TOWN OF TOPSAIL BEACH, NORTH CAROLINA

HURRICANE EVACUATION, HAZARD MITIGATION

AND

POST-DISASTER RECONSTRUCTION PLAN

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JUNE, 1984

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POST-DISASTER RECONSTRUCTION PLAN

prepared by

GEORGE EICHLER & ASSOCIATES, INC.

JUNE, 1984

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TABLE OF CONTENTS

		PAGE
I.	INTRODUCTION	1
II.	TOPSAIL BEACH HURRICANE HAZARD MITIGATION PLAN	2
	A. EXISTING DEVELOPMENT	2
	B. HAZARD AREAS IN TOPSAIL BEACH	3
	C. EXISTING DEVELOPMENT LOCATED IN HAZARD AREA	8
	D. ESTIMATED SEVERITY OF POSSIBLE HAZARD AREA DAMAGES	11
	E. ANTICIPATED DEVELOPMENT IN HAZARD AREAS	12
	F. EXISTING TOPSAIL BEACH HAZARD AREA MITGATION POLICIES AND REGULATIONS	12
	G. RECOMMENDED HAZARD MITIGATION POLICIES	14
III.	TOPSAIL BEACH POST DISASTER RECONSTRUCTION PLAN	15
	A. INTRODUCTION	15
	B. ORGANIZATION OF LOCAL DAMAGE ASSESSMENT TEAM	16
	C. DAMAGE ASSESSMENT PROCEDURES AND REQUIREMENTS	18
	D. ORGANIZATION OF RECOVERY OPERATIONS	20
	E. RECOMMENDED RECONSTRUCTION POLICIES	24
IV.	TOPSAIL ISLAND HURRICANE EVACUATION PLAN	28
	A. TOPSAIL BEACH EVACUATION PLAN	28
	B. SURF CITY EVACUATION PLAN	29
	C. TRAFFIC ASSESSMENT OF MAJOR EVACUATION ROUTES	30

APPENDIX - DAMAGE ASSESSMENT FORMS

I. INTRODUCTION

The North Carolina Coastal Resources Commission has adopted rules for "Storm Hazard Planning" which require the incorporation of such a planning program into the land use plans that local coastal communities are required to prepare.

The Commission's rules are designed to implement a storm hazard planning process that is outlined in Before the Storm: Managing Development to Reduce Hurricane Damages. That publication was prepared for the Office of Coastal Management of the North Carolina Department of Natural Resources and Community Development to be used as a guide for local planning efforts.

In Before the Storm, Topsail Island was used as a case study to illustrate how the storm hazard planning process should work. Hazard area maps were prepared as part of that undertaking. However hazard information on Topsail Beach and Surf City used in the case study has been significantly revised during the past year. Additionally, Before the Storm includes only a cursory examination of storm reconstuction planning for both Topsail Beach and Surf City. Consequently, the objective of this project is to build on the information contained in Before the Storm and present storm hazard mitigation and post-disaster reconstruction plans which 1) meet the specific needs of Topsail Beach, and 2) conform with the State rules for storm hazard planning.

The remainder of this report describes Topsail Beach's storm hazard planning program. Chapter II presents the Town's Storm Hazard Mitigation Plan. Chapter III presents the Town's Post Disaster Reconstruction Plan. Chapter IV presents recommendations related to Hurricane Evacuation operations effecting both Topsail Beach and Surf City.

II. TOPSAIL BEACH HURRICANE HAZARD MITIGATION PLAN

A. EXISTING DEVELOPMENT

Topsail Beach has developed as a vacation/second home community, with permanent residents representing only about 5% of its seasonal population.

Table 1 shows the permanent, average seasonal and peak seasonal populations of the Town for the years 1975, 1980, 1990, and 2000 based on data included in the Topsail Beach Land Use Plan.

TABLE 1

TOPSAIL BEACH POPULATION

YEAR	PEAK SEASONAL	AVERAGE SEASONAL	PERMANENT
1975	4110	3140	200
1980	5310	4060	220
1990	7720	5890	260
2000	10120	7720	300

There are 354 acres of land zoned for residential purposes within the Town. About 55% is already developed for residential purposes at an average town-wide density of about 4 units per acre. About 160 acres of developable land remains vacant. Although vacant lots are scattered throughout the Town, the largest undeveloped tracts are generally located on the northeast side of the Town above Empie Street.

Based on 1980 data, the rates of peak seasonal visitors per dwelling unit is between 8 and 9 persons per unit. If the same ratio is used to project future needs, another 500 to 600 housing units would have to be constructed in the Town to accomodate the year 2000 peak seasonal population. There are indications that higher density development is starting to occur within the Town to accomodate this demand.

There are now about 653 residential units in the town that are either existing or under construction. The construction of single units on individual lots is the norm for the town, with the major exception being the 120 unit Queens Grant development which is currently under construction on the ocean side of Anderson Boulevard just south of Dolphin Pier.

There are 37 non-residential structures in Topsail Beach. These structures are concentrated in the center of town generally between Crews Street and Davis Street.

Topsail Beach does not have a central sewer system. Individual septic systems are utilized throughout the Town. A central water supply system is supplied by three deep wells. Because the recharge area is located on the mainland, the Topsail Beach Land Use Plan concluded that the "possibilities of contamination from on-site disposal systems are almost non-existent."

B. HAZARD AREAS IN TOPSAIL BEACH

Topsail Beach contains a full-range of storm hazard areas. Areas of Environment Concern (AECs) include: ocean erodible AECs; inlet hazard AECs; flood hazard AECs; and estuarine shoreline AECs. Other hazard areas include the 100 year flood zone and the finger canals located at the northern end of the Town opposite Dolphin Pier.

Ocean Erodible AECs

These are areas where a substantial possibility of excessive erosion and significant shoreline fluctuation exists. The ocean erodible AEC is based on a setback from the first line of stable natural vegetation plus an additional area where erosion can be expected from storm surges and wave action.

When the case study in Before the Storm was developed, the State rule was to multiply the annual erosion rate factor by 30 to determine the boundary of the ocean erodible AEC. This rule has now been modified to use 60 rather than 30 as the multiplier. The practical effects of this change in Topsail Beach was to increase the ocean erodible AEC from 195 feet to 255 feet for 1.8 miles on the northern most sector of the Town and from 215 feet to 275 feet along the remaining 3 miles of ocean frontage.

Inlet Hazard AECs

An inlet hazard area is a natural hazard area that is especially vulnerable to erosion, flooding and other adverse effects of sand, wind, and water because of its proximity to dynamic ocean inlets. New Topsail Inlet on the southern end of the Town is currently migrating to the southwest adding land to Topsail Beach. However, this inlet hazard area, which consists of all the land south of Trout Avenue is still considered to be very unstable.

Estuarine Shoreline AECs

Estuarine shorelines are defined as non-ocean shorelines which are especially vulnerable to erosion, flooding or other adverse effects of wind and water and are intimately connected to the estuary. In Topsail Beach, the estuarine shoreline encompasses the area landward from Banks Channel for a distance of 75 feet from the mean high water level for

about 4.8 miles.

Figure 1 dipicts the Topsail Beach ocean erodible, inlet hazard and estuarine shoreline AECs. Development is not prohibited in any of these AECs. However, it must conform with use and construction standards delineated in the State Guidelines for Areas of Environmental Concern.

Flood Hazard AECs

The flood hazard AEC corresponds to the National Flood Insurance Program V-zones, which refer to flood prone areas that are also susceptible to high velocity wave surges. New data indicates that the size of the 'V' zones in Topsail Beach was significantly overestimated in Before the Storm.

