740 |
| 3 | 255 | 760 | 720 | 300 | 168 | 144 | 1100 | | 980 | 610 | 740 | | | | 196 | 100 | 138 | 276 | 740 |
| 4 | 281 | | 952 | 299 | 120 | 110 | 1122 | | 1160 | 935 | 624 | | 510 | | 144 | 104 | 195 | 169 | 624 |
| 5 | 353 | 1380 | 1652 | 672 | 720 | | 1380 | 588 | 616 | 616 | 2500 | | | | 240 | | 144 | 128 | 2300 |
| 6 | 456 | 1410 | 3200 | 754 | 464 | | 3200 | 378 | 556 | 940 | 900 | | 1140 | | 512 | | 420 | 230 | 190 |
| 7 | 601 | 1875 | 4900 | 1360 | 675 | 432 | 1600 | 264 | 4340 | 2980 | 1700 | 50 | | | 575 | 252 | 840 | 198 | 1700 |
| 8 | 735 | 2260 | 3010 | 1350 | 625 | 500 | 3750 | 450 | 2680 | 1540 | | | | | | | | | 3180 |
| Conway (existing) | 50 | | | | | | | 100 | | | | | | | | | 250 | | |

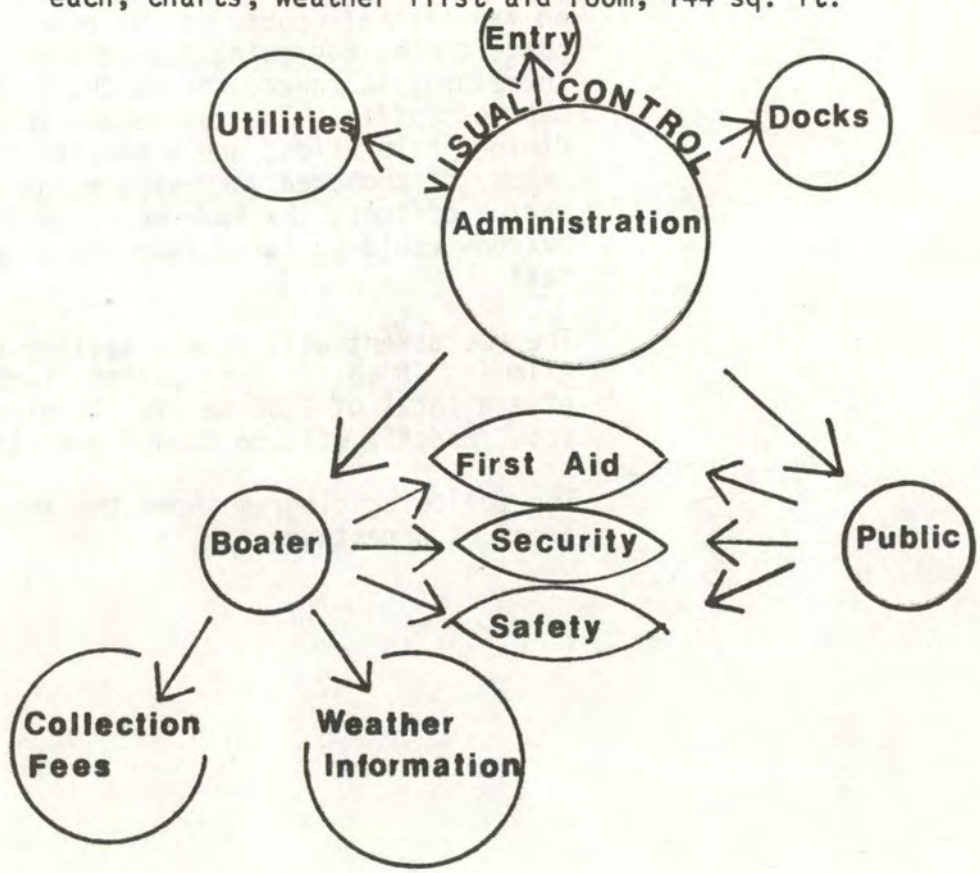
# Sales & Service Building

floor space 113
sq. ft.

| MARINA NUMBER | NO. BOAT BERTHS | OFFICE | SNACK BAR | KITCH. & FOOD STORAGE | BOAT SALES ROOM | ACCESSORIES SALES | PARTS & ENGINE SALES | PACKAGE FOOD & BAIT SALES | HULL REPAIR SHOP | INBOARD ENGINE SHOP | OUTBOARD ENGINE SHOP | PAINT SHOP | PAINT STORAGE | LAUNDRY | MEN'S RESTROOM | WOMEN'S RESTROOM | MEN'S TOILET | GEAR STORAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 230 | 420 | 896 | 500 | 2000 | 1500 | | 396 | 2350 | 940 | | 1050 | | | 336 | 400 | | 280 |
| 2 | 250 | 450 | 925 | | 2200 | 696 | 1050 | 480 | 2640 | 1150 | | | | 336 | 336 | 544 | 300 | 408 |
| 3 | 255 | 300 | | | 2250 | 840 | 750 | 600 | 3000 | 835 | 483 | | | | 500 | 750 | 300 | 400 |
| 4 | 281 | 480 | | | 2150 | 780 | 920 | 520 | 3000 | 918 | 200 | | | 364 | 520 | 598 | 320 | 430 |
| 7 | 601 | 300 | 1460 | | 2700 | 840 | 750 | 900 | 3600 | 835 | 484 | 1440 | | 572 | 500 | 750 | 400 | 320 |
| 8 | 735 | 600 | | | 2800 | 875 | 1100 | 625 | 3900 | 1136 | 280 | | | 400 | 500 | 750 | 320 | 486 |
| Conway (existing) | 50 | | | | | | | | | | | | | | | | | |

## Administration

The administration is in charge of marina operations, which functions first as a service to the boater and to boater's safety; and secondly, as a service to the public. The administration consists of the marina owner or manager and his staff. The manager and his assistants must insure and enforce safety and security standards, assure fire protection, provide distress relief, first aid, and weather information. The administrative services must include an office for the manager and his secretary/bookkeeper and space for posting weather information, collecting fees, control of docks, control of utilities, and control of access to the docks. The office must be situated to provide visual surveillance of the docks to insure security and safety; two offices of 250 sq. ft. each, charts, weather first aid room, 144 sq. ft.



# Public Oriented Facilities

These facilities would be in the form of the restaurant, bar, lounge and meeting places, observation areas, shops, and supply stores for concessions and water related sales.

