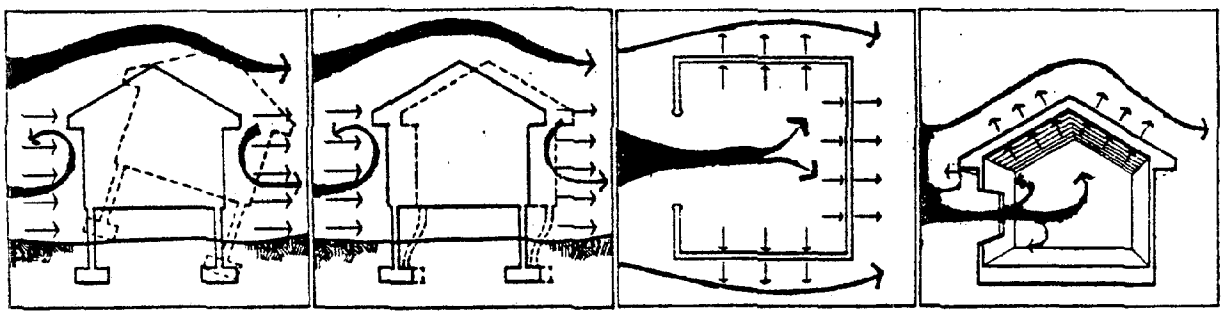
HURRICANE EVACUATION, MITIGATION, AND RECOVERY PLAN

Phase Two - Hurricane Hazard Mitigation and Post-Disaster Reconstruction Plan

AUGUST 1985

Prepared by the New Hanover County Planning Department

WIND FORCES ON BUILDINGS



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1986 Wilmington - New Hanover County Land-Use Plan Update

HURRICANE EVACUATION, MITIGATION, AND RECOVERY PLAN
- PHASE TWO -

HURRICANE HAZARD MITIGATION AND POST-DISASTER RECONSTRUCTION PLAN

August, 1985

Prepared by the New Hanover County Planning Department

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HURRICANE HAZARD MITIGATION STUDY -- PHASE TWO

1. PURPOSE

The purpose of this study is to describe and evaluate New Hanover County's activities related to planning for hurricanes, and to make specific recommendations that may be either incorporated into the Wilmington-New Hanover Land Use-Plan or implemented by other means. This study, prepared under Coastal Area Management Act (CAMA) contract, represents Phase 2 of hurricane hazard planning work begun in fiscal year 1983/84 under CAMA contract. In addition to providing some background, this presents information corresponding with the following format required by N. C. Coastal Management regulations (T15: 078 .0203 (6)):

A. A composite hazard map and brief narrative description of hazardous areas including all area of Environmental Concern (AEC's), flood zones, and other hazard areas of importance.

This map and description have been prepared in the earlier study, "HURRICANE EVACUATION PLAN -- Phase One -- An analysis of Evaculation Capability and Vulnerability to Hurricanes in New Hanover County," June, 1984, by the County Planning Department.

B. An inventory and analysis of existing land-uses, structures, and their values in each hazard area.

C. Suggested hazard mitigation policies dealing with:

(1) The effects of destructive hurricanes forces,

(2) Structures and uses not conforming to hazard mitigation policies,

(3) Means of encouraging hotels, restaurants, and similar large commercial structures to locate outside of erosion-prone areas, and

(4) Acquisition of parcels located in hazard areas or rendered unbuildable for the purpose of public access.

D. A post-disaster reconstruction plan including:

(1) Reference to Emergency Management responsbilities for immediate clean-up and removal activities,

(2) Local policies to direct reconstruction over a longer period of time, and

(3) Possible establishment of a "recovery task force" to oversee the reconstruction process and policy issues.

(4) Guidelines for post disaster reconstruction including:

(a) the timing and use of damage assessments and temporary development moratoria, and

(b) development standards to which repairs and reconstruction shall conform.

(5) A schedule for staging repair and reconstruction according to priorities assigned to essential services, minor and major repairs, and new development,

(6) The determination of which agency shall implement the plan, and

(7) Policies for repair or replacement of public utilities and facilities including possible relocation.

II. BACKGROUND

HURRICANE HAZARD PLANNING

According to McElyea et al (1982), hurricane hazard planning can be disaggregated into four phases, as indicated in Figure 1 and as defined below:

(1) **Preparedness:** These activities immediately precede a particular hurricane. Preparation helps cope with immediate threats to life and property and initiates disaster response activities. Preparation involves evacuation, public awareness issuing warnings, and readying equipment.