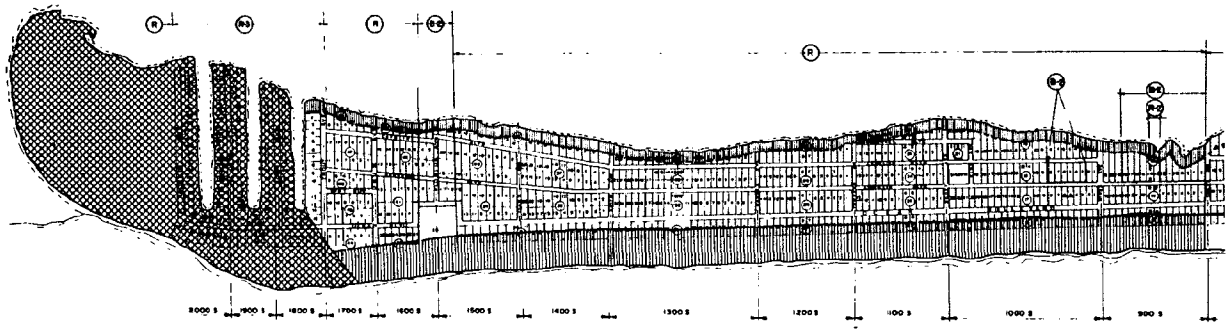
Topsail Beach was converted to the Regular Phase of the National Flood Insurance Program (NFIP) in 1977 with the issuance of Flood Insurance Rate Maps (FIRMS). In the fall of 1983, new detailed Flood Insurance Studies for the town were released by FEMA. A comparison of the 1977 and 1983 maps reveals considerable changes to the designation of flood hazard areas. The "V" zones, or areas subject to high velocity water from wave momentum during the 100-year flood, cover considerably less land on the new maps.

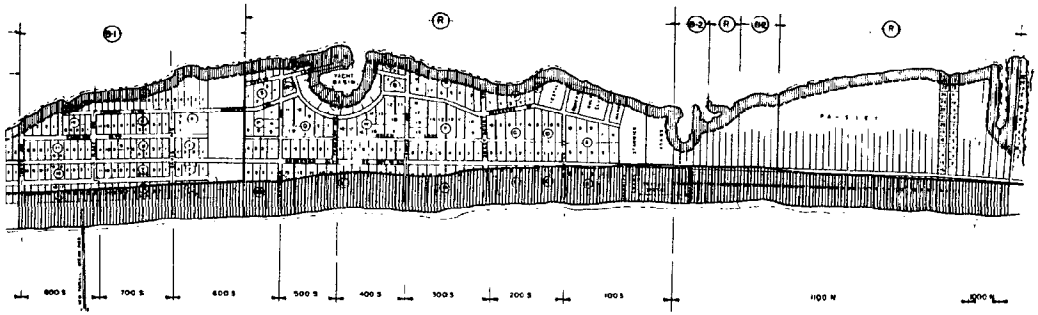
The original FIRM designated 95% of Topsail Beach as being in "V" zones. The remaining 5% were designated as "A" zones, or areas subject to little or no wave action but within the 100-year flood area. The revised maps designate the beachfront area on the oceanside of Ocean Boulevard and Anderson Boulevard and the area southwest of Godwin Street (the inlet hazard area) as "V" zones with base flood elevations of from 13-17 feet. The new maps designate about 25% of the town as being in "V" zones. Marsh and waterways behind Topsail Island were originally designated as "V" zones but are no longer so designated.

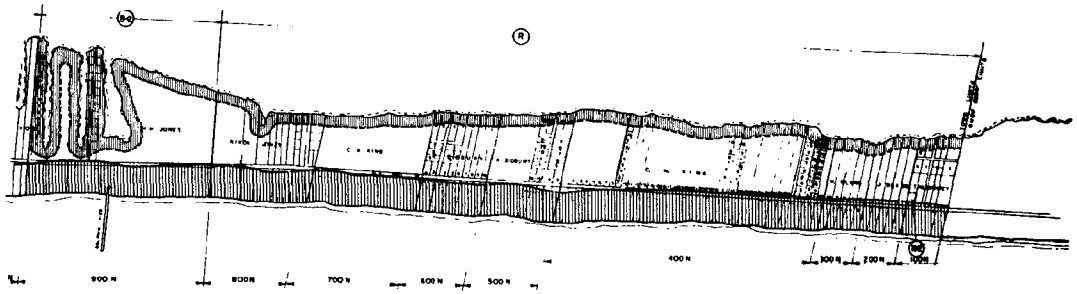
Other Flood Prone Areas

When Before the Storm was prepared, the entire Town of Topsail Beach was estimated to be in the "A" zone below the 100 year flood elevations, with 95% of this area also being in the "V"-zone. The new FEMA flood insurance rate maps indicate that most of the Town remains below the 100 year flood elevations.

The new study indicates that 100-year flood elevations on the landward side of the Island will vay from 9 to 11 feet. A narrow strip of land about 50' to 150' in width between the beach and Ocean Boulevard is designated as being in Zone "B". An area between Fields and Humphrey is also in a "B" zone. "B" zones are areas lying between the 100-year and 500-year flood. The remainder of the town, basically everything







Legend

- Ocean Erodible A.E.C.
- Estuarine Shoreline A.E.C.
- Inlet Hazard A.E.C.

Environmental Hazard

TOWN OF TOPSAIL BEACH

Scale: 0 400 800 1200 FEET

COASTAL STORM HAZARD PLANNING

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landward of the "B" zone and northeast of Godwin, lies in "A" zones with base flood elevations of from 10-13 feet. The 1983 study estimates that beachfront erosion resulting from a 100-year storm surge will range from 154 feet at the northeastern City limits to 215 feet between Crocker and Darden.

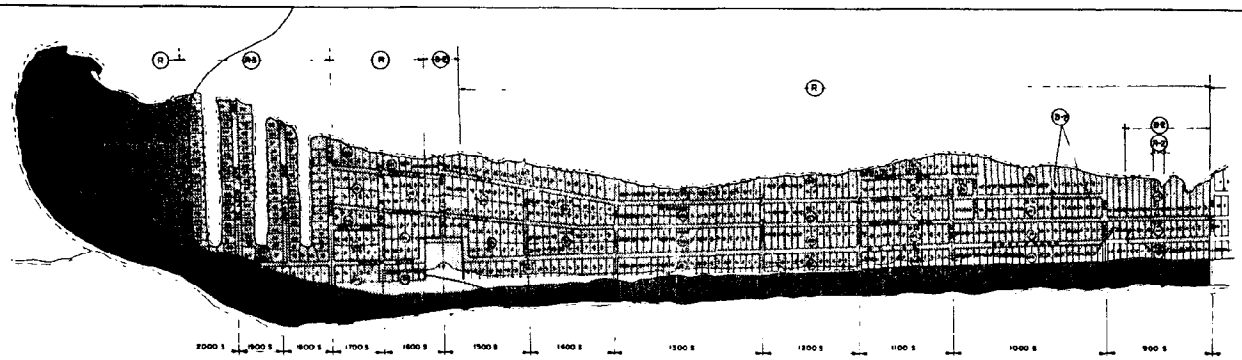
Finger Canal Areas

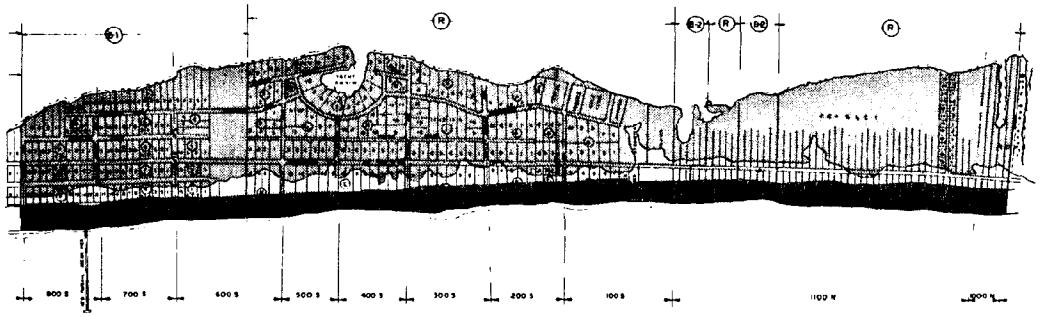
There are two areas in Topsail Beach where finger canals have been cut from the Banks Channel toward the ocean. A major storm could breach the beach at these locations, cutting off all southward areas from the remainder of the Island and from the mainland.

