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PENDER COUNTY ENVIRONMENTAL AND GROWTH ALTERNATIVES STUDY

COASTAL ZONE
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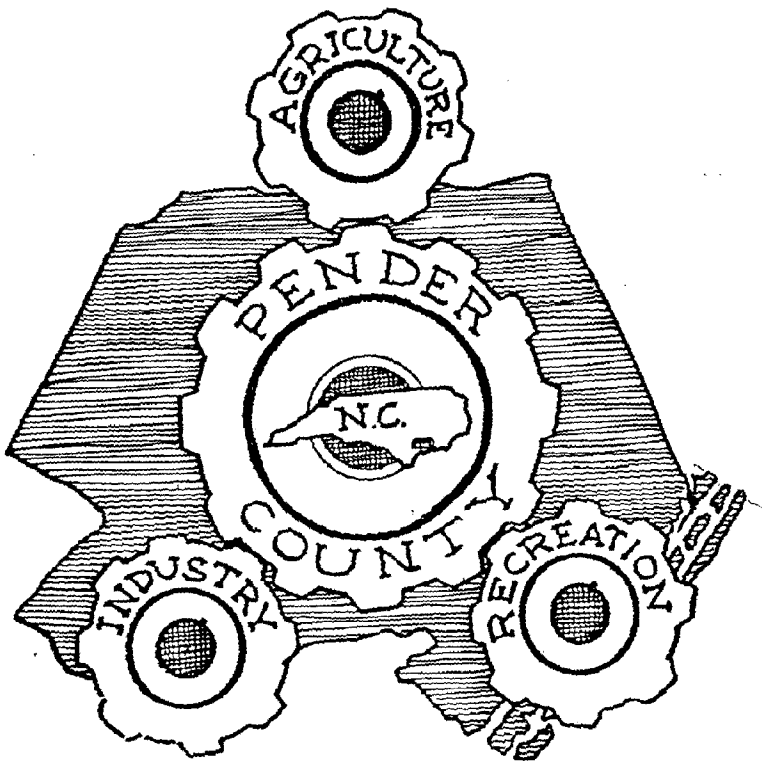

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The purpose of this study is to enumerate environmental and man-made developmental limitations in the County and to identify policy decisions that should be addressed in the near future by the County in the face of inevitable urban development.

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PENDER COUNTY ENVIRONMENTAL AND GROWTH ALTERNATIVES STUDY

1978

Prepared by

The Pender County Planning Board and Planning Department
In Cooperation With The Pender County Board of Commissioners

Planning Board Members

DeLeon Fennell, Chairman
Sidney Williams, Vice-Chairman
Mrs. Lee Hust, Secretary
Bennie Herring
Anthony J. Comentale
Johnnie Wells
Leslie Batson
E.L. Durham, Sr.

Planning Department Staff

Jack J. Cochran,
Planning Director
James L.F. (Jimmy) Smith,
Assistant Planner
Rebecca N. Lane,
Secretary

Special Thanks Goes To:

Mr. Wayne Arnold
Pender County Historical Society

Mr. Lewis Dunn
Executive Director, Pender County Economic Development Commission

Mr. Casper Wells
Agriculture Stabilization and Conservation Service

Lower Cape Fear Soil and Water Conservation District

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North Carolina. Dept of Natural Resources and Community Development.

PENDER COUNTY ENVIRONMENTAL AND GROWTH ALTERNATIVES STUDY

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to enumerate environmental and man-made developmental limitations in the County and to identify policy decisions that should be addressed in the near future by the County in the face of inevitable urban development.

B. Approach

The development limitations are delineated on township maps on a scale of one inch equals 2000 feet. Since there are ten (10) townships and since the County is so large on this scale, the mapping was done on eleven (11) separate maps.

Some of the limitations mapped are highly generalized except for the agricultural lands, cultural/historic sites, Coastal Area Management Act's Areas-of-Environmental-Concern (AECs), and public recreational lands, which are detailed and realistic. The soils information is based on general soils mapping rather than on a detailed soil survey. The flood hazard information is likewise generalized and will be more accurately delineated, probably sometime within the next year or two. The mineral limitations is perhaps the weakest of the limitations. The public recreational lands are delineated by their respective legal boundaries. The AECs include several categories of fragile lands as defined by the Coastal Area Management Act: 1) a 75 foot strip along the estuarine shoreline shown seaward of the brackets on the maps, 2) the ocean-erodible/primary-dune system measured 121' landward of the toe of the primary dune on the oceanfront, and 3) the ocean-inlet lands on the barrier islands. Categories 2 and 3 are not shown on the maps because of the difficulty of symbolizing these small areas on these maps. Other limitations considered, but none found, include man-made hazards such as oil tank farms and primary aquifer recharge areas.

The township development limitations will be filed in the Planning Department's map file and copies will be available to developers at a nominal cost.

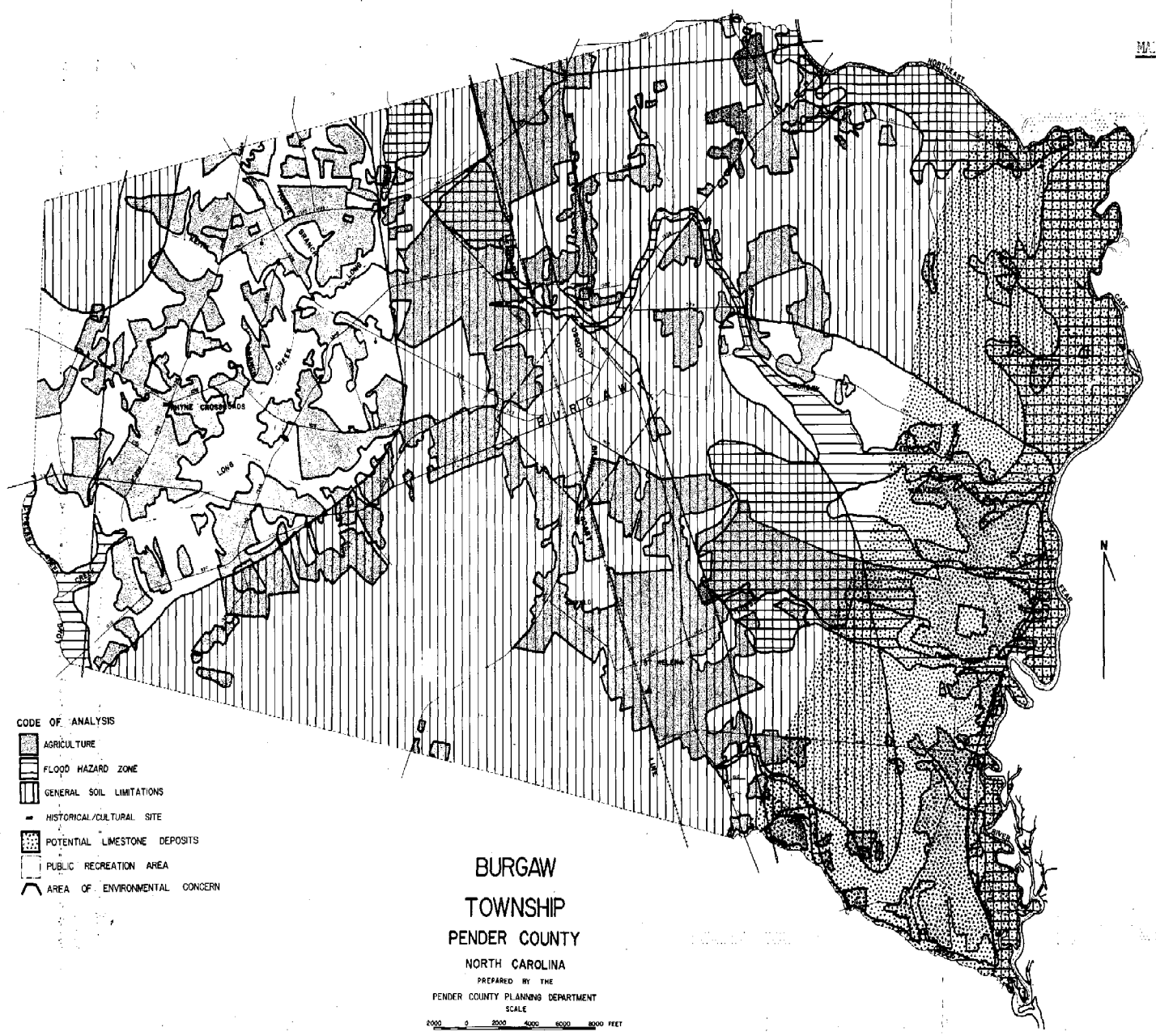
The approach taken here was that pioneered by Ian McHarg. McHarg mapped all limitations for development, many of which overlap to create a composite of development limitations. The areas with no limitations, or very little limitations, should be the areas into which to direct development.