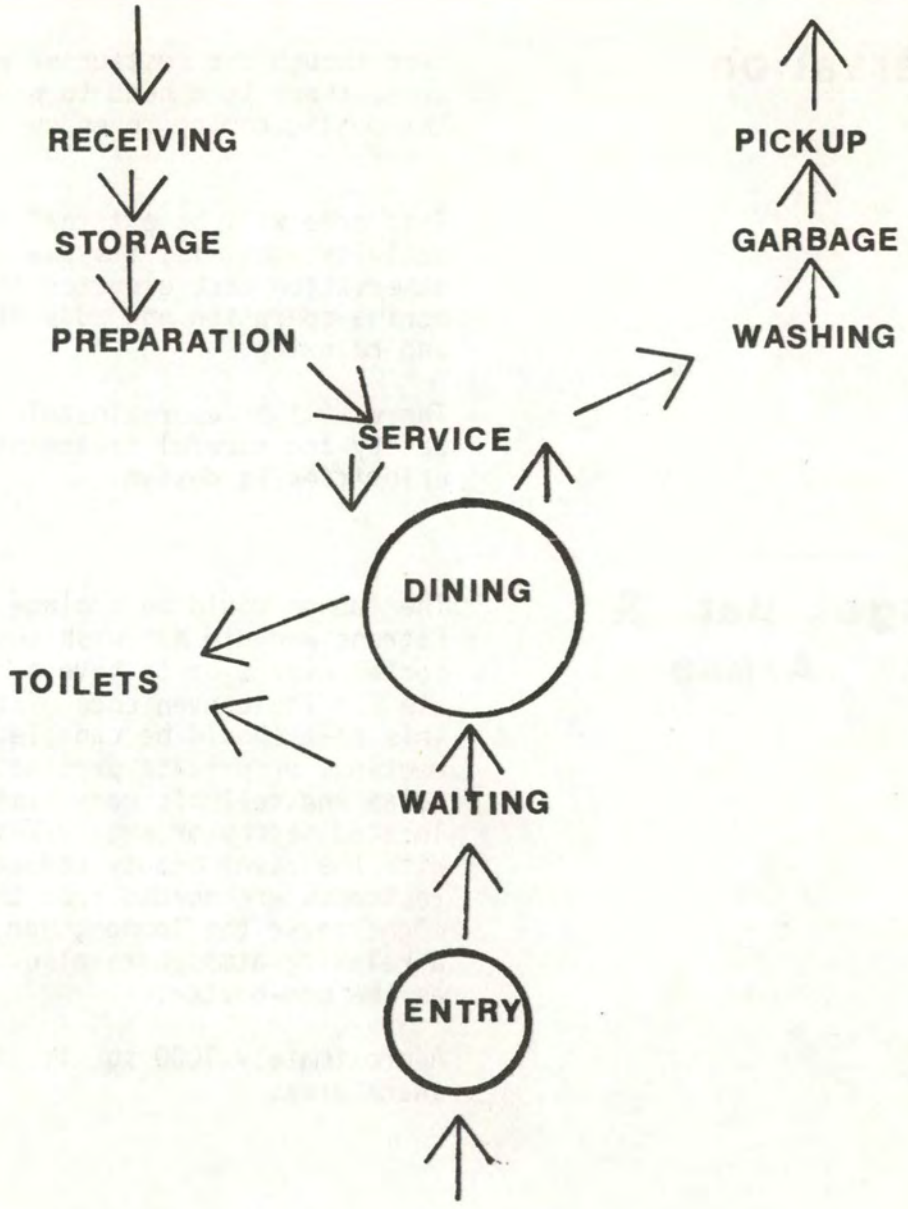
## Restaurant

There could be a separate observation area for patrons who come solely to watch the activity of the river, or the restaurant could act as the observation area. The location of the restaurant is critical because it is here that the boater and non-boater could mix and enjoy an evening together. This area should be related to the most important views and activity. It could focus on the natural beauty of the river and also on the activity of boats coming and going from the marina. The best location, therefore, is toward the south, looking out onto the main flow of marine traffic. The restaurant should be a place of leisurely dining, relaxation, and conducive to the enjoyment of the natural beauty of the area. By separating the restaurant from the marina offices, the town would profit from the traffic in that patrons could be lured into the shops either before or after a meal.

The restaurant will have a seating capacity of 100 persons. Allowing 25 sq. ft. per person, including circulation, this would give a total of 2500 sq. ft. Dining will take up 55% of this total and 45% will go toward the kitchen and its related areas.

The following diagram shows the arrangement of the necessary areas of a restaurant.

## Restaurant Arrangement



## Observation

Even though the restaurant would serve as the best observation area, there is a need to provide a separate area that caters to the public coming to enjoy the atmosphere and activity of the river.

This area will be external and oriented toward the marina activity; that is, its boats and the main river. Having the observation deck elevated allows visual contact with the entire marina operation and adds vitality if people are seen mingling and relaxing.

There will be approximately 1000 sq. ft. of external deck space. Safety and careful treatment of material should be considered priorities in design.

## Lounge, Bar & Snack Areas

The lounge would be a place of social mixing and relaxing. Patrons who did not wish to have a meal could come here for social events or to have a drink. A snack bar would be appropriate for the convenience of the boater who wanted a quick lunch. This area should be capable of being divided in case there are meetings or private parties. Here the fisherman might sit and relax and tell his many fishing stories. The bar should be located nearby or even within the lounge area. Visual contact with the river beauty and activity is important also. Separate restrooms are needed from those used by the boaters. These might serve the lounge, bar, and restaurant. The bar should offer a relaxing atmosphere also. It would serve the boater as well as the non-boater.

Approximately 1000 sq. ft. is allocated to the bar, lounge, and snack areas.

## Showroom Marine Sales Shops

Specialty shops handling boating togs, souveniers, clothing, and many other items have been widely patronized by the boating populace and visitors to the marina. These shops should be at the pedestrian level or easily accessible from the visitor's entrance. The boater may patronize them, but the majority of their revenue will come from the pedestrian interested in something unusual to buy and an interesting, exciting atmosphere to shop in.

A marine sales shop handling boating hardware, sales of boats and their equipment will be used by both the boater and non-boater. These shops should be located close to easy landside accessibility and parking.

The marina sales area or showroom will be 1000 sq. ft. An additional 1000 sq. ft. is needed for retail or specialty shops.

# Boater Oriented Facilities

The marina is designed primarily to the boater's needs and secondarily to the needs of the public. Boater's areas should be inducive to the boater himself. They should reveal relaxation and a place of rest offering an opportunity to the boater to "take a break". These areas are highly important in creating the vitality of the marina.