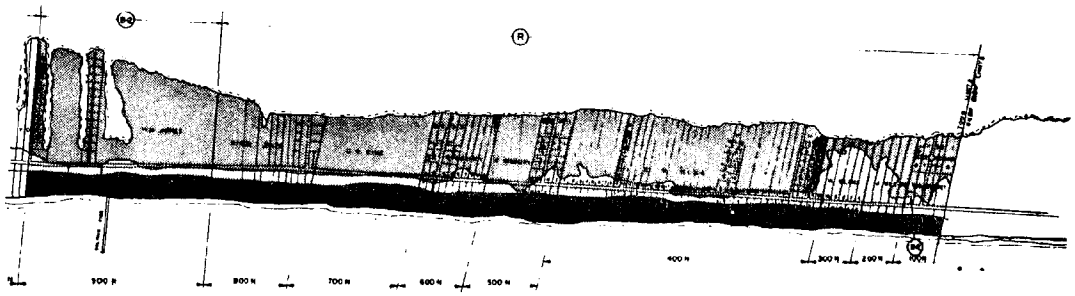
The first series of 3 finger canals is located at the southern end of the Town south of Trout Avenue. The canals are only 300 feet from the ocean, with only a road and a narrow beach with low dunes in between.

The second series of finger canals is located 400 feet from the ocean on the northern end of the Town just south of the Dolphin Pier. The dunes in this area are higher than at the southern end of the Island and offer better protection. However, there is still a possibility that a very major storm could broach the beach at this point.

Figure 2 depicts the areas within the Town of Topsail Beach that are susceptible to flooding of varying severity. The two finger canal areas are also highlighted.







Legend

'B' ZONE: Areas Between 100 & 500 Year Floods

'V' ZONE: Areas Of 100 Year Flood With High Velocity Wave Action

'A' ZONE: Areas Subject To 100 Year Flood

Flood Hazard

TOWN OF TOPSAIL BEACH

Scale: 0 400 800 1200 FEET

COASTAL STORM HAZARD PLANNING

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C. EXISTING DEVELOPMENT LOCATED IN HAZARD AREAS

In Before the Storm, the following system, shown in Table 1, for classifying hazard areas was presented.

TABLE 1

DEFINITION OF HAZARD AREAS

	Forces Present/Expected				
Area	Erosion	Wave Action	Flooding	High Winds	Boundaries
1	x	x	x	x	Ocean erodible AECs, inlet hazard AECs, estuarine shoreline AECs
2		x	x	x	Flood insurance V-zones
3			x	x	Flood insurance A-zones
4				x	Rest of community

The number of structures within each hazard area based on the above classifications was then determined as follows.

TABLE 2

STRUCTURES BY HAZARD AREA FROM BEFORE THE STORM

Area	Residential Units	Commercial Units
1	298	11
2	312	26
3	1	0
4	0	0
Total	611	37

The above analysis tends to be somewhat misleading in that all the AECs included in Area 1 were also in the Flood Insurance V zone (Area 2). Therefore, the 312 residential units

were not the total number of units in the V zone, but instead refers to only those units located in the V zone that were not also included in one of the other AEC areas. In actuality, 610 residential units were located in the V zone.

Based on this earlier data, only one structure in the entire Town was located in an area that was not susceptible to erosion and wave action and that structure was susceptible to flooding and high winds as are all other structures in the Town.

The AEC boundaries have been revised significantly since the hazard maps used in Before the Storm were prepared in order to reflect:

- Significant enlargement of the ocean erodible AEC area in accordance with new Coastal Resource Commission rules.
- Significant reduction of the V zone to reflect new FEMA flood insurance rate maps.
- Significant enlargement of the flood insurance A zone to reflect the reduction of the V zone.
- Existence of the narrow strip running approximately 85 percent of the length of the Town that is located outside of the primary hazard areas. The land in this strip appears to be susceptible only to damage resulting from high winds.

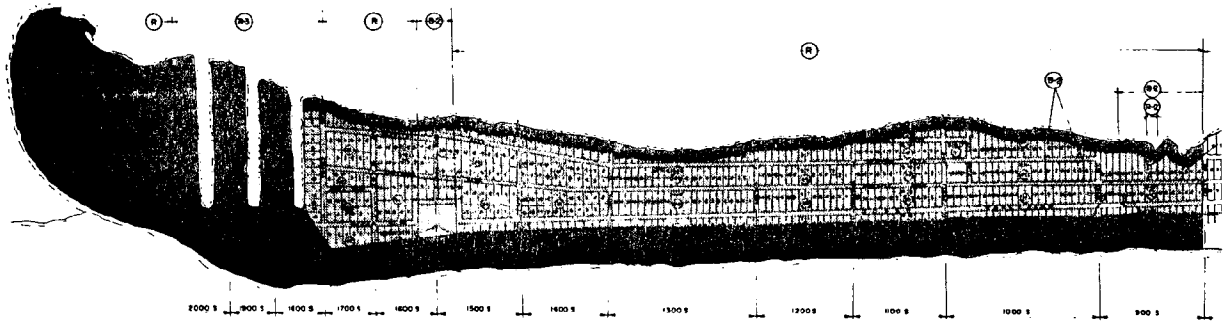
Figure 3 is a composite hazard area map based on this new data. The number of structures within each hazard area category are presented in Table 3 below.

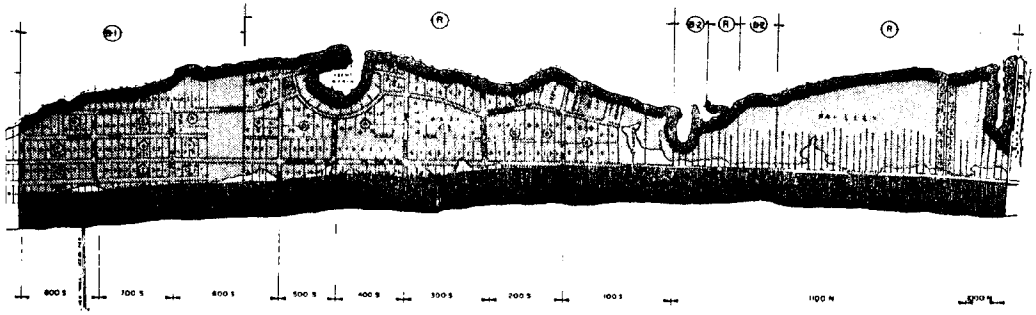
TABLE 3

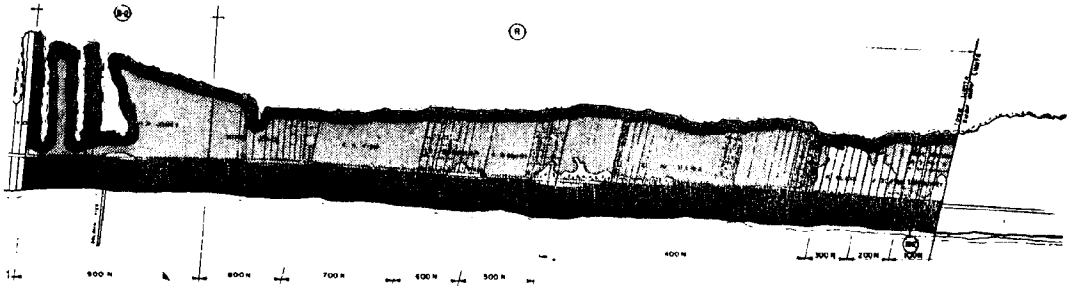
STRUCTURES BY HAZARD AREA

Hazard Area Category	Residential Units	Commercial Units
1	288	14
2	0*	0*
3	359	27
4	6**	--
Total	653	41

* There are actually 4 commercial stuctures and 113 residential units located in the V zone that are already included in AECs included in Hazard Area Category 1.







Legend

- High Hazard Area
- Flood Prone Area
- Susceptible Primarily To Wind Damage

Hazard Area Categories

TOWN OF TOPSAIL BEACH

Scale: 0 400 800 1200 FEET

COASTAL STORM HAZARD PLANNING

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** It is estimated that 60 other residential structures are located above the 100 year flood elevation. However, these structures are within the ocean erodible area and are therefore included in Hazard Area Category 1.