II. TOWNSHIP DEVELOPMENT LIMITATIONS DESCRIPTIONS

A. Burgaw Township

Burgaw Township is centered upon the only true urban community in the County, the Town of Burgaw, which is the county seat. This township is characterized as having much good farmland - about 50%. About 75% of this township has moderate or severe soil limitations and about 15% is flood hazard. The Town of Burgaw will need to decide in what direction to expand in the future; it is bordered on all sides, except the East, with farmland.

MAP 1



N

CODE OF ANALYSIS

- AGRICULTURE
- FLOOD HAZARD ZONE
- GENERAL SOIL LIMITATIONS
- HISTORICAL/CULTURAL SITE
- POTENTIAL LIMESTONE DEPOSITS
- PUBLIC RECREATION AREA
- AREA OF ENVIRONMENTAL CONCERN

BURGAW
TOWNSHIP
PENDER COUNTY
NORTH CAROLINA

PREPARED BY THE
PENDER COUNTY PLANNING DEPARTMENT
SCALE

2000 0 2000 4000 6000 8000 FEET

1 0 1 2 3 KILOMETERS

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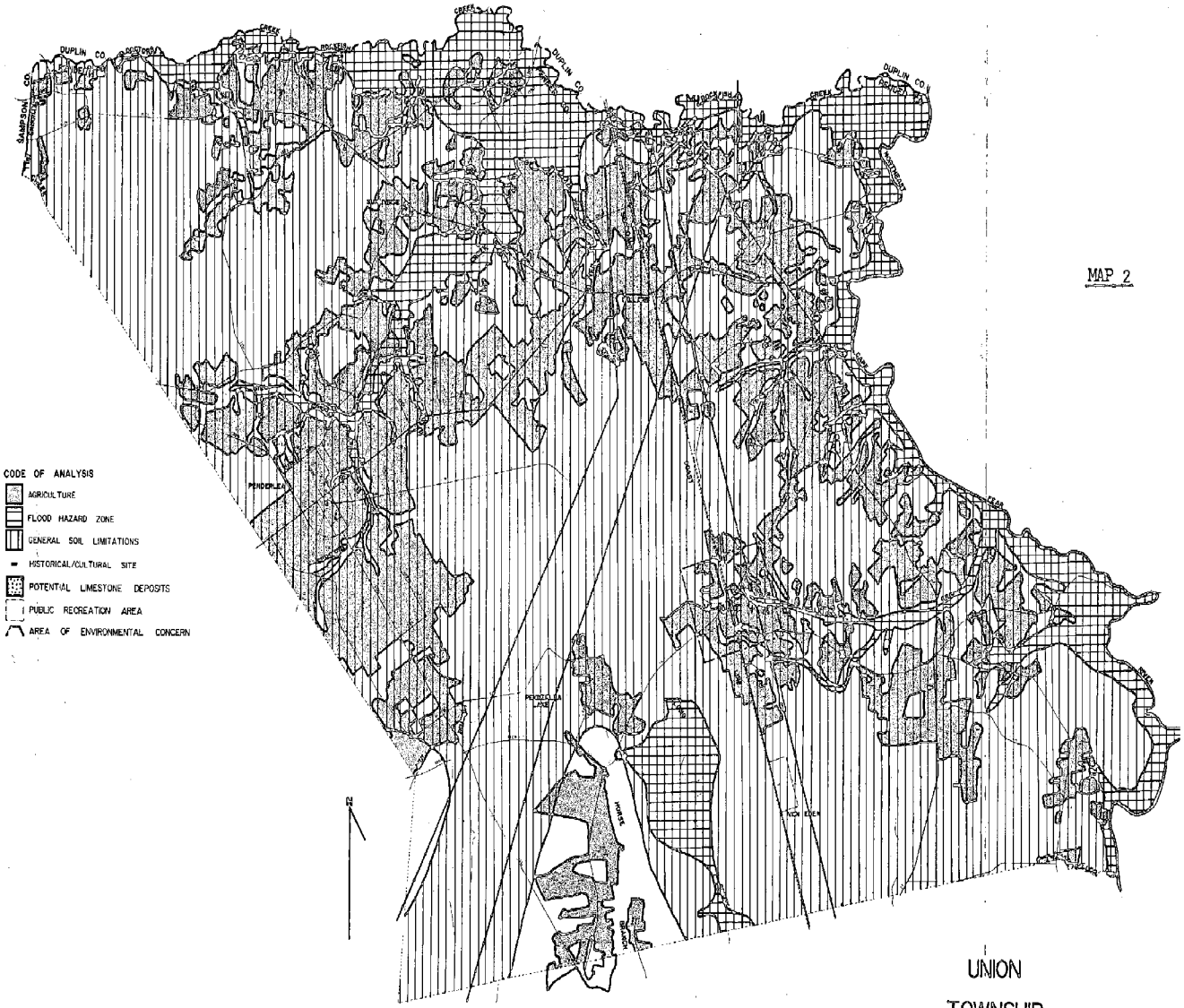
B. Union Township

Union Township is characterized by much farmland - about 30%. Almost all of the soils have moderate or severe general limitations for development. Approximately 15% is flood hazard, which extends mostly along the Northeast Cape Fear River, Rockfish Creek, and Doctors Creek.

Presently the denser areas of residential development centers are around the communities of Penderlea, Watha, and Willard. Also, there is much development just South of the Town of Wallace. Much of the growth exists in and is encroaching upon prime farmlands. This creates economic as well as social problems. However, the existing settlement pattern will have to be generally adhered to, and a decision will have to be made as into which type of farmland to direct denser urban-type development.

MAP 2



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- AREA OF ENVIRONMENTAL CONCERN

UNION

TOWNSHIP

PENDER COUNTY

NORTH CAROLINA

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PENDER COUNTY PLANNING DEPARTMENT

SCALE

9000 0 2000 4000 6000 8000 FEET

0 1 2 3 KILOMETERS

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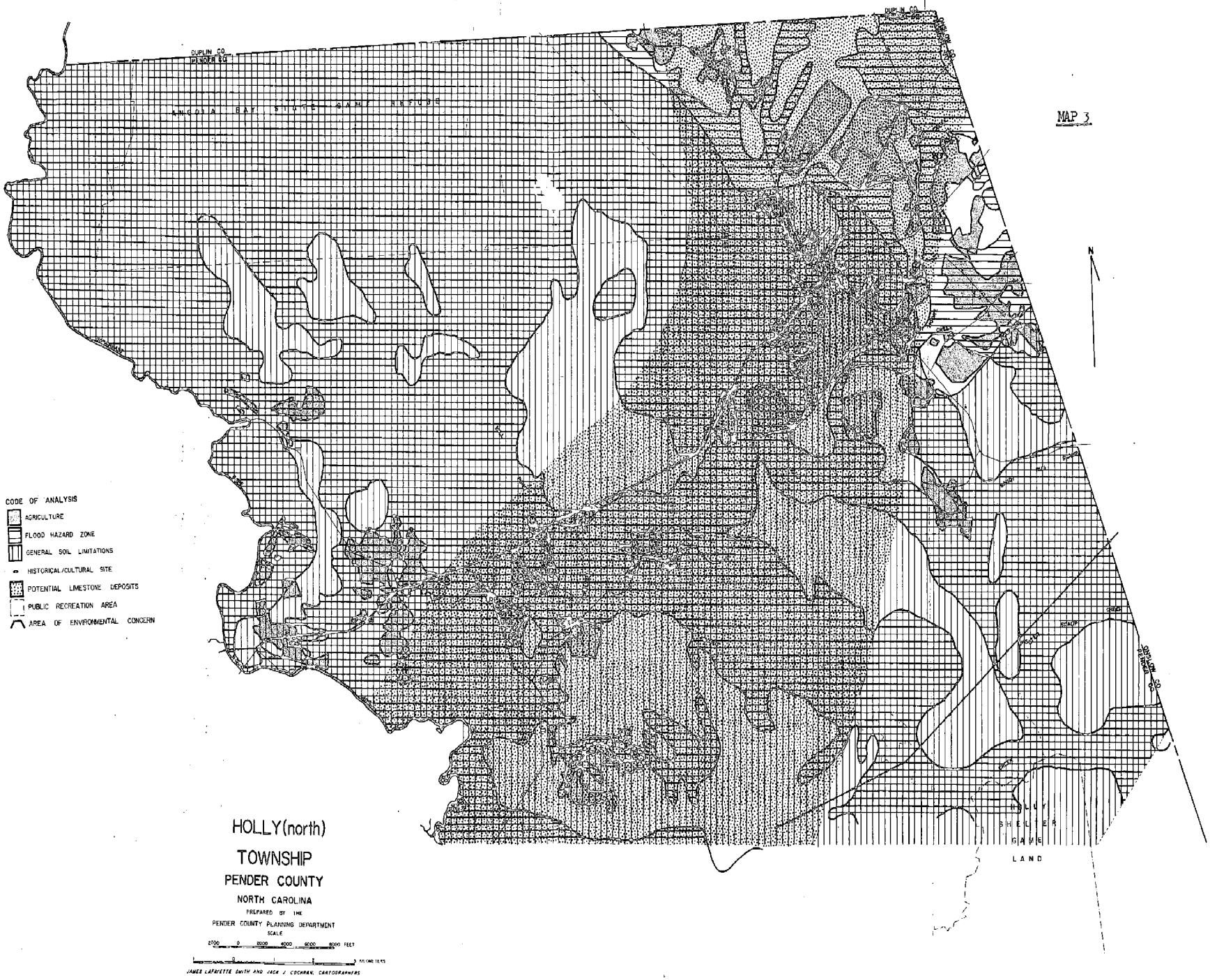
C. Holly (North) Township