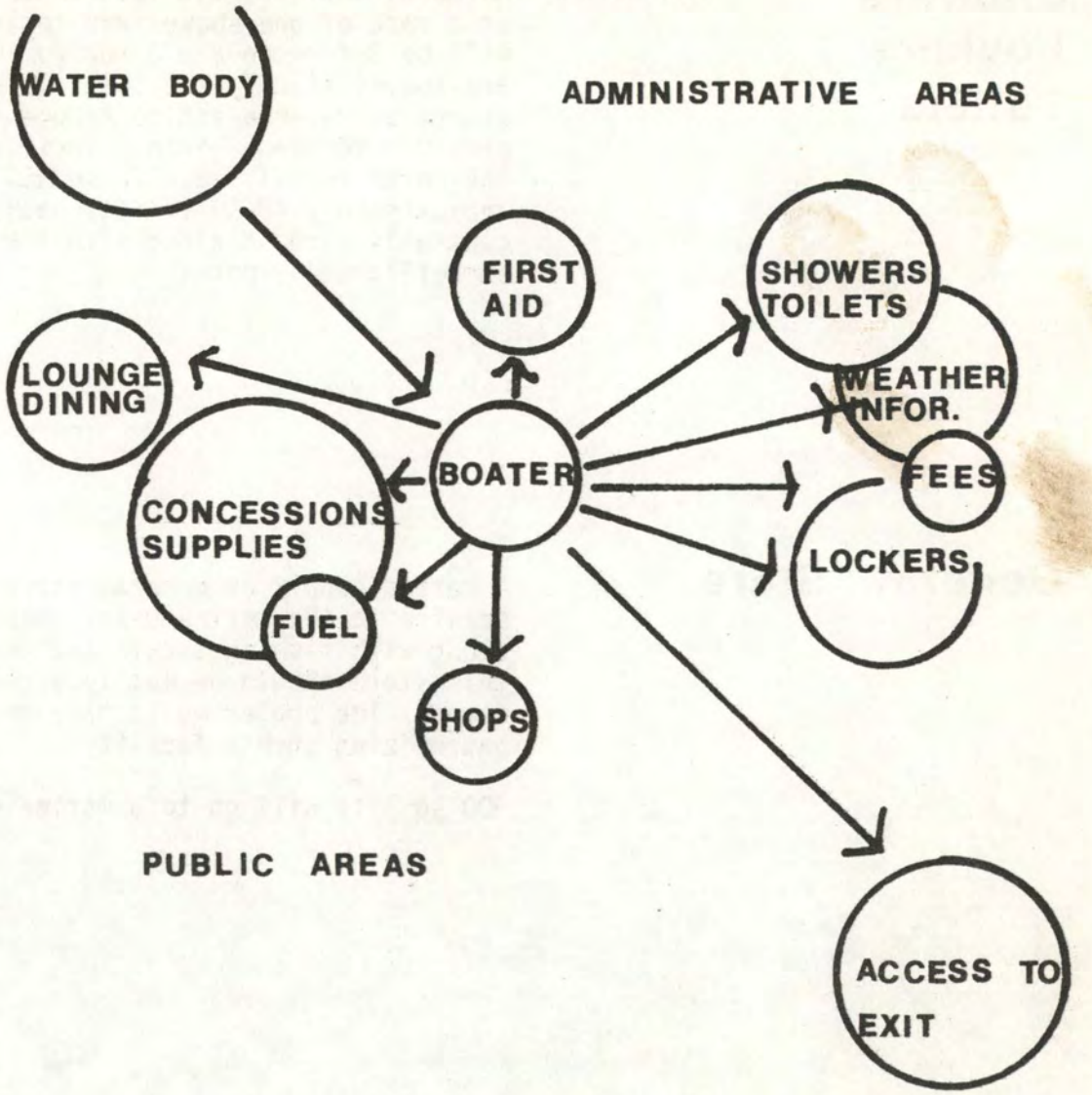
The boater may want to have a snack, or even eat a delicious seafood meal. Therefore, showers and storage space must be provided for the boater to have a chance to change. He may even want to stop just for a break and have a drink. The establishments have to be inducive to both the boater and the non-boater who will come to watch.

a distinct separation of these two different marina patrons must be avoided. The mixing of both types of marina users is highly important in making a marina an active and interesting place to shop, visit, or stroll on a Sunday afternoon.

Regardless of the reasons the boater may have for utilizing this marina there must be space for gear storage, toilets and showers, concessions, lounge and eating establishments, and areas to obtain distress relief and first aid.

The boater's routine of docking his craft, resting, cleaning up, storing supplies, taking care of fees, and even washing down his craft before returning home must take as little trouble as possible.

This diagram shows how important the location of boater related facilities are to the function of the marina.



## Showers Lockers Toilets

Showers, toilets, and lockers for the marina user will be provided at a rate of one shower and toilet per 20 berths. Therefore, there will be 3 for men and 3 for women. Showers and dressing rooms are appreciated by the boat users. Coin locks are used for a source of revenue and to reduce vandalism. Lockers will be provided for each berth. Their rental fee will be included with the berth rental fee. These will be the stand up type with approximately 40-50 sq. ft. each. These facilities will be centrally located along with the administration for safety and surveillance purposes.

## General Store

A marine supply or general store has been found to be a real service to the marine user. Here food staples will be sold along with fishing tackle and small hardware. The location of this store should be easily accessible by the boater for quick stops. The boater would take priority over the visitor in patronizing such a facility.

500 sq. ft. will go to a marine supply store.

## Boat Launch & Wash Down Area

The boat ramp will be the most used facility within the marina basin and due to this use, even though at times there will be no traffic at all, it is recommended that there be a two-lane ramp installed.

The location of the ramp is within easy surveillance by the administrative facilities. Traffic to the boat ramp is isolated from traffic to the parking lot.

The pavement is concrete and extends 3 ft. below normal low water line so that the trailer's wheels do not get hung at the end of the pavement. The ramp itself is no steeper than 12% grade and has adjacent float space adequate for temporary boat tie-up while trailers are being parked. A total width of 30 ft. is needed for this double ramp because most trailer boat owners are not too adapt at backing a trailer and handling the boat to or from the trailer.

Adequate lighting is necessary to avoid accidents for night operation.

There will be no launching fee because this is a public marina. Most of the patrons are use to the many public landings along the Waccamaw River.

A wash-down area is provided adjacent to the launch ramp. However, it is large enough not to provide any congestion with boaters launching or bringing in their craft. Water supply is provided at both the launch ramp and wash-down area.

## Parking & Roads

Traffic coming into the marina is separated into two areas: boaters going to the launching ramps and visitors or boaters going to the marina facilities and moored boats. It is important that the boat ramp traffic entering the boat ramp area will not bottle-neck with the traffic coming out of the ramp area. Therefore, a single entrance and separate exit are used.

Parking requirements are one space per boat berth and car-trailer space every two boat slips. There are approximately 50 car spaces and 25 boat-trailer spaces with room for expansion as the marina grows.

Parking is within easy walking to both the boat slips and marina facilities. A buffer of landscaping between the parking and circulation roads is provided to screen the parked vehicles and offer a pleasing entrance and exit to the facility.

## Dock & Boat Slips

The waccamaw River has a tidal variance of approximately 3 ft. Yet, several times each year the river level reaches close to flood stage of 7 ft. above mean water level.

SOIL

There are no soil boring texts known to be available for study on this site, but from surface the soil appears to be clay and sand for the uppermost 6 to 8 ft. with some evidence of a grayish clay around the water line. This clay has become extremely hard when it has been allowed to dry out. If there is much of this material here it will be an important consideration in driving piles later on. If it remains wet it is possible to drive piles into the material without great difficulty.

Within these conditions, both convenience and economy dictate the use of floating piers. These structures will provide uniform levels with respect to boat docks regardless of water elevation. They also permit economical anchorage which does not require high strength foundation soils.

CAPACITY

The facility will accommodate 50 floating slips for permanent craft. Because of the river width, the expectex maximum length of boats to be permanently moored will be 24 ft. The arrangement of the piers and slips for permanent craft is as follows:

One pier 8 ft. wide with double slips on both sides. Finger piers of 4 ft. width will extend 80% the length of the maximum craft. There will be 10 slips to accommodate 24 ft. boats.
Two piers of 10 slips each are to accommodate 16 ft. boats and under.

There is a separation between permanent craft and transient craft and also larger house boats. This will be further discussed in the Design Concept.

FLOATING PIER FORCES

A floating pier must resist a variety of forces. These include wind, pressures and waves acting on exposed pier and boat surfaces, the weight of the piers, weight of people and supplies, anchorage loads, and the vertical and horizontal components created by wave displacement.

FLOATING DOCK SYSTEM

"Koppers" modular floating dock system has been selected because they are pre-built and assembled prior to shipment. They can be placed into the water, floated into position, anchored and the connections bolted together.

In performance, Koppers dock modules are notably stable, yet readily adjusted to changes in tides, dock loads, and movement of the water itself. It also offers an aesthetically pleasing appearance. The stained wood decking is clean Cellon pressure-treated wood.

UTILITIES

All berths will have electric service. Pedestals supporting the electrical outlet boxes will have lighting fixtures mounted to the top. Each berth has a water faucet for hose connection to the boat.