Topsail Beach does not have a central sewer system. Individual septic systems and the Town's wells are all located within the 100 year flood plain.

There are no potentially hazardous material storage or disposal sites at Topsail Beach.

D. ESTIMATED SEVERITY OF POSSIBLE HAZARD AREA DAMAGES

In 1982, the U.S. Army Corps of Engineers surveyed existing structures at Topsail Beach in order to estimate the monetary damages to each structure which could result from flooding associated with different storm events. The damages associated with the 500 year storm were estimated to be $18 million for residential structures and $4 million for commercial structures. The average damage to a residential structure would have been about $30,000 and the average damage to a commercial structure was estimated at $110,000. Based on these estimates and pervailing 1982 market values, it has been estimated that the average structure would incur 50% damage from storm of this magnitude. Using these same assumptions, the 500 year storm occurring in 1984 would result in an estimated $28 million in damages.

The Corps study estimated that $10.1 million in residential damages and $2.6 million in commercial damages would result from the 100 year storm. The estimated $2.6 million in commercial property damages would not change because all of these structues remain within the 100 year floodplain. However, there are now 647 residential structures (versus the 610 in 1982) located within the 100 year flood plain and/or in other AEC areas that are susceptible to hurricane damage. If each of these structures receives the same average amount of damages as was estimated in the Corps study, the resulting damages from the 100 year storm would be about $13.3 million.

According to the Town's Land Use Plan, about $13 million (or 38%) of the Town's tax base was accounted for by oceanfront properties. It is expected that this percentage has increased and will continue to increase because most new development is occurring on the oceanside of Anderson Boulevard. Additionally, it was estimated that property in the inlet hazard area was worth over $7 million (about 20% of the Town's tax base). This data provides another indication of the magnitude of property damage that could result from a major storm.

E. ANTICIPATED DEVELOPMENT IN HAZARD AREAS

About 160 acres of developable land remains vacant in Topsail Beach. It was previously estimated that between 500 and 600 new housing units will have to be consturcted in the Town if the peak seasonal population actually increases by 90 percent between 1980 and 2000 as is projected in the Topsail Beach Land Use Plan. If developed at historical densities, these new units would utilize all the developable land still available within the Town. However, a trend toward higher density development is already apparent.

The only area in Town located outside the V and A zone flood hazard areas is the narrow strip on the ocean side of Anderson Boulevard. However, most of this area is located in the ocean erodible area AEC. Consequently, it can be anticipated that almost all future development within the Town will be located in hazard areas. The primary issue is to insure that this development is constructed in a manner that minimizes damages when an inevitable major storm occurs.

F. EXISTING TOPSAIL BEACH HAZARD MITIGATION POLICIES AND REGULATIONS

The growth policy of Topsail Beach as stated in the Town's Land Use Plan is for gradual and controlled increases in single family residential development at existing growth rates, with only limited growth in supporting retail services and other uses encouraged.

Topsail Beach has adopted a full range of policies and regulation to 1) support its growth policy, and 2) control development in hazard areas. Two primary ordinances, the zoning ordinance and the flooplain management regulation, are used to control development in hazard areas. The primary provisons of each of these ordinances related to hazard area development are summarized below.

Topsail Beach Zoning Ordinance

1. The flood insurance rate map is considered an overlay to all existing zoning districts. Uses within the underlying districts are permitted only if they meet the requirements of the Town's Floodplain Management regulations. Special use permits are required for any use in the flood hazard overlay area.

2. Only single family residences and duplexes are permitted in ocean erodible areas. Multi-family uses are permitted with a special use permit. The special use permit requires that dune protection measures be implemented in order to receive the permit.

3. Only single family residences and duplexes are permitted in inlet hazard areas. Multi-family uses are permitted only with a special use permit.

4. Multi-family structures are a permitted use only in the business district. The Town has also lowered the permitted multi-family density.

5. The maximum height in any district is limited to 36 feet.

6. Non-conforming uses may not be rebuilt in a residential zoning district if reconstruction costs exceed 50 percent of replacement cost.

7. Non-conforming uses may not be rebuilt in a non-residential zoning district if reconstruction costs exceed 70 percent of replacement cost.

8. Non-conforming structures (i.e. those not meeting setbacks and other requirements) may not be rebuilt in any district if reconstruction costs exceed 75 percent of replacement cost.

9. The establishment of a mobile home park is not a permitted use in any of the Town's zoning districts.

Topsail Beach Floodplain Management Regulations

The Town's floodplain management regulations meet all requirements for participation in the Regular Phase of the federal flood insurance program. Specific ordinace requirements include:

1. Non-residential structures must be elevated to 13 feet above MSL or floodproofed.

2. Structures in the V-zone must have open space or breakaway walls below base flood elevations.

3. Pilings, anchorages, and breakaway walls must be approved by the building inspector.

4. No dunes may be altered.

5. No use of fill for structural support shall occur in the V-zone

6. No mobile homes may locate in the V-zone.

G. RECOMMENDED HAZARD MITIGATION POLICIES

Almost the entire Town of Topsail Beach is located in areas susceptible to storm damage. Recognizing this, the Town has already taken strong steps to insure that future development occurs in a manner that minimizes hazard damages. Specifically,

1. The Town's growth policy encourages low density residential development and avoids the higher density, high rise developments found in other coastal communities.

2. The Town's policies support and comply with State policies and regulations for development in Areas of Environmental Concern.

3. The Town's floodplain development policies conform with all Federal and State requirements.

The basic conclusion is that Topsail Beach is already doing a good job to mitigate future storm damages and that the Town's policies meet both the requirements and philosophical objectives delineated in Before the Storm.

The modification of only one Town policy is recommended. The non-conforming structure provision of the zoning ordinance currently permits the rebuilding of a non-conforming structure even it it sustains up to 75% of the value of the structure. This should be modified so that if a structure sustains damages of up to 50% of the value of the structure it will not be rebuilt. The justification for this modification is that if a structure sustains 75% damage, it is for all practical purposes destroyed. There is no reason to allow the same situation to be repeated by permitting such a structure to be rebuilt at the same location.

III. TOPSAIL BEACH POST-DISASTER RECONSTRUCTION PLAN

A. INTRODUCTION

A post-disaster reconstruction plan provides a program that will permit a local government to deal with the aftermaths of a storm in an organized and efficient manner. The Plan provides the mechanisms, procedures, and policies that will enable a local community to learn from its storm experiences and to rebuild the community in a wise and practical manner.

A post-disaster reconstruction plan encompasses three distinct reconstruction periods:

- The emergency period encompasses the period immediately after a storm. The emphasis is on restoring public health and safety, assessing the nature and extent of storm damage, and qualifying for and obtaining whatever federal and state assistance might be available.

- The restoration period covers the weeks and months following a storm disaster. The emphasis during this period is on restoring community facilities, utilities, essential businesses, etc. so that the community can once again function in a normal manner.

- The replacement reconstruction period is the period during which the community is rebuilt. The period could last from months to years depending on the nature and extent of the damages incurred.

It is important that local officials clearly understand the joint federal-state-local procedures for providing assistance to rebuild after a storm so that local damage assessment and reconstruction efforts are carried out in an efficient manner that qualifies the community for the different types of assistance that are available. The requirements are generally delineated in the Disaster Relief Act of 1974 (P.L. 93-288) which authorizes a wide range of financial and direct assistance to both local communities and individuals. The sequence of procedures to be followed after a major storm is as follows.

1. Local damage assessment teams survey storm damage within the community and report this damage to the County Emergency Services Coordinator.

2. Damage information is compiled and summarized by the County, and the nature and extent of damage is reported to the North Carolina Division of Emergency Management (DEM).

3. DEM compiles local data and makes recommendations to the Govenor concerning state actions.

4. The Govenor may request a Presidential declaration of "emergency" or "major disaster". A Presidential declaration makes a variety of federal resources available to local communities and individuals.