Holly (North) Township is characterized as being about 75% flood prone. Also, this area has about 85% under moderate or severe general soil limitations. Approximately 10% is under agricultural cultivation. The denser settlement areas are located around the Maple Hill Community and the "Webbtown" Community. Both have general soil limitations for development and are surrounded by good farmland.

Much of the Angola Bay State Game Refuge extends into Pender County in this township, and the rest extends northward into Duplin County. This Refuge is owned by the State and will not be available for development in the future.

D. Holly (South) Township

Holly (South) Township is characterized as being about 80% flood prone. The entire area has moderate or severe general soil limitations. There are only a few agricultural tracts in this area. There are no community-type settlements to mention. Holly Shelter Game Refuge is owned by the State and constitutes about 75% of this area. This Refuge will not be available for development. The shoreline along the Northeast Cape Fear River Northward to the NC Highway 210, lies within a special fragile area of concern called the estuarine shoreline. This area falls under the jurisdiction of the Coastal Area Management Act and is to be managed to protect the estuarine environment.


MAP 3
DUPLIN CO
PENDER CO
ANGOLA BAY STATE GAME REFUGE
N
CODE OF ANALYSIS
AGRICULTURE
FLOOD HAZARD ZONE
GENERAL SOIL LIMITATIONS
HISTORICAL/CULTURAL SITE
POTENTIAL LIMESTONE DEPOSITS
PUBLIC RECREATION AREA
AREA OF ENVIRONMENTAL CONCERN
HOLLY SHELTER GAME LAND
HOLLY(north)
TOWNSHIP
PENDER COUNTY
NORTH CAROLINA
PREPARED BY THE
PENDER COUNTY PLANNING DEPARTMENT
SCALE
2000 0 2000 4000 6000 8000 FEET
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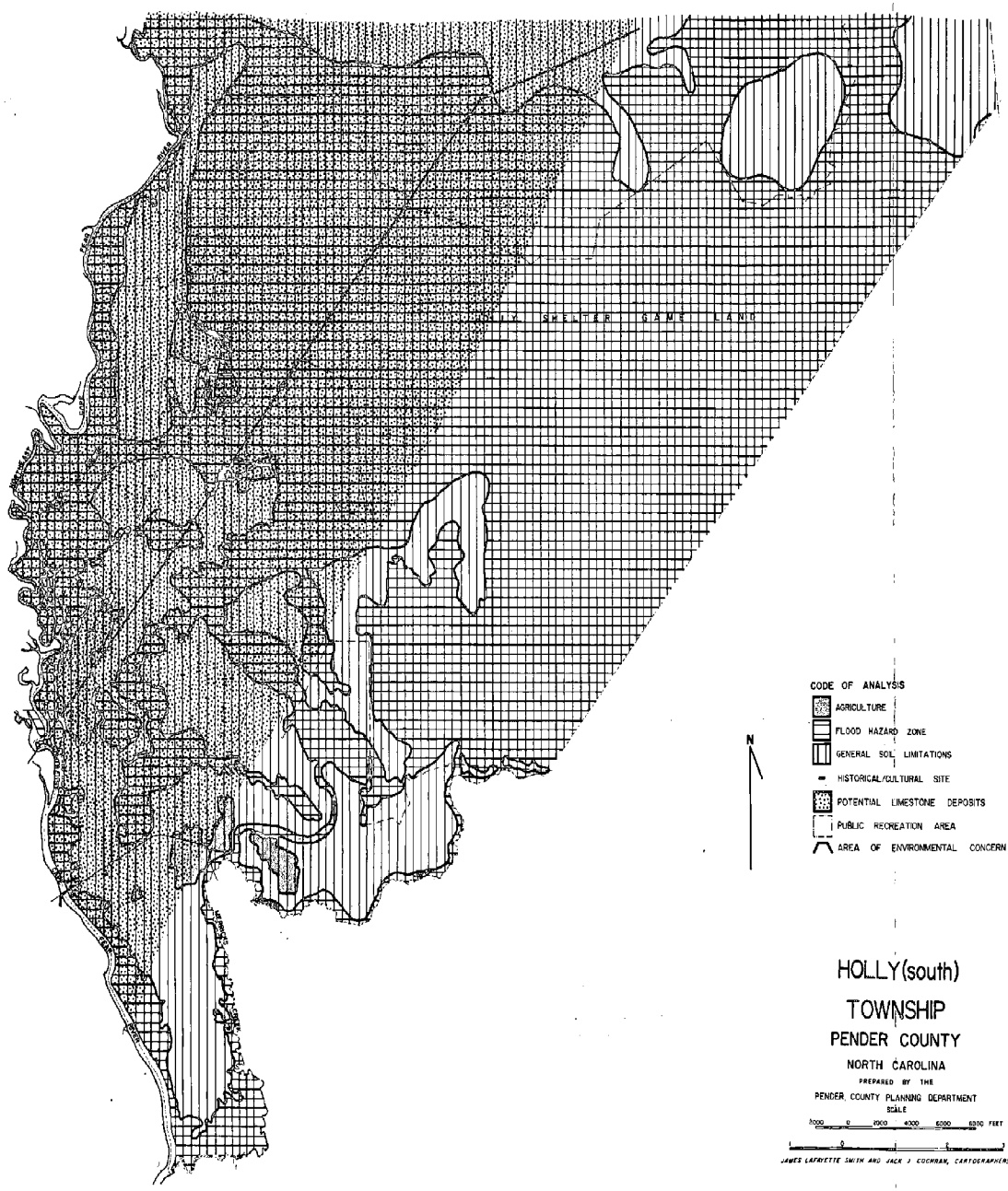
MAP 4



HOLLY(south)

TOWNSHIP

PENDER COUNTY

NORTH CAROLINA

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E. Topsail Township

Topsail Township is characterized as having relatively intense development pressures compared to other townships of the County. Most of this residential development has occurred and is occurring between U.S. Highway 17 and the sound waters of the Atlantic Ocean. There is a strong potential for acute conflict between some good farming soils/operations in the County with this sprawling, intensifying growth. Although most of this growth area is on some of the better soils for development in the County, the soils along the sound and tidal creeks are not as suitable and are especially being developed intensely. About 50% of this township has moderate or severe general soil limitations for development. Also, approximately 40% is flood hazard. The flood hazard areas along the sound and tidal creeks are especially subject to intense development pressure. There are already about 310 dwellings in the flood hazard areas. A decision as to what area to guide this sprawling growth will have to be made by the County in the future.

The Coastal Area Management Act has more impact in this township than any other township of the County. Under the management system, permits are required for development in the estuarine shoreline of the sound and tidal creeks. Also, permits are required in Areas-of-Environmental-Concern on the barrier islands. The Areas-of-Environmental-Concern there include the inlet lands, the ocean erodible area, and the frontal dune system.