(2) **Response:** These activities immediately follow a hurricane. They include search and rescue operations, provision of temporary housing and medical facilities, and assessment of damages.

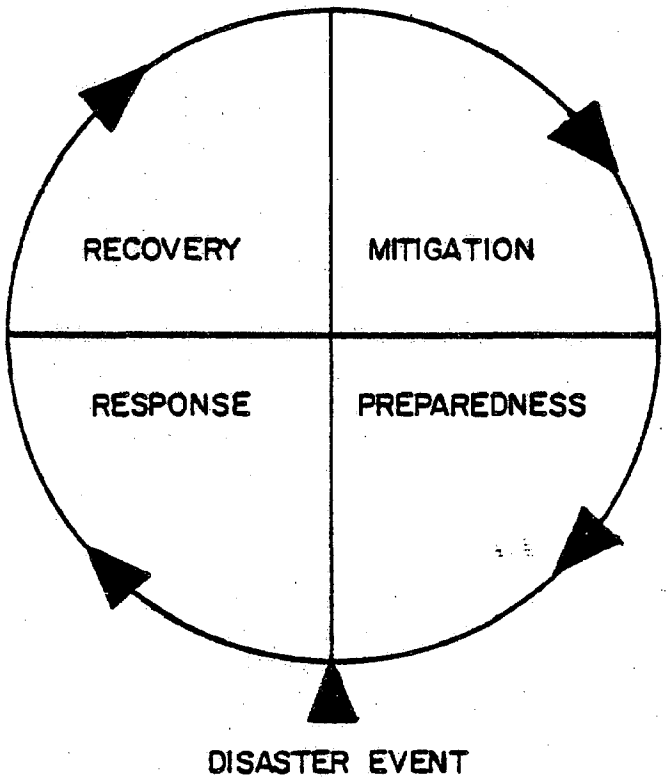
(3) **Recovery:** These activities involve the full range of rehabilitation and reconstruction which seeks to return the community to "normal". They include developing financial assistance and economic recovery plans for property damage, reassessment of land development policies, and the repairs or relocation of public utilities and facilities.

(4) **Mitigation:** These activities are performed in anticipation of future hurricanes and should reflect the lessons learned from previous hurricanes. An example of a mitigation activity is the adaption of land-use regulations discouraging residential land-use in flood-prone areas.

Two distinct government functions, **emergency management** and **development management** operate throughout this four phase cycle. Emergency management deals primarily with the preparedness and response cycles that immediately precede and follow a specific disaster. Emergency management requires a high degree of short-term tactical skills. Development management focuses more on long-term strategic skills. A major key to effecting hurricane hazard planning is the integration of these two functions in order that reconstruction of an area hit by a hurricane will follow the long range policies established earlier by the community.

FIGURE I

THE FOUR PHASES OF DISASTER-RELATED ACTIVITY



SOURCE: McELYEA et al., 1982

Based on well-documented research (Hass et al, 1972), the response and recovery phases can be further broken down into four phases of reconstruction as indicated in Figure 2. The actual time it takes to recover from a hurricane may be significantly different from that indicated in Figure 2. According to Mc Elyea et al (1982), the key factors (in rough order of importance) are:

(1) the extent of damages,
(2) prehurricane trends of growth or decline,
(3) level of organizations and leadership in decision- making,
(4) resources available for reconstruction.

III. INVENTORY AND ANALYSIS OF LAND-USE, STRUCTURES, AND STRUCTURAL VALUES IN HAZARD AREAS

A. PREVIOUS WORK

The severity and magnitudes of risk in different hazard areas has been partially discussed in the study, "HURRICANE EVACUATION PLAN - Phase One - An Analysis of Evacuation Capability and Vulnerability to Hurricanes in New Hanover County", in June 1984 by the New Hanover County Planning Department. This earlier study discussed potential hurricane impacts, including wind damage, flooding damage, wave actions, and erosion. This study also discussed the history of hurricanes in New Hanover County. The study concluded with an analysis of evacuation times in the different beach communities.

The different hazard areas examined by the Phase One study included Ocean Erodible Areas of Environmental Concern (AEC's), Inlet Hazard AEC's, Estuarine Shoreline AECs, Wetland AEC's, and the V and A zones of the Federal Flood Insurance Program.

B. INVENTORY AND ANALYSIS

This present study has inventoried structures and land-uses in the V and A zones. These zones were chosen as the basis for mapping because of their importance in the Insurance Program, their overlapping of the AEC categories, and the more precise means (physical modeling) of delineating their boundaries.