5. Federal relief assistance provided a community when an "emergency" has been declared typically ends one month after the initial Presidential declaration. Where a "major disaster" has been declared, federal assistance for "emergency" work typically ends six months after the declaration and federal assistance for "permanent" work ends after 18 months.

Federal disaster assistance programs previously provided aid for communities to rebuild in the same way as existed before the disaster occurred. This policy tended to foster reoccurring mistakes. However, recent federal policy has started to change the emphasis of disaster assistance programs. Specifically,

- Executive Order 1198 (Floodplain Management) directs all federal agencies to avoid either directly or indirectly supporting future unwise development in floodplains (e.g. through sewer grants in locations that foster floodplain development).

- Section 406 of the Disaster Relief Act can require communities, as a prerequisite for federal disaster assistance, to take specific actions to mitigate future flood losses.

The remainder of this chapter concerns recommendations regarding 1) procedures that Topsail Beach should follow in carrying out its damage assessment program so as to meet all federal and state reuirements, and 2) reconstruction policies that the Town should adopt to insure that future development that does occur in local hazard areas is constructed in a manner consistent with sound land use planning, public safety considerations, and existing and evolving federal and state policy.

B. ORGANIZATION OF LOCAL DAMAGE ASSESSMENT TEAM

A local damage assessment team should include individuals who are qualified to give reliable estimates of the original value of structures, an estimated value of sustained damages and a description of the repairs (and costs) that will be needed to rebuild each structure. Following is a listing of Topsail Beach town personnel available to assume these responsibilities:

Administrative
1 Town Clerk
2 Office Personnel

Police
1 Police Chief
3 Officers

Public Works
1 Supervisor
1 Worker

Fire Department
1 Chief
26 Volunteer Firemen

Rescue Squad
1 Chief
15 Members

Inspection Department
1 Building Inspector

Town Officials
1 Mayor
5 Commissioners

The Building Inspector should head the Damage Assessment Team. The Public Works Supervisor should also be a member of the Team. Other members of the team should consist of volunteers recruited from the community. Such volunteers must be recruited, organized and trained prior to a storm occurrence.

The suggested make-up of the Topsail Beach Damage Assessment Team is as follows:

- Building Inspector (Team Chief)
- Public Works Supervisor
- Local Property Appraiser (MAI) *
- Building Contractor * or Residential Realtor *
- Architect *

* Community Volunteer

The Mayor should immediately undertake a recruitment effort to secure the necessary volunteers and to establish a training program to familiarize the members of the team with required damage classification procedures and reporting requirements. In doing so, it must be recognized that it might be very difficult to fill certain positions, such as the building contractor position, because the services of individuals with such skills will likely be in great demand after a storm disaster.

C. DAMAGE ASSESSMENT PROCEDURES AND REQUIREMENTS

Damage assessment is defined as a rapid means of determining a realistic estimate of the amount of damage caused by a natural or man-made disaster. For a storm disaster, it is expressed in terms of 1) number of structures damaged, 2) magnitude of damage by structure type, 3) estimated total dollar loss, and 4) estimated total dollar loss covered by insurance.

After a major storm event, members of the Damage Assessment Team should report to the Emergency Operations Center prior to deployment. There are over 650 structures in the Town. The extent of damage will depend on the magnitude of the storm and where landfall occurs on the North Carolina coast. Because of the potentially large job at hand, the limited personnel resources available to conduct the assessments, and the limited time within which the initial assessment must be made, the first phase of the assessment should consist of only an external visual survey of damaged structures. A more detailed second phase assessment can be made after the initial damage reports are filed.

The inital damage assessment should make an estimate of the extent of damage incurred by each structure and identify the cause (wind, flooding, wave action, combination, etc) of the damage to each structure.

Damaged structures should be classified in accordance with the suggestd State guidelines as follows:

- Destroyed (repairs would cost more than 80 percent of value).
- Major (repairs would cost more than 30 percent of the value).
- Minor (repairs would cost less than 30 percent of the value, but the structure is currently uninhabtable).
- Habitable (some minor damage, with repairs less than 15 percent of the value).

It will be necessary to thoroughly document each assessment. In many cases, mail boxes and other information typically used to identify specific structures will not be found. Consequently, the Damage Assessment Team must be provided with tax maps, other maps and photographic equipment in order to record and document its field observations. Enough information to complete the Damage Assessment Worksheet must be obtained on each damaged structure. (Samples of damage assessment worksheets are contained in the Appendix of this report. The emphasis should be placed on completing the worksheets and on providing documentation on the tax maps.

To expidite the more detailed follow-up assessment, the Town could consider using the Town of Long Beach's method of coding" structures as to damage. Each category of damage is given a color code. During initial damage assessment, the appropriate color would be sprayed or painted on a corner of the structure. The second phase of the damage assessment operation will be to estimate the value of the damages sustained. This operation should be carried out in the Emergency Operations Center under the direction of the Mayor and the supervision of the Town Clerk. The two other Town Hall office personnel should be assigned to assist the Town Clerk in carrying out this responsibility.

In order to estimate total damage values it will be necessary to have the following information available for use at the Emergency Operations Center:

- o A set of property tax maps identical to those utilized by the damage assessment field team.

- o Copies of all Town property tax records. This information should indicate the estimated value of all commercial and residential structures within the Town. Because time will be of the essence, it is recommended that the Town immediately commence a project to list the property values of all existing structures on the appropriate lots on the set of property tax maps that will be kept at the Emergency Operations Center. While somewhat tedious job, the fact that there are less than 700 structures in the Town makes this task manageable. The information should prove invaluable if a storm disaster does occur. This set of tax maps should be updated annually prior to the hurricane season.

Additionally, the Town should make a request to Pender County for the County to undertake a telephone survey of Pender County lending institutions to determine the average value of flood insurance coverage that is carried by Pender County participants in the program. This information should be kept available in the Emergency Operations Center for estimating the value of sustained damages covered by hazard insurance.

In order to produce the damage value information required, the following methodology is recommended:

1. The number of businesses, and residential structures that have been damaged within the town should be summarized by damage classification category.

2. The value of each damaged structure should be obtained from the marked set of town tax maps and multiplied by the following percentages for the appropriate damage classification categories.

- o Destroyed - 100%
- o Major Damage - 50%
- o Minor Damage (uninhabitable) - 25%
- o Habitable - 10%

3. The total value of damages for the Town should then be summarized and reported as required to the County Emergency Operations Center.

4. The estimated value loss covered by hazard insurance should then be determined by 1) estimating full coverage for all damaged structures for situations where the average value of such coverage exceeds the amount of damage to the structure, and 2) multiplying the number of structures where damage exceeds the average value of insurance coverage by the average value of such coverage.

The Damage Assessment Plan is intended to be the mechanism for estimating overall property damage in the event of a civil disaster. The procedure recommended above represents an approach for making a relatively quick, realistic "order of magnitude" damage estimate after a disaster.

D. ORGANIZATION OF RECOVERY OPERATIONS

Damage assessment operations are oriented to take place during the emergency period. After the emergency operations to restore public health and safety and the initial damage assessments are completed, the State guidelines suggest that a Recovery Task Force to guide restoration and reconstruction activities be created. In Topsail Beach, the Mayor and Council should assume the responsibilities of such a Task Force in carrying out the following:

1. Establishing reentry procedures.

2. Establishing an overall restoration schedule.

3. Setting restoration priorities.

4. Determining requirements for outside assistance and requesting such assistance when beyond local capabilities.

5. Keeping the appropriate County and State officials informed using Situation and Damage Reports.

6. Keeping the public informed.

7. Assembling and maintaining records of actions taken and expenditures and obligations incurred.

8. Proclaiming a local "state of emergency" if warranted.

9. Commencing cleanup, debris removal and utility restoration which would include coordination of restoration activities undertaken by private utility companies.

10. Undertaking repair and restoration of essential public facilities and services in accordance with priorities developed through the situation evaluations.

11. Assisting private businesses and individual property owners in obtaining information on the various types of assistance that might be available to them from federal and state agencies.