Also, Holly Shelter State Game Refuge is partially located in this township. This constitutes about 25% of the township and thus will not be available for development purposes.

TOPSAIL

TOWNSHIP

PENDER COUNTY

NORTH CAROLINA

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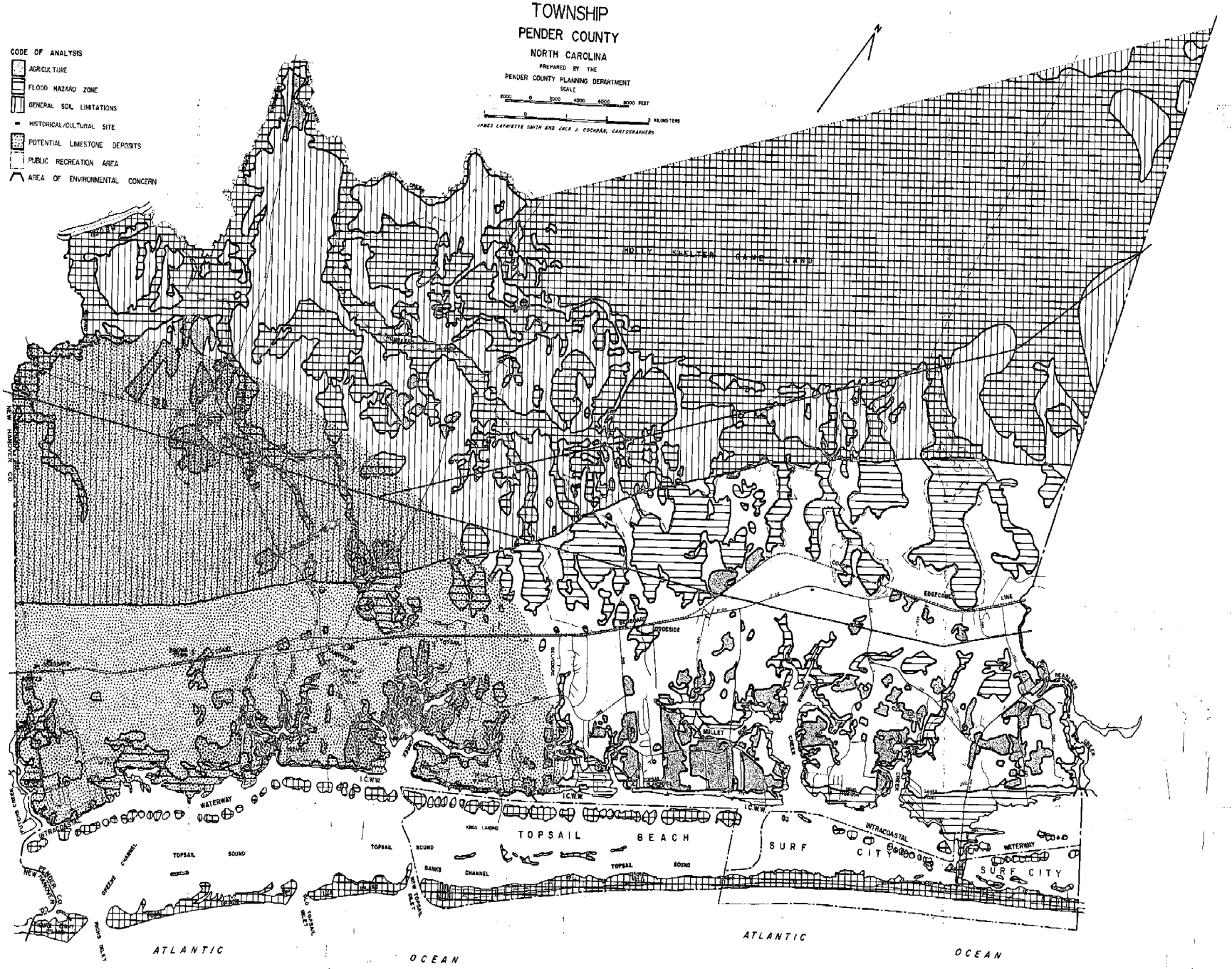
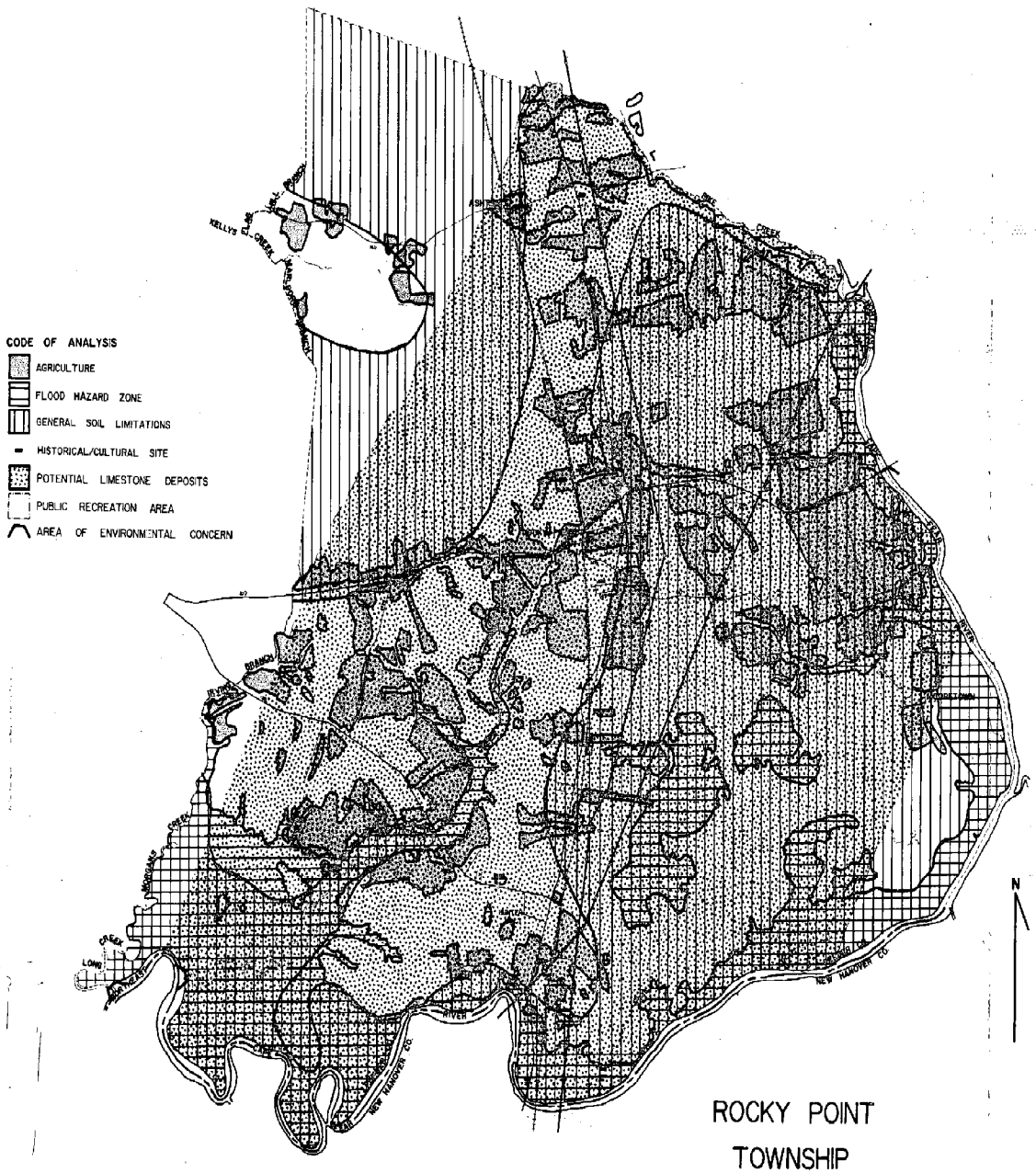


F. Rocky Point Township

Rocky Point is made up of about 25% farmland. About 70% had moderate or severe soil limitations. Approximately 15% is flood hazard. The denser area of settlement include the Rocky Point Community and areas along NC Highway 133. Both of these growth areas are encroaching on prime farmland areas. This township has experienced and will experience more spillover growth from New Hanover County. The decision will have to be made as to how, where, and when this future development will take place.