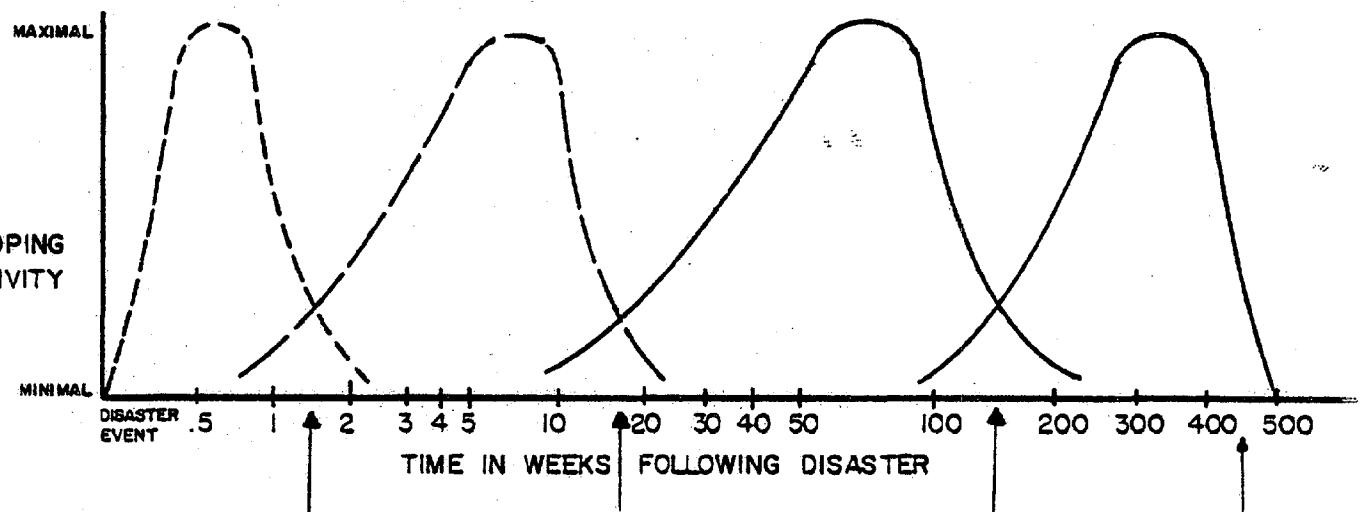
The V zone is defined as those areas likely to be both flooded by a 100 year storm and exposed to scouring and erosive wave actions. The V zone generally encompasses the Ocean Erodible and Inlet Hazard AEC's. The A zone is defined as those areas likely to be flooded in a 100 year storm but not subject to scouring and erosive wave action. The A zone generally encompass Coastal Wetland and Estuarine Shoreline AEC's.

The structures were inventoried by comparing structure locations on aerial photographs with preliminary 1984 Flood Insurance Rate Maps (FIRMs) prepared for the Federal Emergency Management Agency. The values of the structures were then categorized and summed by use, based on County tax record information. Some field checking was performed. Sources of possible significant error in the results include the age (four years old) of the aerial photography, human error in interpretation, and inaccurancies in tax record data.

FIGURE 2

THE FOUR STAGES OF RECONSTRUCTION

ACTIVITY PHASE:	RESPONSE		RECOVERY	
PERIODS:	EMERGENCY	RESTORATION	RECONSTRUCTION I	RECONSTRUCTION II
CAPITAL STOCK:	DAMAGED OR DESTROYED	PATCHED	REBUILT (REPLACEMENT)	MAJOR CONSTRUCTION (BETTERMENT, DEVELOPMENT)
NORMAL ACTIVITIES:	CEASED OR CHANGED	RETURN AND FUNCTION	RETURN AT PREDISASTER LEVELS OR GREATER	IMPROVED AND DEVELOPED



SAMPLE INDICATORS:

COMPLETION OF SEARCH AND RESCUE	RESTORATION OF MAJOR URBAN SERVICES	ATTAIN PREDISASTER LEVEL OF CAPITAL STOCK AND ACTIVITIES	COMPLETETION OF MAJOR CONSTRUCTION PROJECTS
END OF EMERGENCY SHELTER OR FEEDING	RETURN OF REFUGEES		
CLEARING RUBBLE FROM MAJOR ARTERIES	RUBBLE CLEARED		

SOURCES: HAAS et al., 1977, AND McELYEA et al., 1982

The results of this inventory are presented in Table 1. As evidenced by the results, the major use in the A and V floodplain zones is single-family residential, accounting for 54.5 million dollars of the nearly 70 million dollar total. Approximately 8.2 million dollars are accounted for by various business, office and institutional, and industrial properties. Over 90% of all uses in the floodplain are in the A zone. The V zone uses are single-family residential on Figure Eight Island. It should be noted that these values may be significantly overstated because if a parcel has two or more structures and at least one of those structures is in the floodplain, it was assumed that all the structures were in the floodplain.