In Before the Storm, a sequence and schedule for undertaking local reconstruction and restoration activities is presented. The schedule was left deliberately vague because specific reconstruction needs will not be known until after a storm occurs and the magnitude of the damage can be assessed. Table 4 contains a sequence of activities and schedule to guide reconstruction activities. The schedule should be reconsidered by the Mayor and Council and revised as necessary and appropriate after the damage assessment activities are completed.

TABLE 4

SEQUENCE OF ACTIVITIES FOR ASSESSING DAMAGES

AND PERMITTING RECONSTRUCTION

	ACTIVITY	TIME FRAME
1.	Complete Initial Damage Assessment	Immediately after storm occurrence.
2.	Complete Second Phase Damage Assessment	Completed by second week after the storm.
3.	Prepare Summary of Reconstruction Needs.	Completed one week after damage assessment is completed.
4.	Decision with Regard to Imposition of Temporary Development Moratorium	One week after damage assessment is completed.
5.	Set Reconstruction Priorities and Prepare Master Reconstruction Schedule.	Completed one week after summary of reconstruction needs is completed.
6.	Begin Repairs to Critical Utilities and Facilities.	As soon as possible after disaster.
7.	Permitting of Reconstruction Activities for all Damaged Structures receiving minor damage that are not included in Development Moratorium Areas	One week after damage assessment is completed.
8.	Permitting of Reconstruction Activities for all Damaged Structures receiving major damage that are not included in Development Moratorium Areas	Two weeks after damage assessment is completed.
9.	Initiate assessment of existing mitigation policies	Two weeks after damage assessment is completed.

10.	Complete Re-evaluation of Hazard Areas and Mitigation Policies in Areas Subject to Development moratorium.	Length of period for conducting re-evaluations and receiving input from State should not exceed two months.
11.	Revise Mitigation Policies and Development Standards for Areas Subjected to Development Moratorium and Lift Development Moratorium.	Two months after Temporary Development Moratorium is imposed.
12.	Permit New Development	Upon suspension of any temporary development moratorium.

E. RECOMMENDED RECONSTRUCTION POLICIES

The following policies have been designed to be 1) considered and adopted by the Topsail Beach Town Council prior to a storm, or 2) implemented, as appropriate, after a storm occurs.

REENTRY

1. Reentry of Topsail Beach town residents to Topsail Island shall not be permitted until 1) the damage assessments have been completed, and 2) the Mayor proclaims the Town safe to re-enter.

2. A list of Topsail Beach (and Surf City and West Onslow Beach) property owners shall be maintained at the N.C. 210 and N.C. 50-210 bridge entrances to Topsail Island. Valid identification must be shown in order to proceed onto the Island. Passes shall be issued and displayed at all times until the State of Emergency is offically lifted (this policy needs to be coordinated with the Town of Surf City and with Onslow County).

PERMITTING

1. Building permits to restore structures located outside of designated AEC areas that were previously built in conformance with local codes, standards and the provisions of the North Carolina Building Code shall be issued automatically.

2. All structures suffering major damages as defined in the Town's Damage Assessment Plan shall be repaired or rebuilt to conform with the provisions of the North Carolina Building Code, the Topsail Beach Zoning Ordinance and the Topsail Beach Floodplain Management Regulations.

3. All structures suffering minor damage as defined in the Topsail Beach Damage Assessment Plan shall be permitted to be rebuilt to their original before the storm condition.

4. For all structures in designated AECs, a determination shall be made for each AEC as to whether the provisions of the N.C. Building Code, the State Regulations for Areas of Environmental Concern and the Topsail Beach Floodplain Management Regulations appeared adequate in minimizing storm damages. For AECs where the construction and use requirements appear adequate, permits shall be issued in accordance with permitting policies 1, 2 and 3. For AECs where the construction and use requirements do not appear to have been adequate in mitigating damages, a Temporary Development Moratorium for all structures located within that specific AEC shall be im-

posed and a request should be made to the North Carolina Offic of Coastal Management to assist the Town re-evaluating the requirements.

5. Permits shall not be issued in areas subject to a Temporary Development Moratorium until such a moratorium is lifted by the Topsail Beach Town Council.

UTILITY AND FACILITY RECONSTRUCTION

1. All damaged water system components shall be repaired so as to be elevated above the 100 year floodplain or shall be floodproofed, with the methods employed and the construction being certified by a registered professional engineer.

2. Overhead power lines and utility poles along Anderson Boulevard present the greatest obstacle to the safe evacuation of Topsail Beach in the event of a major storm disaster. The narrowness of the Islands prevents these poles and lines from being relocated away from the roadway. Additionall, relocating these lines underground would be very costly at this time. However, if major damage occurs as a result of a storm, the cost effectiveness would improve and public safety considerations might override economic considerations. Topsail Beach should now request that Jones Onslow initiate an assessment of the feasibility of relocating overhead power lines underground if substantial damage to the existing system is sustained during a major storm.

TEMPORARY DEVELOPMENT MORATORIUMS

Under certain circumstances, interim development moratoriums can be used in order to give a local government time to assess damages, to make sound decisions and to learn from its storm experiences. Such a moratorium must be temporary and it must be reasonably related to the public health, safety and welfare.
There is no doubt that Topsail Beach will suffer heavy and serious damages should a major storm have its landfall in the vicinity of Topsail Island. Consequently, the Town should be prepared to issue Temporary Development Moratoriums as appropriate.

It is not possible to determine prior to a storm whether a timporary development moratorium will be needed. Such a measure should only be used if damage in a particular area is very serious and if redevelopment of the area in the same manner as previously existed would submit the residents of the area to similar public health and safety problems. In Topsail Beach, such a situaion is most likely to occur in one or more of the AECs.

The Topsail Beach policy regaring the proclamation of temporary development moratoriums shall be to:

1. To determine for each AEC whether the provisions of N.C. Building Code, the State Guidelines for Areas of Environmental Concern and the Topsail Beach Floodplain Management Regulations appeared adequate in minimizing storm damages. For AECs where the construction and use requirements do not appear adequate, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.

2. After imposing a Temporary Development Moratorium for an AEC, the Town of Topsail Beach shall request that the Coastal Resources Commission conduct a special analysis for the Town and all other communities similarly situated in order to determine how local regulations for those hazard areas which are based on State and or Federal guidelines or requirements should be imposed or modified. A response within a reasonable time period (e.g. two months) as determined through negotiations should be requested.

3. The Temporary Building Moratorium shall be lifted after local ordinances and regulations have been revised after receiving recommendations from the State or at the discretion of the Mayor and Council if a response is not made within a reasonable period of time. In the latter case, reconstruction shall be permitted in accordinance with existing regulations and requirements.

WIND DAMAGE

It is assumed that many structures constructed to conform with the provisions of the North Carolina Building Code will not be able to withstand the accompanying winds if a major hurricane hits the North Carolina coast. It is stated in Before the Storm that "the State Building Code, as it now stands, falls short in adequately protecting buildings from the damaging forces of hurricanes and other coastal storms. The Building Code Council, in seeking to maintain uniformity of regulation across the state, has been resistant in the past to allowing more stringent local standards. Another problem small coastal communities are likely to face is a lack of fiscal and staff resources to sponsor the engineering and architectural studies that the Building Code Council requires to justify any local variations to the code."

While Topsail Beach has no technical studies to indicate that the provisions of the Code are inadequate as they effect the Town, the Town should have some flexibility in imposing

stricter standards it if desires. This is a problem that the Coastal Resources Commission must face it it expects local communities to take the iniative in developing effective storm mitigation programs. The Town policy should be to request the Coastal Resources Commission to carefully assess this problem which is common to all coastal communities.

IV. TOPSAIL ISLAND HURRICANE EVACUATION PLAN

Topsail Beach, Surf City, Pender County and Onslow County must coordinate Topsail Island evacuation operations in the event of major storm. Each of these local governments has developed its own evacuation plan. In this report, the primary concern is the evacuation of the southern end of the Island which includes the Towns of Surf City and Topsail Beach.