The Coastal Area Management Act affects the shoreline of the Northeast Cape Fear River which borders this township as far North as Lane's Ferry Bridge on Highway 210. Under the management program, the estuarine shoreline environment is to be managed to protect this fragile environmental area.

MAP 6



ROCKY POINT
TOWNSHIP
PENDER COUNTY
NORTH CAROLINA

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SCALE

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1 0 1 2 3 KILOMETERS

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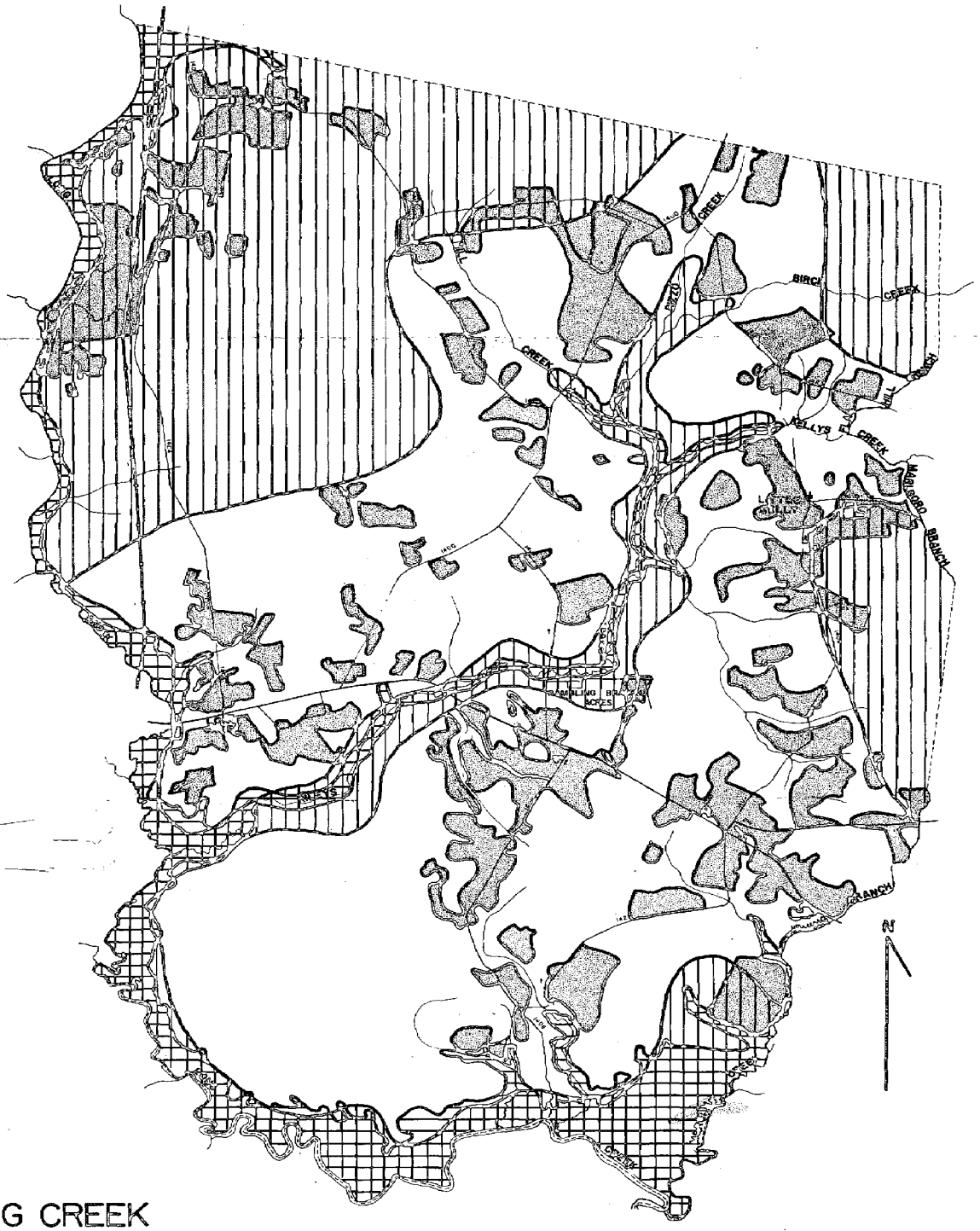
G. Long Creek Township

Long Creek is characterized as having about 70% of its area in good soils for agricultural as well as for developmental purposes. About 15% of the township is presently under farm cultivation. The township is subject to very little flooding from Long Creek and Riley's Creek - approximately 5%.

This township has experienced some scattered spillover urban-type development from New Hanover County. The only denser settlement-community is Long Creek, which does not constitute the threat of encroachment as the spillover growth does to the traditionally rural environment. A decision will have to be made as to how to handle this emergence of nonrural-type development in an otherwise rural area.

MAP 7



LONG CREEK TOWNSHIP

PENDER COUNTY

NORTH CAROLINA

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PENDER COUNTY PLANNING DEPARTMENT

SCALE

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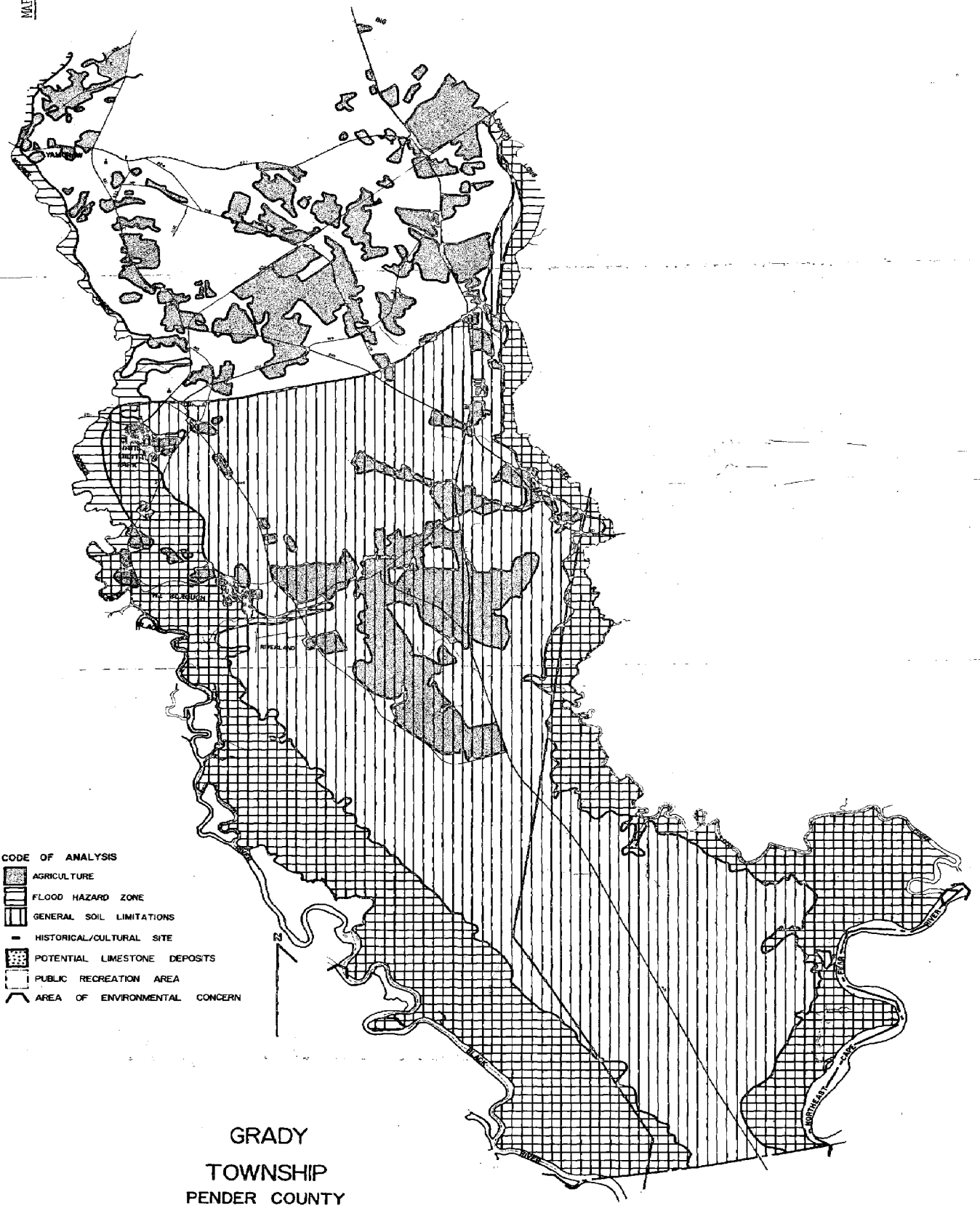
- PUBLIC RECREATION AREA
- AREA OF ENVIRONMENTAL CONCERN

H. Grady Township

Grady Township has about 80% moderate or severe general soil limitations. About 20% is flood prone. The Northern part of the township has much good farmland - approximately 20% of the township. There is only one denser human settlement - Currie. Spillover growth from New Hanover is likely to occur in the township in the future. In view of the limitations in this area, a decision will have to be made by the County whether to allow dense growth in this area and if so, where?