ANCHORAGE

Piers will be anchored by means of creosoted wooden piles driven into the river bottom to a depth of 15 ft. and shall extend 3 ft. above flood elevation of 7 ft.

SERVICE

A service pier is located in the transient craft basin providing gasoline, oil, and water.

## Maintenance

An existing warehouse remote from the marina facilities will be used for maintenance and repair work. Location is away from marina traffic and activity. Boats will be lifted out of the water and carried to the repair building by a 50 ton hydrolic crane which can be operated by one man.

## Dry Storage

There is enough room in this area for future dry storage if and when needed.

## Repair Display

A display and repair yard is adjacent to the maintenance building. This area can be used by the boat owner in repairing or painting his own craft. Also, exterior boat shows will be able to utilize this area.

# CONCEPT

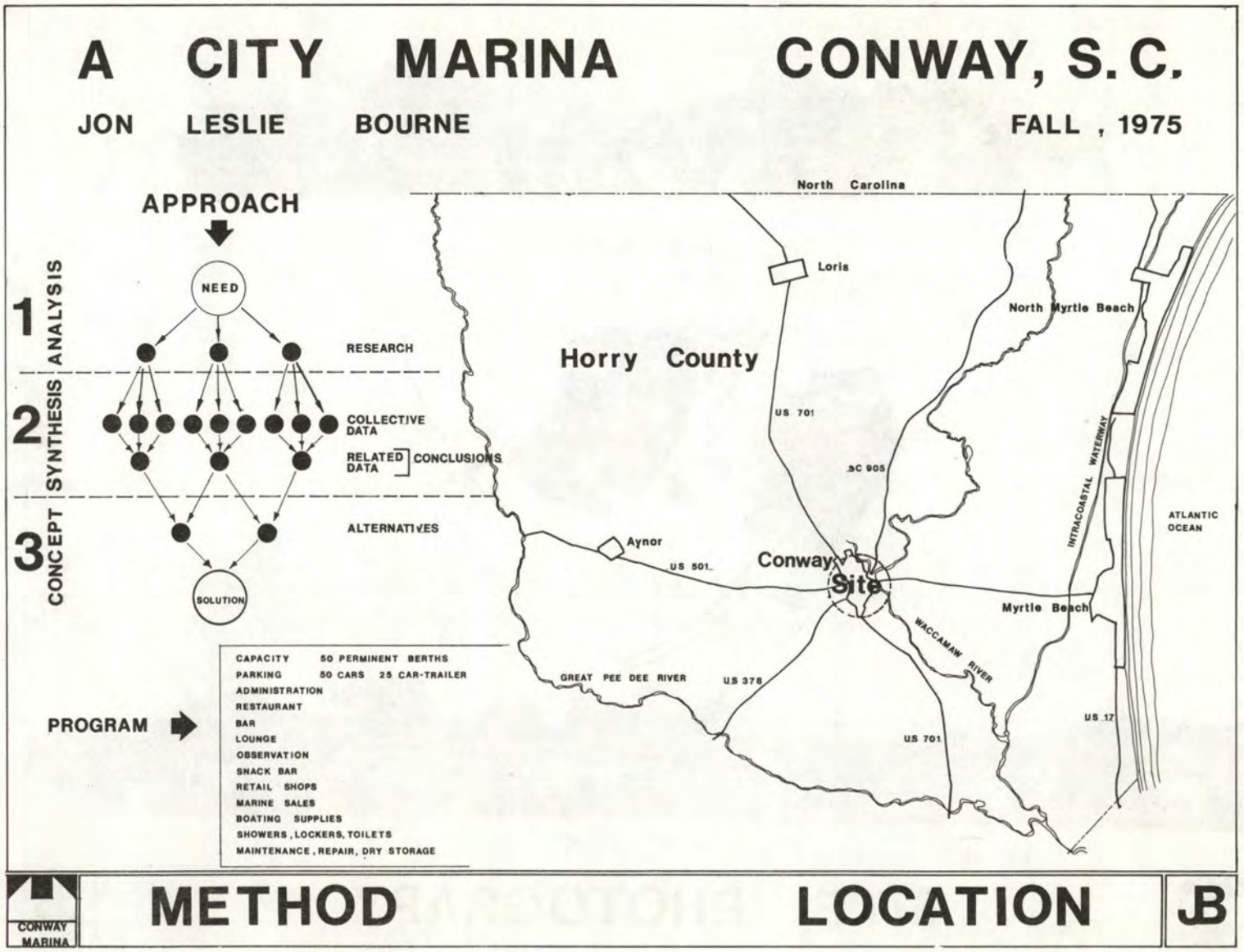
3

# Visual Presentation

# A CITY MARINA CONWAY, S.C.

JON LESLIE BOURNE

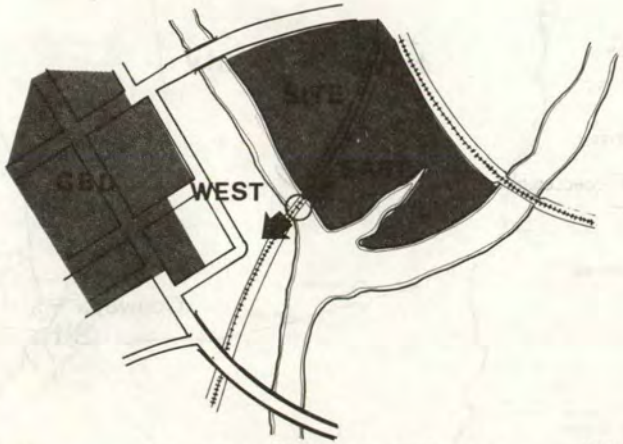
FALL , 1975




CONWAY MARINA

METHOD LOCATION JB

EAST BANK




WEST BANK

CONWAY MARINA

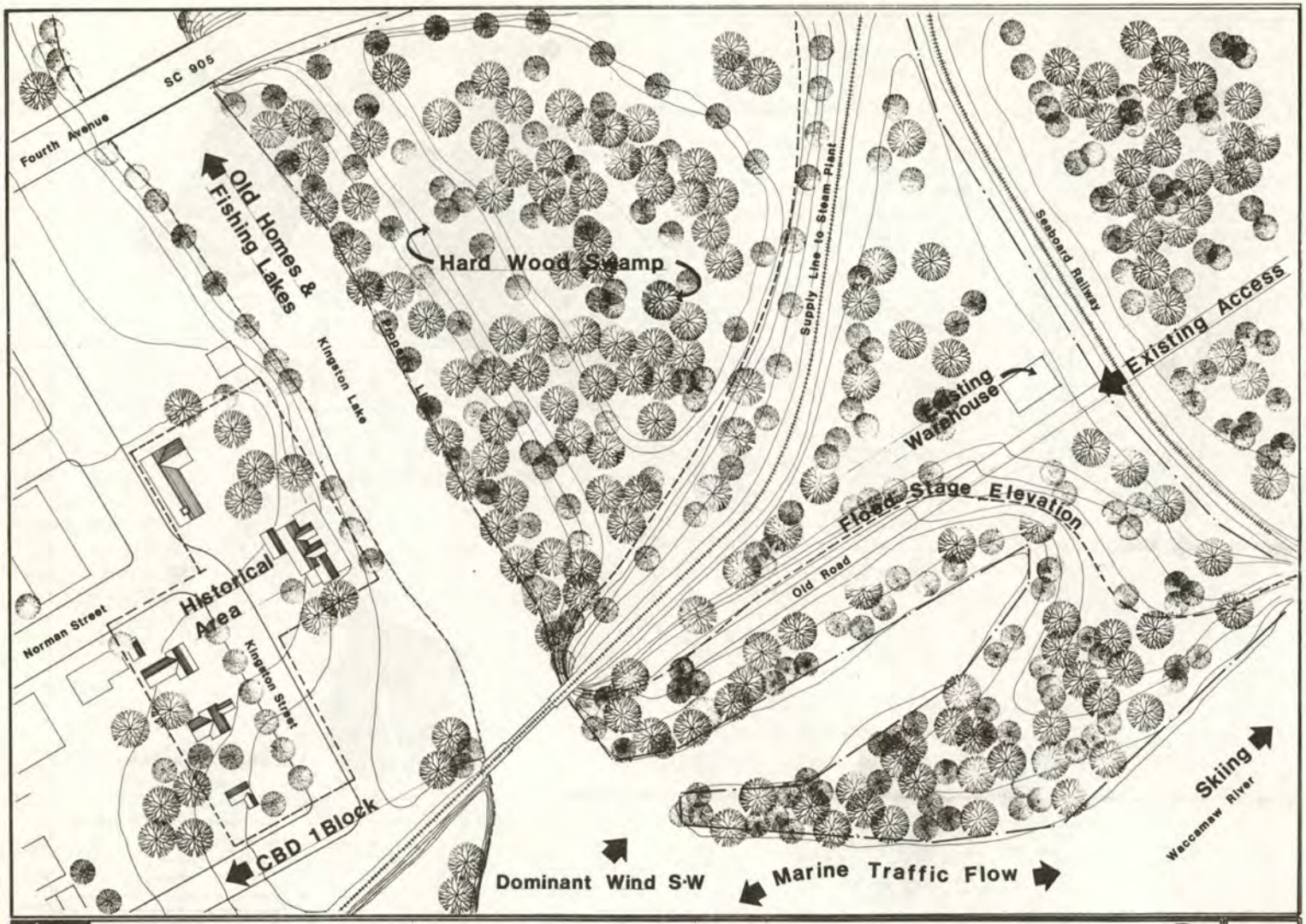