The Town of Topsail Beach has developed and adopted a Hurricane Emergency Plan and the Town of Surf City has developed and adopted a Hurricane Evacuation Plan. These plans have been thoroughly assessed. Both plans are very comprehensive and provide an excellent framework for each Town to use in conducting its evacuation operations. Following is a brief outline of the major provisions of each plan regarding evacuation operations.

A. TOPSAIL BEACH EVACUATION PLAN.

The Topsail Beach hurricane evacuation procedures are very thorough. The plan presents a program for carrying out evacuation operations as part of a five phase effort: Condition 3 - Hurricane Watch (approximately 48 hours to forecasted land fall); Condition 2 - Hurricane Warning (approximately 24 hours to forecasted landfall); Condition 1 - Evacuation Phase (12 hours or less to expected landfall); Condition 0 - Landfall Imminent; and Reentry. The plan describes how specific preparatory, shutdown, warning and evacuation operations will be conducted by Town personnel during each phase of the evacuation process.

At the southern end of the Town there are three north-south routes - Carolina Boulevard, Anderson Boulevard (N.C. Highway 50), and Ocean Boulevard. The number of north-south routes is reduced to two north of Hines Street and to only one (Anderson Boulevard) from Bridges Street to Surf City. Consequently, the successful evacuation of Topsail Beach is dependent upon keeping Anderson Boulevard clear and open until all evacuation operations are complete. In Before the Storm the entire length of Anderson Boulevard was shown as being within the 100 year flood plain. However, the most recent FEMA flood insurance rate maps indicate that portions of the roadway are above the 100 year flood elevation. Regardless, Anderson Boulevard remains subject to flooding that could isolate Topsail Beach from the mainland. Additionally, the roadway is lined on both sides by utility poles and electric overhead lines. The toppling of even one of these poles could block the only evacuation route available to town residents.

Therefore, the prime concern with the Topsail Beach Hurricane Emergency Plan is that if localized flooding or heavy winds occur prior to the setting of Condition 1, the only evacuation route from the Town could be impassable before evacuation operations are completed or before they even commence. Because of the potential difficulties in keeping this 4.5 mile length of roadway open for evacuation operations, it is recommended that a two-phase evacuation order be included in the Town's Hurricane Emergency Plan.

A Phase 1 Evacuation Alert would be issued concurrently with the issuance of the hurricane warning and the setting of Condition 2 (24 hours prior to projected landfall). The Topsail Beach Chief of Police should request that the Pender County Emergency Services Coordinator open the designated shelter at the Topsail High School at this time and Town residents and visitors should be urged to evacuate at this time. A Phase 2 Evacuation Order (mandatory evacuation with door to door warnings provided by the Topsail Beach Police and Fire Departments) would be issued as Condition 1 is set, as is currently provided for in the Town's Plan.

B. SURF CITY EVACUATION PLAN

The Surf City hurricane evacuation procedures are very thorough. The Town's Evacuation Plan also includes a five phase evacuation process: Condition 3 - Hurricane Watch; Condition 2 - Hurricane Warning; Condition 1 - Evacuation; Condition 0 - Landfall; and Condition 5 - Reentry. The Plan is organized according to department responsibilites. Specific responsibilities for each evacuation phase are listed for the Rescue Squad, the Fire Department, the Police Department, the Public Works Department, and other Town Officials.

Shore Drive (N.C. Highway 50) is the only north-south evacuation route available from the Surf City/Topsail Beach city limits northward to the intersection of Shore Drive and Topsail Drive. Fortunately, Shore Drive is elevated above the 100 year flood elevation over this entire 2.3 mile stretch.

Both Topsail Drive and Shore Drive are available as evacuation routes from their intersection northward to Roland Avenue. Both routes are below the 100 year flood elevation over this stretch. North of Roland Avenue, Topsail Drive, Shore Drive and New River Drive are available for use as evacuation routes. According to the latest FEMA flood insurance rate maps, both New River Drive and Topsail Drive are located below the 100 year floodplain elevation.

Because there is only one evacuation route available for use of Town residents south of the intersection of Shore Drive and Topsail Drive, it is recommended that residents south of this area be evacuated prior to the setting of Condition 1. While the high dunes along this stretch of roadway should protect the roadway from flooding, the concern is that high winds could result in damage that blocks this single evacuation route.

C. TRAFFIC ASSESSMENT OF MAJOR EVACUATION ROUTES.

As discussedd in the previous section, there is a single primary road (N.C. Highway 50/N.C. Highway 210), which runs the entire length of Topsail Island. It is the only through route on the southern/western end of the Island. Other north-south routes are located in the middle section of the Island. N.C. 50/210 is subject to flooding at various locations along its entire length.

Topsail Island was utilized as a case study in Before the Storm. In this study it was concluded that evacuation of the Island was not currently a problem and that up to 18,000 vehicles could be evacuated during the 12 hour evacuation period. As a component of the review of existing evacuation plans, a special traffic engineering analysis was undertaken in order to confirm the conclusion reached in Before the Storm. The analysis is summarized in the sections which follow.

N. C. Highway 50 from Topsail Beach to Surf City and its juncture with N.C. 210 is 20 feet wide with 10 foot travel lanes in each direction. The roadway is currently being widened to 24 feet. N.C. Highway 210 is a 20 foot roadway from Onslow County to its intersection with N.C. Highway 50.

There are two basic characteristics that differentiate traffic operations on a two-lane roadway from multi-lane facilities. First, distribution of traffic by direction has practically no effect on operating conditions at any given total volume level. Therefore, the capacity and service volumes of two-lane highways are expressed in total vehicles per hour, regardless of the distribution of traffic by direction. Second, overtaking and passing maneuvers must be made in the traffic lane normally occupied by opposing traffic. Inasmuch as the maintenance of a desired speed requires passing maneuvers, the volume of traffic plus the highway geometrics, which establish available passing sight distance, have a much more significant effect on operating speeds than is the case on multi-lane roads.

The capacity of a two-lane, two-way roadway under ideal

conditions is 2,000 passenger vehicles per hour total, regardless of directional distribution.

Traffic volume increases have a direct effect on operating speeds, independent of roadway alignment features. Operating speeds for uninterrupted flow on all two-lane roadways are 40 mph or above. The total volume for both directions reaches 70 percent of capacity with continuous passing sight distance, or 1,400 passenger cars per hour, under ideal conditions. With operating speeds of 35 mph, total traffic volumes for both directions may reach 85 percent of capacity with continuous passing sight distance, or 1,700 passenger cars per hour, under ideal conditions. This represents the highest volume that can be maintained for short periods of time without a high probability of breakdown in flow.

The ability of the transportation network to adequately handle evacuation needs is dependent upon the evacuation time as established by Pender County, Surf City and Topsail Beach. A major element of the evacuation timing is the clearance time, which is directly related to the vehicular capacity of the transportation network. Clearance time is defined as the amount of time necessary for the relocation of all vulnerable evacuees to their respective shelter destinations once the official evacuation order is issued. The clearance time consists of three main subcomponents: mobilization time, travel time and queuing delay time.

Mobilization time is that period between the issuance of the evacuation order and the departure time of the last vehicle from the vulnerable area. It depends to a large extent on the attitudes and response time of residents Travel time is the period necessary for the vehicles to travel the length of the evacuation route at an anticipated operating speed assuming no traffic delays (queuing). Queuing delay time is defined as the time spent by vehicles in traffic jams resulting when the capacities of the evacuation routes are exceeded by the number of vehicles using these routes.

The primary Topsail Beach evacuation route is Anderson Boulevard (N.C. 50). The current widening of this roadway will improve this route to consist of two twelve foot travel lanes. Open areas unprotected from wind and sand will remain. Based on information contained in the Topsail Beach Land Use Plan, this route might have to be used to evacuate up to 7720 peak seasonal vactioners by the year 1990 and over 10,000 by the year 2000.

The primary Surf City evacuation routes are N.C. 50 from the south and N.C. 210 from the north. Based on the Surf City Land Use Plan, these routes might have to be used to

evacuate up to 7340 peak seasonal vacationers by the year 1990 and about 9000 by the year 2000. The potential number of persons that might have to be evacuated from the two communities during peak vacation seasons by the year 1990 could therefore be over 15,000 (specific planning for year 2000 evacuation needs should be accomplished during the regular update of this plan).