MAP 8



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N

GRADY

TOWNSHIP

PENDER COUNTY

NORTH CAROLINA

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SCALE

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0 1 2 3 KILOMETERS

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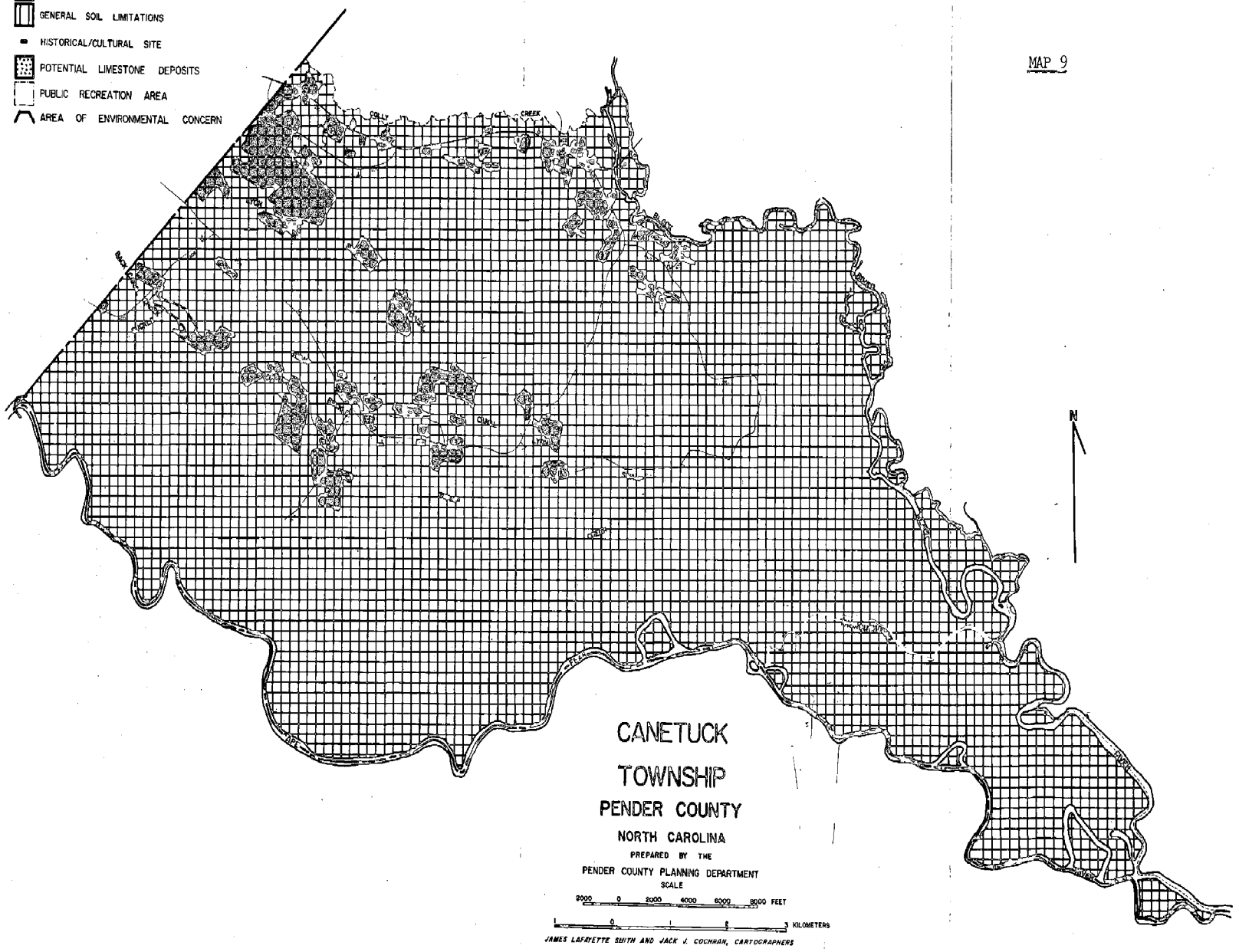
I. Canetuck Township

Canetuck Township is characterized as being completely within the flood hazard area. It is also covered by moderate or severe general soil limitations. There is very little farmland currently being cultivated - only about 5%. There are no dense urban settlements in the township, probably because of the conditions mentioned above and the relative isolation of this area. The shoreline of the Cape Fear River falls under the jurisdiction of the Coastal Area Management Act (CAMA). This fragile area of concern is subject to the management objectives of the Coastal Area Management Act in order to protect the estuarine environment.

MAP 9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CANETUCK
TOWNSHIP
PENDER COUNTY
NORTH CAROLINA
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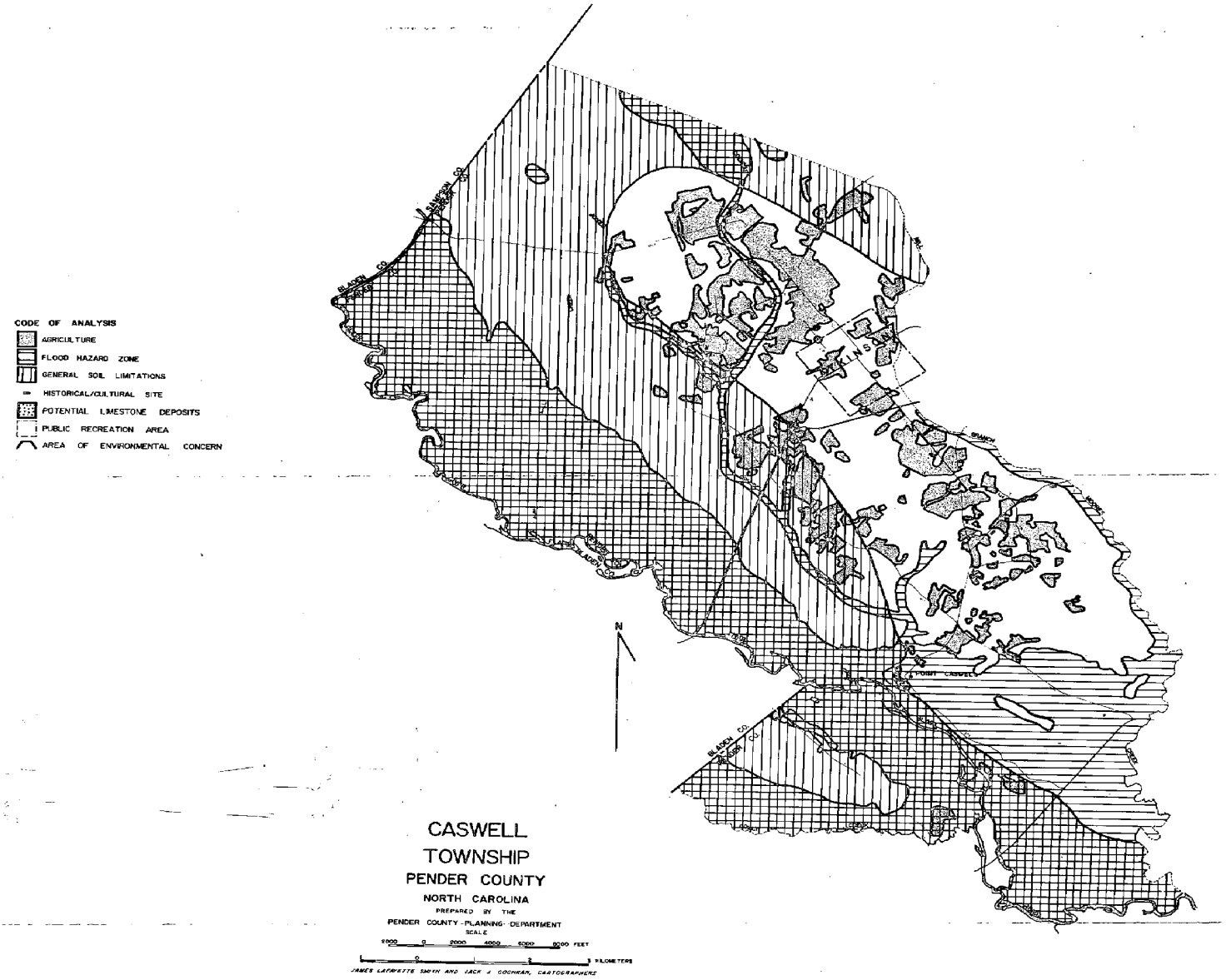
JAMES LAFAYETTE SMITH AND JACK J. COCHRAN, CARTOGRAPHERS

J. Caswell Township

Caswell Township is characterized by about 45% flood hazard areas. About 15% of the East Central part of this township has very good farmland. This prime farmland lies to the Northwest and Southeast of the Town of Atkinson. Approximately 70% of this township has moderate or severe general soil limitations for development. The only dense area of urban settlement in this township is the Town of Atkinson. There is some farmland in and near the Town but there appears to be enough non-farmland to accomodate urban-type development inside and near the Town without encroaching on some of the best farmland in the County.