IV. HAZARD MITIGATION POLICIES AND IMPLEMENTATION

A. DESTRUCTIVE HURRICANE FORCES

(1) Background

Hurricane forces, described in more detail in the earlier Phase One study by the County Planning Department (1984) and by Mc Elyea et al (1982), includes wind damage, flooding damage, wave actions, and erosion. Wind damage and flooding will effect structures in both A and V zones, while wave action and erosion affect structures in only the V zone.

(2) Land-Use Plan Policies

The following policies in the Wilmington--New Hanover Land-Use Plan 1981 Update either directly or indirectly deal with destructive hurricane forces:

1.2 (1) Publicly financed urban services shall be concentrated within the geographic limits of a defined Urban Services Area. The boundary of the urban services area should only be expanded when there is a demonstrated public need.

1.2 (2) Future urban development shall be encouraged to locate in geographic areas where urban services are already in place or, secondarily, where urban services can be readily provided.

1.2 (3) Existing urban development not provided with urban service shall receive priority in the development of new service and the expansion of existing service.

1.2 (4) Areas outside the defined Urban Services Area should not contain urban development.

1.2 (5) The timing and location of capital improvements expenditures and construction within the Urban Services Area shall be targeted to priority areas as determined by local government.

1.31 (4) Proposed residential development which would expose residents to harmful effects of...environmental hazards shall be prohibited.

1.31 (1) Industrial sites shall be located on land which is environmentally suitable...

1.36 (1) Unique natural areas shall be preserved to provide visual relief and passive recreational opportunities for area residents.

TABLE 1

INVENTORY OF STRUCTURES BY LAND-USE IN V AND A ZONES

USE	Number of Parcels with Structures in Floodplain	TAX VALUE OF STRUCTURES IN PARCELS IN THE FLOODPLAIN
Single-Family Residential	954	$54,534,340
Multi-Family Residential	14	892,920
Mobile Homes	11	99,490
Business	39	3,376,200
Office and Institutional	17	2,315,950
Industrial	23	2,504,060
Transportation, Communication, Utilities	1	6,260
Recreation	3	124,190
Agricultural or Vacant	19	111,020
TOTAL	1098	$63,963,800

1.36 (3) Public access to the area's natural recreational amenities such as the ocean and river and sound shall be insured.

1.36 (4) Provision of open space and recreation facilities in private developments should be encouraged.

2.2(1) Development activities in ocean erodible areas, high hazard flood areas and inlet hazard areas shall be carefully controlled. If development must occur in these areas, the proper location and design of shoreline structures and the preservation of natural protective features shall be required.

2.2(3) Barrier islands which have the following five characteristics shall be developed only for water dependent uses such as pleasure boat docks and landings; they shall not be developed for residential use:

(1) The land is a barrier island or part of a barrier island with a density equal to or less than one residential unit per five acres.

(2) The barrier island area has been assigned the most severe rank with regard to vulnerability to hurricane forces. This most severe rank is assigned to areas that are Inlet Hazard Areas of Environmental Concern, Ocean Erodible Areas of Environmental Concern, or Estuarine Shoreline Areas of Environmental Concern.

(3) The barrier island area is not connected to the mainland by a permanent network of roads and bridges that would allow safe and timely evacuation by land rather than by boat.

(4) The barrier island area does not qualify for the National Flood Insurance Program as administered by the Federal Emergency Management Agency.

(5) The barrier island area is classified as Conservation in the County's Land Use Plan.

2.3(1) Development activities within the 100 year floodplain shall be carefully controlled. If development must occur, low-intensive uses such as open space, recreation and agricultural activities shall be preferred.

3.4(1) Efforts to control off-road vehicle use in the ecologically sensitive, biologically critical ocean beach and estuarine shoreline areas shall continue to receive support from County government.