# SITE PHOTOGRAPY

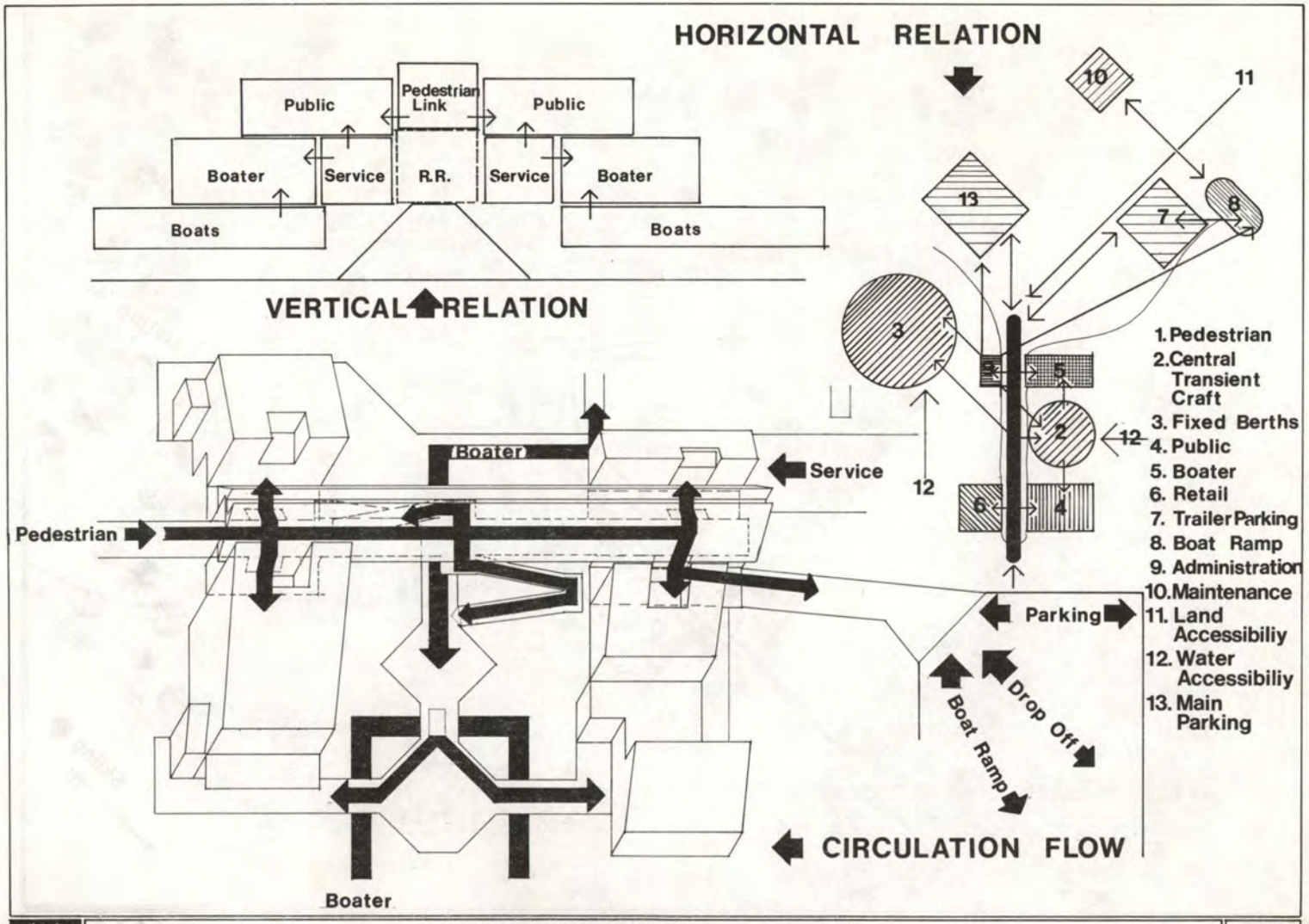
JB


CONWAY MARINA

SCALE 1"=200' **LOCATION ANALYSIS**

JB

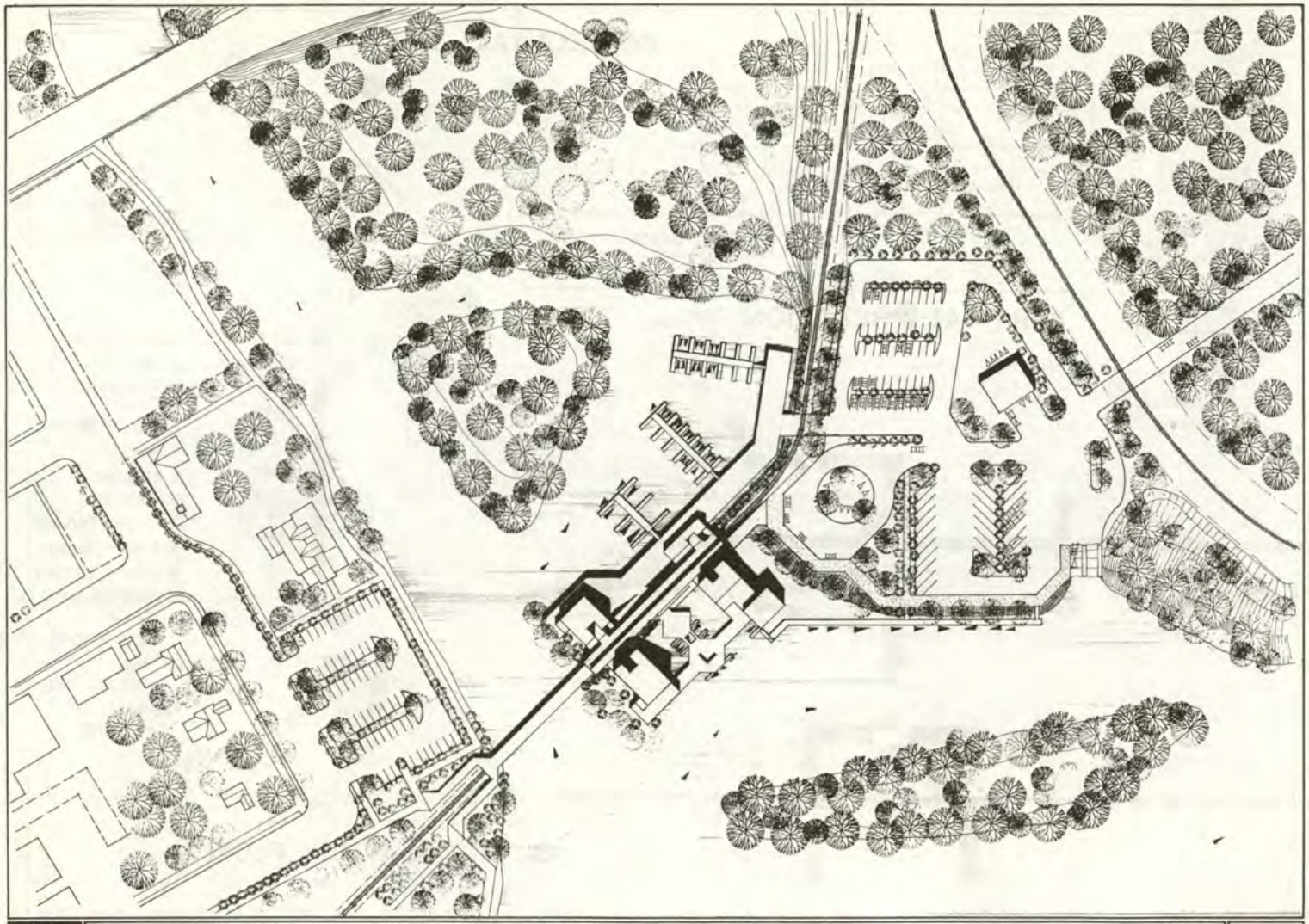

SC 905
Fourth Avenue
Old Homes & Fishing Lakes
Hard Wood Swamp
Kingston Lake
Supply Line to Steam Plant
Seaboard Railway
Existing Access
Existing Warehouse
Flood Stage Elevation
Old Road
Historical Area
Norman Street
Kingston Street
CBD 1Block
Dominant Wind S-W
Marine Traffic Flow
Skiing
Waccamaw River
CONWAY MARINA
SITE ANALYSIS
JB




CONWAY MARINA

# SCHEMATICS

JB

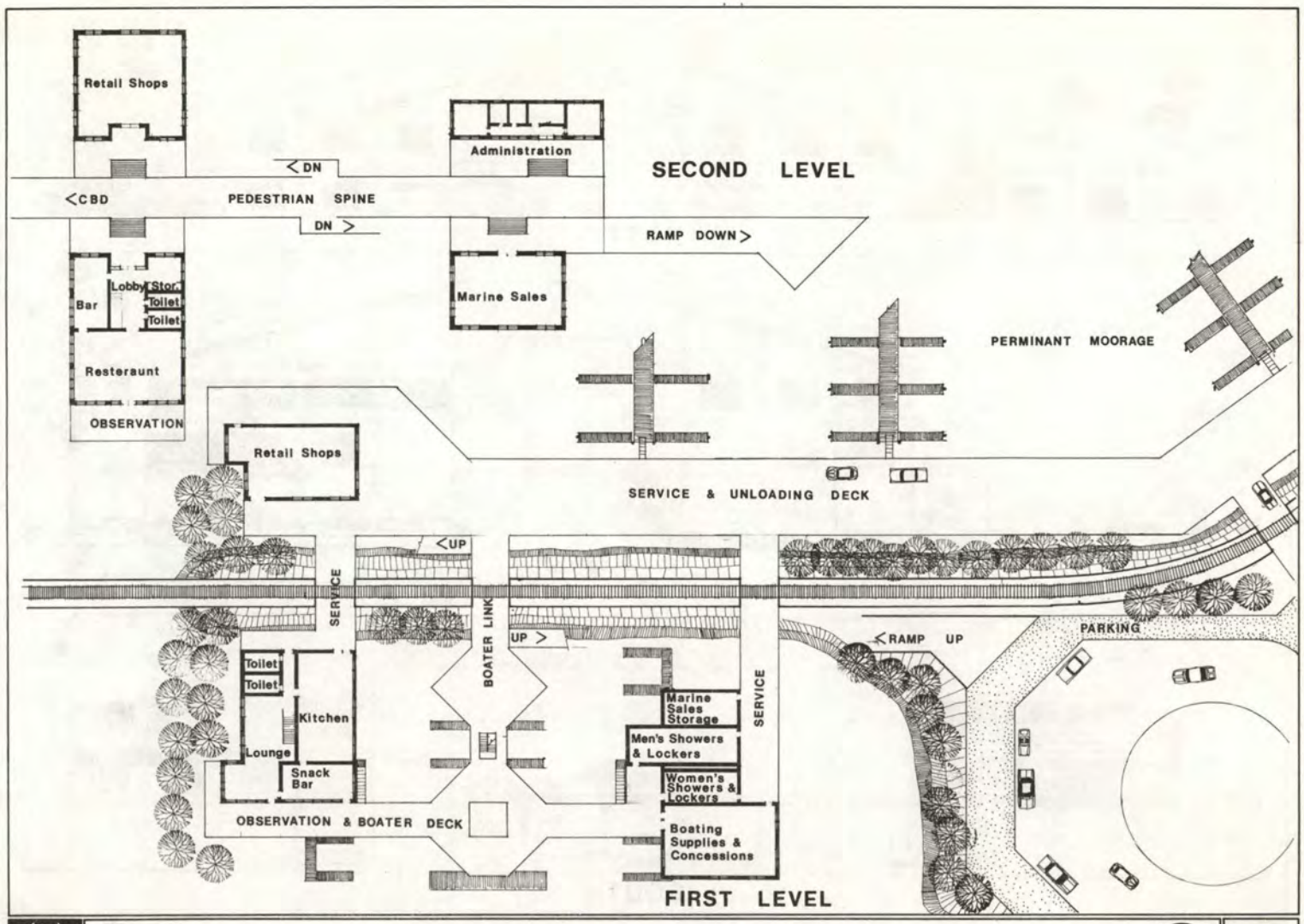


CONWAY MARINA

SCALE 1" = 50'