CASWELL TOWNSHIP
PENDER COUNTY
NORTH CAROLINA

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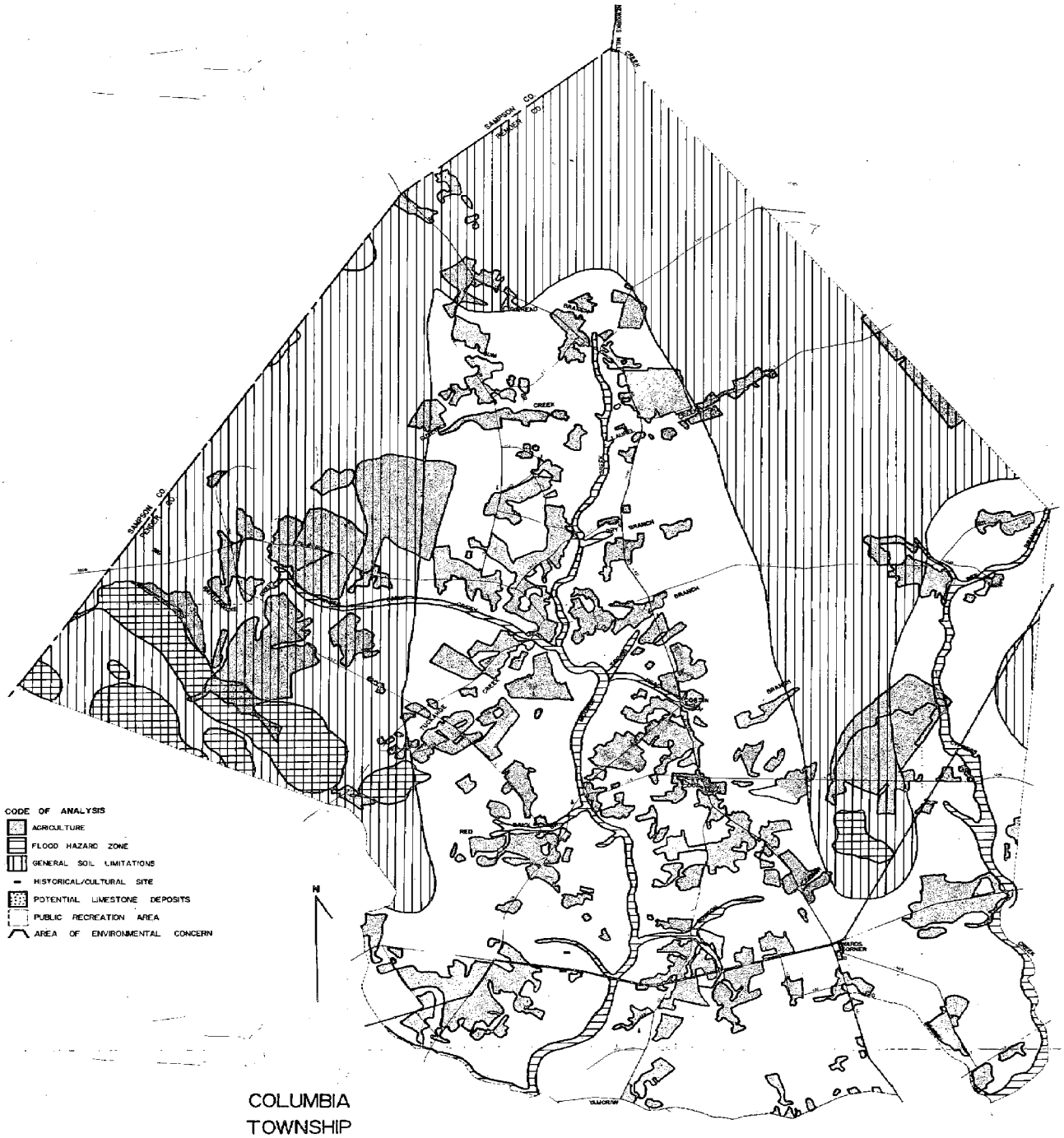
PENDER COUNTY - PLANNING - DEPARTMENT

MAP 10

K. Columbia Township

Columbia Township is distinguished as having approximately 25% prime farmland that is generally located along Moores Creek and its tributaries. Only about 5% is flood prone. About 30% has moderate or severe general soil limitations. There are no dense human settlements that are encroaching upon prime farmland or flood plains at the present time.



COLUMBIA
TOWNSHIP
PENDER COUNTY
NORTH CAROLINA

PREPARED BY THE
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SCALE

2000 0 2000 4000 6000 8000 FEET

0 2 KILOMETERS

JAMES LAFAYETTE SMITH AND JACK J. COCHRAN, CARTOGRAPHERS

MAP 11

III. OTHER LIMITATIONS

A. Water Resources

1. Groundwater Quality and Quantity

The County is underlain by Eastward and Eastward thickening wedges of sediment of Cretaceous and Tertiary age. These sediments are covered throughout nearly all of the Counties by surficial sands and some clays.

The Cretaceous - age Pee Dee Formation is the deep aquifer tapped in the Western part of Pender County, and the Tertiary - age Castle Hayne Limestone is the aquifer tapped by deep wells in the East. The surficial sands are a minor aquifer in most upland areas and are the source of many small domestic supplies throughout the County. These surficial sands, where thick and composed of coarse sand, can yield a few hundred gallons per minute to large diameter, ground-packed wells or horizontal-well systems.

The source of ground-water recharge to all aquifers in Pender County is rainfall that falls within the County. Most ground-water recharge takes place in the broad interstream upland areas. Rainfall infiltrates the surficial sands in these areas and moves down to the water table; most of this water that is not withdrawn by means of wells moves laterally toward major streams and discharges into the streams through springs and seeps. A lesser amount of this recharge moves downward and enters the Pee Dee Formation or the Castle Hayne Limestone. Water in these two aquifers moves toward discharging wells, toward major streams, or toward the coast where it moves upward through the overlying beds and discharges into the coastal waters.

The recharge areas that are most important with respect to groundwater pollution are the sandy interstream areas--more specifically the interstream areas underlain by thick permeable sand, such as the dune areas near the coast and the sand hills area Southeast of Currie. Bain discusses the sand hills deposits in some detail in the New Hanover County report. All of the surficial sands have some clay layers in them, and these clays retard the downward movement of recharge. Sandy upland areas underlain by only a few thin clay layers are the areas where the most recharge to the underlying Pee Dee and Castle Hayne Aquifers is taking place, and these areas should receive special attention when considering prevention of ground-water pollution. Data are not presently available to delineate

the most sensitive of these areas. A detailed study involving a test-drilling program designed to determine the hydraulic connection between the surficial sands and the underlying aquifers would be required in order to do this.

There is a problem of induced infiltration from streams into adjacent aquifers where large ground-water withdrawals are taking place and the danger of salty or brackish river water entering aquifers. This potential danger is present in Pender County. Saltwater encroachment in the Cape Fear River will not be a frequent problem. Saltwater (water with a chloride concentration of 200 milligrams per liter or more) is estimated to move upstream in the Cape Fear River as far as the mouth of the Black River only once in 50 years on the average. In the Northeast Cape Fear River, saltwater is estimated to move upstream as far as the Pender County line nearly every year; two miles downstream from the U.S. Highway 117 bridge once every 20 years; to the U.S. Highway 117 bridge once every 40 years; and one mile upstream from that bridge once every 50 years on the average. The upstream movement of saltwater, especially that occurring once every 20 to 50 years, is associated with very low freshwater inflow in combination with high tides of the magnitude resulting from strong winds such as those accompanying hurricanes.