An analysis of clearance time from Topsail Beach and Surf City was undertaken utilizing the following assumptions:

- a peak number of 15,000 persons might have to be evacuated.
- approximately 15% of the beach population will leave the area prior to the issuance of official evacuation orders (this is probably a very conservative estimate).
- the evacuation roadways will only be able to operate at 75 percent of capacity due to the relatively narrow travel lanes, the limited lateral clearance and the general storm conditions that will be present.
- each vehicle will contain 2.5 persons on the average
- the departure speed will be 35 mph
- under the above assumptions, the normal unrestricted travel folume of 1,700 vehicles per hour (vph) would be reduced to 1,275 vph as the maximum roadway capacity.

Based on the above assumptions, approximately 5,100 vehicles could have to be evacuated from Topsail Beach and Surf City during the evacuation period. Assuming N.C. 50/210 is operated as a one-way facility off the Island during the evacuation period, it would require approximately 4 hours to evacuate the beach areas. This period might be extended somewhat because the N.C. 50-210 bridge over the Intracoastal Waterway is somewhat narrower than the roadway approaching the beach and the reduced lateral clearance could lower its capacity somewhat.

Even if two-way traffic were allowed on the N.C. 50/210 bridge during the evacuation period (which is highly unlikely), the clearance time under this "worse case" condition would only be extended to about 6.5 hours, which is still well within the established 12 hour evacuation time limit.

Of additional concern in assessing the evacuation routes and the clearance time from the beach areas is the potrential for bottlenecks occuring at key intersections. On Topsail Island, the intersection of N.C. 50 and N.C. 210 will be required to handle the traffic from both Topsail Beach and Surf City, as well as a portion of the traffic from West Onslow Beach. At this time, it is impossible to evaluate the capacity of that particular intersection due to the lack of traffic data. A signalized intersection under normal operation will accommodate approximately 1,500 vehicles per lane per hour of green. During emergency operation, this intersection should be monitored/manned by local law enforcement officials to ensure that the merging traffic from the two routes is provided orderly right-of-way and flows smoothly.

Another location that should require extra attention during evacuation is the intersection of N.C. 50 with Roland Avenue one block east of its intersection with N.C. 210. There will be heavy left turn movements at this intersection during evacuation operations. Manual traffic control at this intersection during the evacuation period will also be required.

The primary conclusion resulting from this analysis is that N.C. 50, N.C. 210 and the N.C. 50-210 bridge all have adequate capacity to handle projected evacuation traffic through the planning period. While West Onslow Beach traffic flows were not considered in this analysis, traffic from this part of Topsail Island could evacuate the Island from the N.C. 210 bridge on the northern end of the Island as well as by way of the N.C. 50-210 bridge. The excess capacity of both bridges supports the conclusion contained within Before the Storm.

While the evacuation roadway capacity should be adequate to handle evacuation needs for the foreseeable future, specific actions have to be undertaken to insure that this capacity is available when needed. The following provisions and actions are recommended to be incorporated into the Topsail Beach and Surf City evacuation plans in order to help insure that this capacity remains available.

1. Evacuation operations for the entire Town of Topsail Beach and that portion of Surf City south of the intersection of Shore Drive and Topsail Drive should commence upon the setting of Condition 2. This is recommended because there are no alternatives to this narrow route and the extra evacuation time allows the leeway to address unanticipated problems (i.e. road blockages) along the

two lane, one-way facility upon the setting of Condition 1. The Surf City Evacuation Plan does not include a simialr provision. It is recommended that N.C. 50 be operated as a one-way northbound facility upon the setting of Condition 1. Shore Drive north of its intersection with Topsail Drive would continue to be utilized as a two-way facility.

3. It is imperative that N.C. Highway 50 be kept cleared during the evacuation period. Both the Topsail Beach and Surf City Police Departments should station vehicles at key locations along the road in order to monitor conditions and to coordinate and direct clearance operations to remove accidents, fallen poles, etc. from the roadway as necessary.

4. Surf City should assign members of its Police Department to manually direct traffic at the intersections of N.C. 50/Roland Avenue and N.C. 50/N.C. 210 during the evacuation period in order to keep traffic flowing smoothly and to facilitate needed turning movements. As an alternative, the Pender County Sheriff's Department or the North Carolina Highway Patrol could be requested to assume this responsiblity.

5. A request should be made to the North Carolina Highway Patrol to operate the N.C. 50/210 bridge as primarily a one-way facility during the evacuation period. The only vehicles allowed onto the Island during this period should be official emergency vehicles.

The above recommendations are based on the assumptions that the N.C.50/210 drawbridge will remain passable throughout the evacuation period. This should be the case under foreseeable circumstances. If the drawbridge is not passable, all traffic from Topsail Island will have to be re-routed northeast on N.C. 210 and cross the 210 bridge at the northern end of the Island. The capacity of N.C. 210 and the bridge are adequate for handling these flows. If such a situation occurs, Dixon High School in Onslow County near the intersection of N.C. 210 and U.S. 17 would become the designated shelter for Surf City and Topsail Beach evacuees rather than Topsail High School.

Property Address	Name of Owner	Check (√) Type of Building				Check (√) Extent of Damage				For Use By Damage Assessment Officer		
		Residence[1]	Mobile Home	Business	Other[2]	Unusable/Uninhabitable			Usable/ Habitable			
						Destroyed or Essentially Destroyed, Small Percentage of Structure Remains Intact, or Flood Water Line 8 Feet Above Floor. (x 1.00)	Extensive Exterior and Interior Damage, Portions of Roof or Walls Destroyed, or Flood Water Line 6 Feet Above Floor. (x 0.70)	Damage to Exterior and Interior of Such Magnitude to Render Building Unusable, or Flood Water Line 3 Feet Above Floor. (x 0.30)	Mostly Exterior Surface Damage, Broken Window Glass, etc. Building is Usable. Flood Water Line Above Floor. (x 0.10).	Value of Building (Exclusive of Land, Contents)	Estimated Dollar Loss	% Insurance Coverage
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												
11.												
12.												
13.												
14.												
15.												
16.												
17.												
18.												
19.												
20.												

Notes:
1. Check if single family, enter number of families if multi-family, duplex, or apartments.
2. Check and describe on reverse side of form.
3. Use reverse for notes, sketch maps, etc.

Damage Assessment Worksheet
(Percentage of Value Method)

Incident	Area/Zone	Date of Insp.
Assessor	Sht. No.	Of

form EM-39 9-81

DAMAGE ASSESSMENT WORKSHEET INSTRUCTIONS
(Percentage of Value Method)

This form is used by local/county government damage assessment teams following a disaster to assess losses to private property. Assessment is based upon on-site inspections and classification of damages according to "Extent of Damage" columns on the form. Estimated dollar losses are calculated by the Damage Assessment Officer.

INSTRUCTIONS:

Damage Assessment Team -

a. Complete bottom of form indicating type of incident (flood, tornado, ice storm, etc.), area or zone of assignment covered by this worksheet, date of inspections, name of assessor, and sheet number (serially by assessor, area/zone, or incident, depending upon local preference).

b. List damage property assessed by indicating address, name of owner (or business name, building name, etc.), and type of building. In case of multi-family housing, use figure to indicate number of families. For property not covered by types listed, check "Other" and describe under "Remarks" below.

c. Indicate usability and extent of damage by checking the most appropriate column.

d. Upon completion of the inspections, submit worksheets to the Damage Assessment Officer.

Damage Assessment Officer -

a. Review worksheets for completeness and legibility while assessor is present. Have any incomplete information added and any illegible entries clarified before releasing assessor.

b. Enter property values from available listings, being sure to exclude value of land and building contents.

c. Determine estimated dollar loss by multiplying value of building by percentage multiplier indicated in Damage column checked.

d. Using best available information, enter % of property value covered by insurance.

e. Consolidate damage figures and transmit to the State Emergency Operating Center (EOC) using Damage Assessment Report format used by the local Emergency Management Coordinator.

R E M A R K S:

3 6668 14108 6449