# SITE PLAN

JB

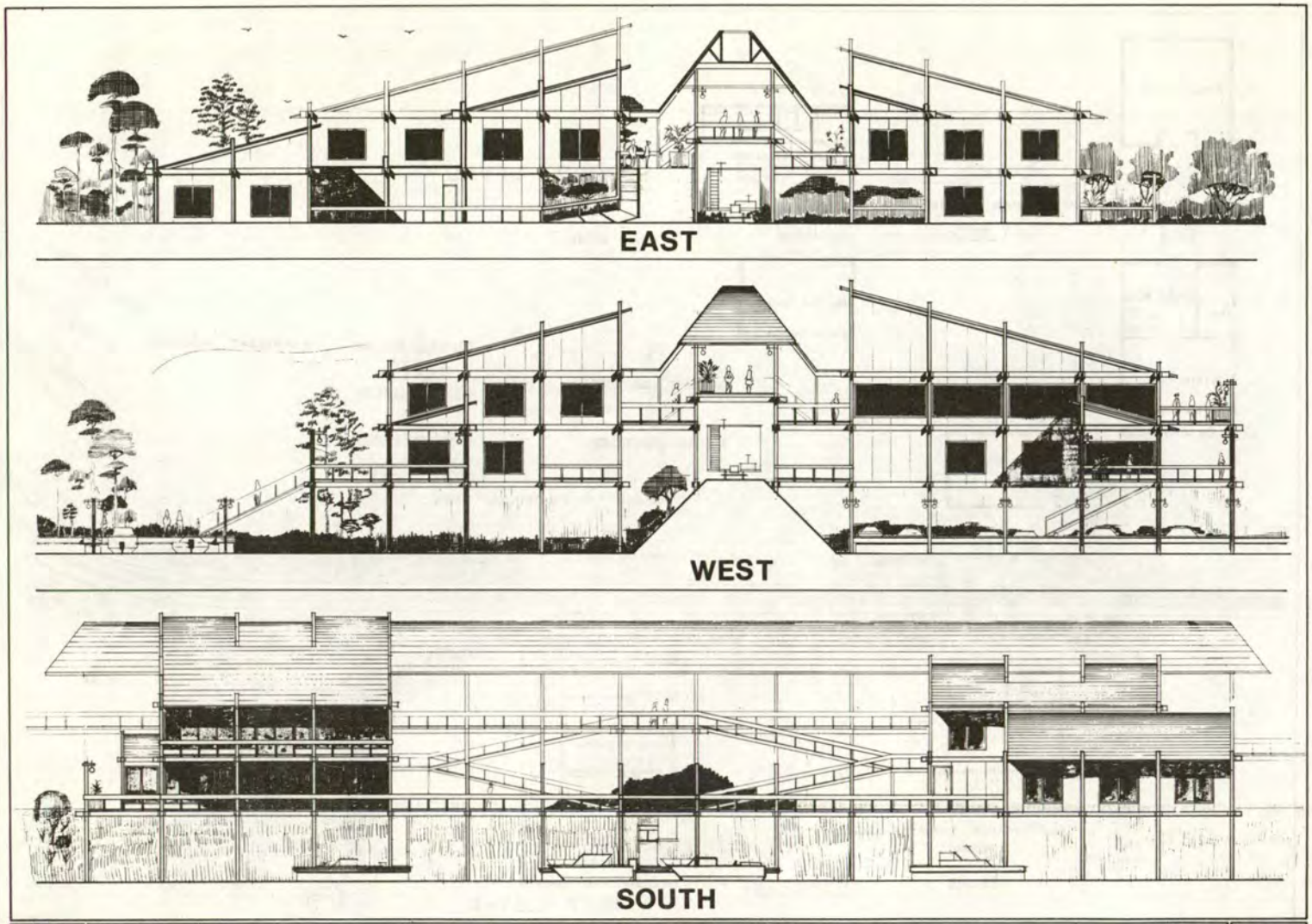



CONWAY MARINA

SCALE 1" = 16'

# FLOOR PLANS

JB

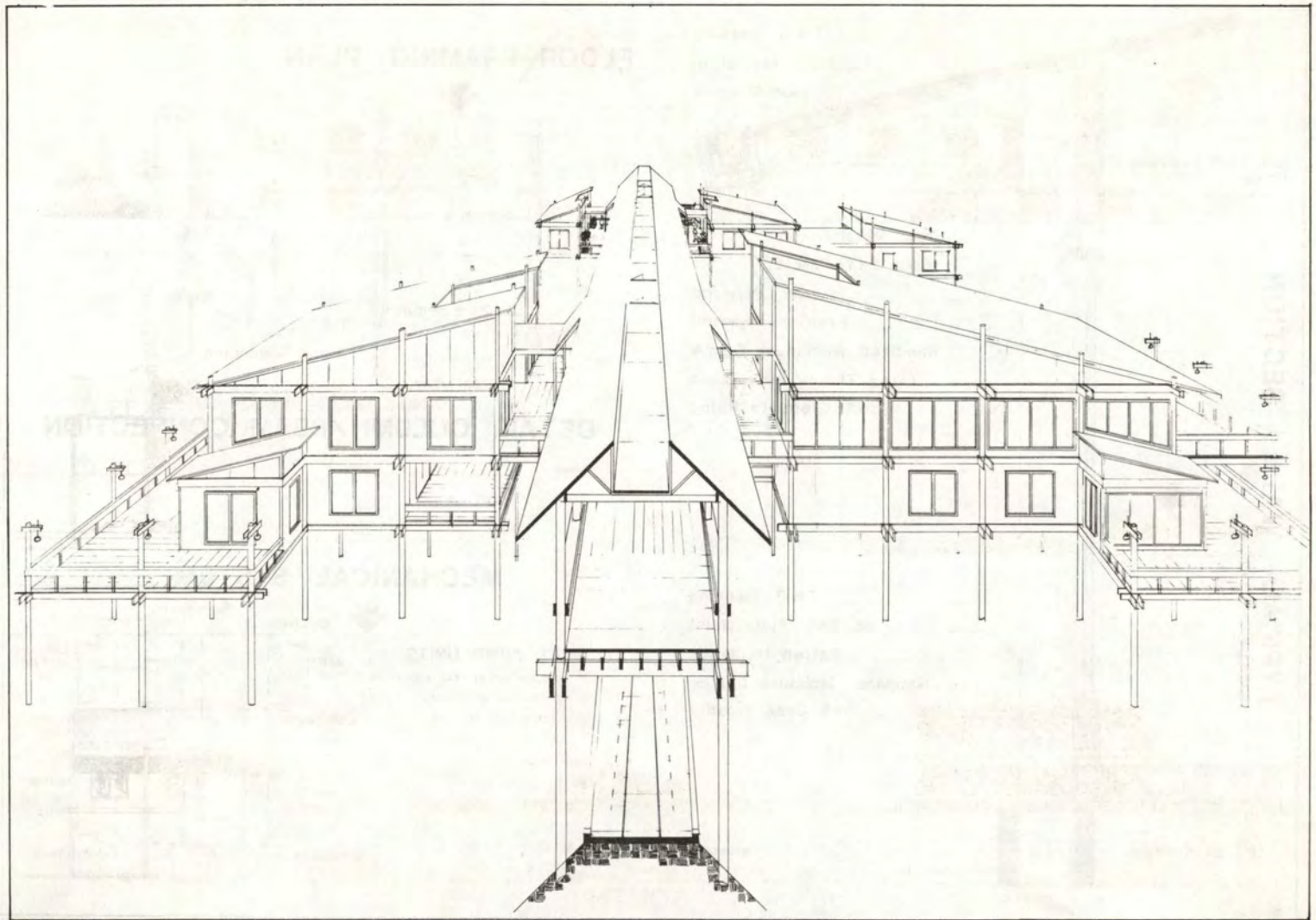



CONWAY MARINA

SCALE 1" = 8'