The Geological Survey often performs hydrologic studies in cooperation with local governmental units. These studies provide basic data and interpretations that result in a detailed understanding of the water resources. This information is a valuable tool for planning and developing water supplies. Much more information is needed on groundwater resources in order to facilitate proper planning in the County.

2. Stream Classification

The North Carolina Department of Environmental Management classifies all rivers and streams in North Carolina to determine their water quality potential for various areas. These classifications are important to a community in planning land uses for certain areas. Most of the rivers and streams are classified as swamp and suitable for bathing only. Others, the tidal creeks and sound waters of the coastal areas, are classified as shellfish waters and are suitable for swimming only. Thus, no surface water is used for domestic purposes - domestic water being extracted from surface supplies.

Stream classification has an impact on the location of sewer

treatment plants which usually serves dense population growth areas and industries. Certain stream classifications must be compatible with certain uses. For example, streams receiving treated wastewater effluent must be classified as able to assimilate the effluent so as not to damage the environment. Thus, productive shellfish waters would not be allowed to receive wastewater effluent in the coastal area and the added distance to pump such water to a suitable area requires much added expense.

3. Wastewater Treatment

One of the major problems is the absolute lack and the lagging behind of public wastewater plants to accomodate expansive population growth in the coastal areas. Therefore, most homes, businesses, et cetera are being served by the use of septic tanks. This practice has been linked to extensive pollution of productive shellfish waters in the State and County.

B. Highway System

The highway system of Pender County, although not as overly-traveled as most of New Hanover County's system, does have limitations in the face of economic growth.

The primary problem is the lack of a direct route to the coastal part of the County with the county seat. This isolation factor hinders the intra-county economic integration of the two areas.

The primary road system (N.C. Highways) also has some problems. Highways 17, 117, and 421 are presently heavily traveled and need improvements. Highways 11, 53, 133, and 210 do not have the traffic as those mentioned above.

Some of the rural roads and bridges have limitations for farm-to-market travel and especially for the heavy trucks involved in the timber industry.

A proposed Piedmont-to-Port highway connector is planned to be routed through the County. If this route is to be an interstate highway, this project will have a very tremendous economic development impact on the County, especially should the route go through the center of the County. This connector is already included in the State's Seven Year Highway Plan.

C. Community Facilities and Services

1. Schools

The Pender County school system is presently overcrowded and in need of repair at various sites. In order to accomodate economic growth, these needed facilities will have to be furnished.

2. Medical Services

The only public hospital that exists in the County is Pender Memorial Hospital located in the Town of Burgaw. This facility is generally overcrowded and needs to be expanded.

There are health clinics, one in Atkinson and one in Holly Ridge just across the Onslow County line, that provides primary health services.

3. Fire and Rescue Services

There are eleven voluntary fire departments in the County, but no fulltime fire departments. There are some parts of the County that are not served by a voluntary fire department.

There are only three rescue squads in the County and these are voluntary. The outer reaches of the County along the county lines with the surrounding counties are a good distance - 15-20 miles (minutes) from a rescue squad - and are therefore not adequately served.

4. Social Services

The Social Services Department is located in the Town of Burgaw. It presently has several functions. This department is presently overcrowded and needs to be enlarged in office space.

5. Higher Education

The Cape Fear Technical Institute is located in New Hanover County just below Pender County. The Institute has an extension program in the County. This function can be expanded in the County and the curriculum can be tailor-made to create future jobs in the County.

The existence of a four year university about 24 miles from the center of the County in New Hanover County, offers potential for the County for continued growth.

6. Solid Waste

The County operates two landfills; one near Surf City and one West of Burgaw. The County uses a green-box system presently which has some problems of being abused and over-loaded at times. As growth continues and urban pockets of growth continue to emerge haphazardly, there will be doubtless demands for expensive house-to-house pickup in the County.

7. Other Functions

Jail - The County Jail and Sheriff's Department will be relocated in a new complex in Burgaw. This facility will be adequate for the forseeable future.

Recreational Facilities - There are currently no public recreational facilities that are managed by the County Recreation Department. The school system presently provides the facilities for the Recreation Department's activities.

Administrative Facilities - The various county departments are housed in three (3) buildings at three (3) different locations in Burgaw. A recently completed administration building is already fully occupied and there is already a need seen for space for future planned functions.

IV. COUNTYWIDE GROWTH ALTERNATIVES

Large percentages of the County are affected by several series of limitations. These limitations overlap in many areas, but no attempt was made in this study to accurately measure what percentages of these various types of limitations, constituted separately and together, effect the County. Only approximations of percentages were made for each limitation by township.

Countywide, the County is affected by being about 49.8% flood hazard. Another 25% is affected by having potentially economically exploitable minerals beneath its surface. Agricultural lands make-up 16.5% of the County. Sixty two (62) percent of the County has moderate to severe general soil limitations for development. Coastal Management and cultural/historic areas constitute less than one percent of the County. Game Refuges (Holly Shelter and Angola Bay) make up 12% of the County.

There are areas of the County that have minimal limitations for development and are therefore most suitable for development (discounting mineral lands); 1) parts of the extreme Northeastern part of Holly (North) Township, 2) a large part (20%) of Topsail Township that extends just West of Highway 17 Eastward to almost the sound waters, 3) areas just West of the Town of Atkinson, 4) much of the area along Moore's Creek in Columbia Township, 5) the Southwestern part of Long Creek Township South of Riley's Creek, 6) the intersection of SR 1400 and SR 1407 in Central Long Creek Township, 7) the South Central part of Rocky Point Township, 8) area South of Rocky Point Community between Highway 117 and the railroad, and 9) parts of Southeastern part of Burgaw Township.

The lands not having limitations (discounting mineral lands) for development only constitute about 14% of the County and a considerable amount of this is fragmented by the various limitations and so could not accomodate community (urban-type) settlements.

Unfortunately, there are only a few existing community-settlements that do not fall in or surrounded by one or more development limitations. These include: Atkinson Community, Rocky Point Community, Long Creek Community, and Hampstead Community.

Also, unfortunate is the fact that the best lands for agriculture are also the best lands for development. This conflict will have to be resolved in areas such as that agricultural area which surrounds the

Town of Burgaw. The decision has to be made to which agricultural lands should succomb to development - the less productive farmland?

The policy of serving developments by septic tanks will have to be scrutinized. About 86% of the coastal area's soils of North Carolina are not suitable for septic tanks and about 80% of Southeastern North Carolina's region is not suitable for septic tanks (Cape Fear Council of Governments, 1977). This problem is especially acute near the shellfish waters where there has been hundreds of thousands of shellfish waters closed to shellfishing because of contaminates from septic tanks and related sources.

Pender County is presently being developed in a dispersed or sprawled pattern in many parts of the County. Almost all County functions and non-County functions (fire and rescue services for example) will cost much more if the dispersed pattern of development continues. Concentrated development in areas already developed will be more cost-efficient in terms of streets, water/sewer, police, fire, rescue, and solid waste collection.

Taken into consideration all the limitations for development in the County, there is still an ample amount of suitable lands for development. Considering the present rate of development in the County, there is enough suitable lands for development for an indefinite period of time.

V. RECOMMENDATIONS

Using this study as a guide, the County should consider the following:

1. Develop and implement a Countywide Rural Development Ordinance.
2. Develop and implement a Countywide Subdivision Ordinance.
3. Initiate and complete a Progressive Soil Survey.
4. Initiate a Groundwater Study.
5. Continue long-range comprehensive planning.
6. Select suitable areas to accomodate future residential and industrial development and consider these as a system in which commuting corridors would be established.
7. Begin planning and phasing water and sewer facilities into the selected suitable growth areas so as to encourage (focalize) growth into appropriate areas.
8. Once growth-areas are selected, natural boundaries such as river/flood plain, swamps, et cetera should be used to separate and contain different land uses.
9. Once growth-areas are selected, all factors that may have an impact (water supplies, groundwater, community facilities/ services, wastewater treatment, et cetera) should be studied for their respective impact on development. Such an analysis would enumerate the most efficient and rational land use pattern for the County.

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