# ELEVATIONS

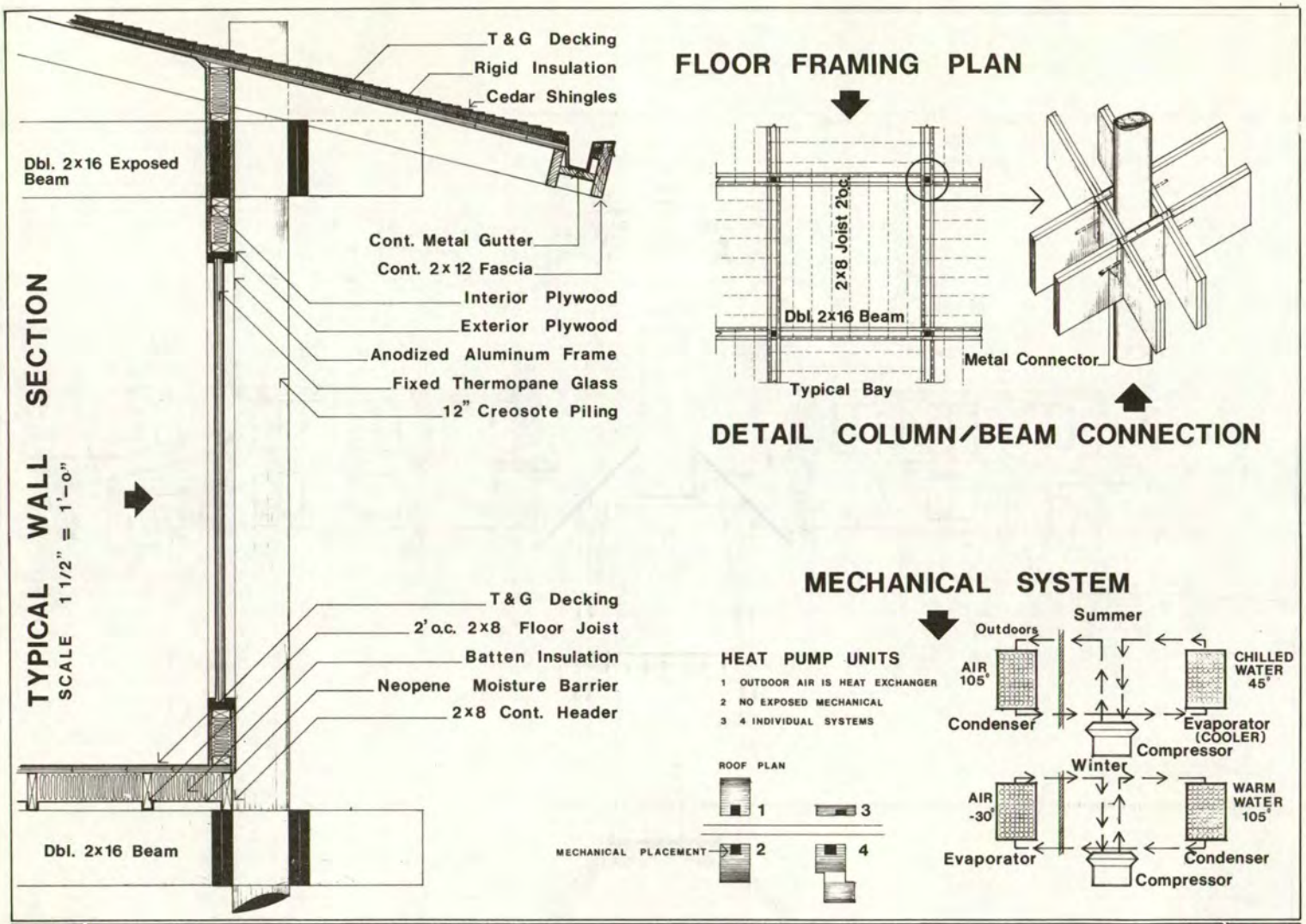
JB



CONWAY MARINA

# PERSPECTIVE

JB




CONWAY MARINA

# DETAILS

JB

# Bibliography

## Books

ASCE. Report on Small Craft Harbors. New York, 1969.

Boaz, Joseph N. Graphic Standards. New York: John Wily & Sons, Inc., 1970.

Graham, Charles Allan, Jr. A Marina for Downtown Beaufort, S. C. (Architectural Thesis), 1972.

Suber, John Thomas, Jr. A Marina for Lake Murray, S. C. (Architectural Thesis), 1972.

Time Saver Standards. "Marinas".

## Reports

Environmental Protection Agency."Water Quality Considerations for Construction and Dredging Operations". 1971.

"Flood Plain Information". Dept. of the Army. Charleston District. Corps of Engineers. Charleston, S. C. March, 1973.

Horry County Historical Society. "Horry County Historic Sites". 1974.

McCoy, E. (Architectural West Marina Del Rey, Calif.) Progressive Architecture 55:44 March, 1974.

McMillan, Hoyt. The Independent Republic Quarterly. "A Brief History of Water Transportation in Horry County, Conway, S. C." June, 1974.

NAEBM. Marinas: Design, Construction and Maintenance.NAEBM, New York, 1939.

NAEBM. NAEBM's Study of Marinas, Revenue and Cost, Profit Ratios, Slip Rental Rates, and Some Boat Owner's Impressions of Marina Services,NAEBM. New York, 1967.

Oesen, Henry Van, & Associates. "Preliminary Engineering Report for Proposed Marina City of Conway, S. C.", 1973.

Rick, William B. Planning and Developing Waterfront Property. Urban Land Institute, Technical Bulletin No. 49, 1964.

SMS Partnership, Architects. (Stanford Landing, Stanford, Conn.) P.A. Design Citation. Progressive Architecture Nos. 51:84-5 January, 1970.

Sternlieb, George. "Leisure Market Studies". Bradford Press, Inc., Flemington, N. J., 1969.

"South Carolina Tidelands Report". S. C. Water Resources Commission, 1969.

"The Modern Marina". (New York: National Association of Engine & Boat Manufacturers, Inc. 1953) Pg. 61.

Waccamaw Regional Planning & Council. "An environmental, Historical, and recreational Atlas of the Waccamaw Region", 1973.

" Zoning Ordinence". City of Conway, S. C. October 21, 1971.

Henry Von Oesen & Associates
Consulting Engineers
Wilmington, N. C.

United McGill Corporation
Marinas by United Flotation Systems
Columbus, Ohio

Harold Doster, President & Gen. Mgr.
Bucksport Boat Sales, Inc
Bucksport Marina
Bucksport, S. C.

Koppers Company, Inc.
Koppers Modular Floating Dock System
Forest Products Division
Pittsburg, Penn.

Environmental Protection Agency
Water Quality Office
Southeast Region
Federal Facilities Branch
Charleston, S. C.

S. C. Dept. of Park Recreation & Tourism
Division of OUtdoor Recreation
Columbia, S. C.

Marion McNinch, Director of Production
Santee-Cooper Electric Co-op
Moncks Corner, S. C.

S. C. Wildlife & Marine Resources Dept.
Boating Division
James W. Webb, Exec. Director
Charleston, S. C.

Mr. H. G. Williamson
Norfolk-Baltimore-Carolina
Barging Line
Norfolk, Virginia

Edward D. Stone, Jr. & Associates P.A.
Fort Lauderdale, Florida

HV
T- BOURNE