Policies 1.2(1) through 1.2(5) can encourage development away from hurricane hazard areas by means of the judicious location and timing of urban services, such as sewer lines. These policies establish an Urban Service Area where growth should be concentrated, based on such criteria as existing population centers. Policies 1.3(4) to 1.36(4) indirectly promote safe development though the promotion of open space and recreational facilities development and through promotion of development away from environmentally unsuitable areas. In many

cases, these areas, which are least suitable for intensive development due to such factors as Class IV soils (lowest potential for development in the County), also correspond with hazard areas and are most suitable for use only for open space recreation or other low intensity use.

Policies 2.2(1) and 2.3(1) deal directly with hurricane impacts. Their strategy is, first, to limit development in hazard areas and, second, to require sound design and preservation of natural protection features.

Another important feature of the Land-Use Plan is the classification of marshes and the 100 year floodplain as Conservation. These areas tend to "...have severe or hazardous limitations to development" (P.7). The Plan further states that conservation areas should be preserved in their natural state, except for water dependent uses, shared industrial access corridors along the Northeast Cape Fear River, or exceptional developments preserving natural features and that are sensitively designed.

(2) Implementation of the Land-Use Plan Policies

A. Floodplain Management Regulations of New Hanover County

The Floodplain Regulations are more directly concerned with protection from hurricane impacts than any other of the measures that implement the above policies. These Regulations, administered by the County Building Inspector and Engineer, closely follow Federal Emergency Management Agency (FEMA) guidelines under the regular program.

The Regulations include the following key provisions:

(1) It must be certified that residential on-site septic systems shall be located and designed to minimize both impairment to them caused by flooding and contamination of adjacent waters.

(2) Building permit applications shall contain:

a. the elevation of the lowest floor of the structure
b. certification from a professional engineer or registered architect that the structure meets regulation standards

(3) All new construction and improvements shall be adequately anchored and contructed with materials resistant to flooding.

(4) Sanitary sewage and water supply systems shall be designed to eliminate infiltration either from or into flood waters.

(5) New or improved residential construction shall have the lowest floor elevated to base flood elevation, as determined by the FIRM maps.

(6) New or improved commercial, industrial, or other non-residential construction shall also be above base flood elevation or floodproofed sufficient to withstand hydrostatic and hydrodynamic loads.

(7) No mobile home shall be place in a floodway (watercourse channel necessary to adequately discharge floodwater) or in V zones, except in an existing mobile home park or subdivision.

(8) All mobile homes shall be anchored with three or more over-the-top ties and eight or more frame ties.

(9) New or expanded mobile home parks and subdivisions shall provide lots with pilings or compacted fill sufficient to place the mobile home at or above the base flood level.

(10) No encroachments shall be made in floodways unless it can be certified that there will be no increase in flood levels during occurrence of the base flood discharge.

(11) In V zones, all buildings shall be securely anchored on pilings or columns with the lowest supporting member no lower than base flood elevation. All areas below shall remain open or with breakaway walls.

(12) No fill shall be used for structural support in V zones and no alteration of dunes or dune vegatation shall be allowed.

(13) In A zones other than floodways, the lowest floor shall be elevated to or above the crown of the nearest street or above the depth number required on the FIRM map.

(14) All subdivisions shall have utilities and facilities located, designed, and constructed to prevent flood damage and shall have drainage adequate to reduce flood exposure.

The Floodplain Regulations generally are considered to be adequate by the County Building Inspector in terms of construction requirements. Flood Insurance Rate Maps have been available for the County since 1978. A recent update of the maps is presently undergoing the public hearing process. The new maps, based on a different methodology and set of assumptions, will result in, one, a reduction of V zone coverage with present V zones on the sounds and estuaries becoming A zones and, two, a lowering of base flood elevations by several feet..

It should be noted that the U. S. Corps of Engineers is presently developing a SLOSH (Sea, Lake, and Overland Surges from Hurricane) model for eastern North Carolina. The model should give a more accurate picture of potential impacts from any given hurricane of a specific direction and force than the floodplain model. SLOSH, however, cannot presently be used to predict general impacts of a general 100 year storm as can the floodplain model.

B. New Hanover County Building Code

The New Hanover County Building Inspector enforces and administers the North Carolina State Building Code. This Building Code is generally considered to be adequate. Because of the legal obstacles that would be encountered from the N. C. Building Code Council in attempting to exceed the State Building Code, no attempt has been made by New Hanover County to do so.

C. New Hanover County Zoning Ordinance

Development is directly or indirectly restricted in hurricane hazard areas by a number of key sections in this Aoning Ordinance:

(1) **Performance Residential:** This provision allows for flexible lot lines and setbacks in desgining a subdivision, as opposed to conventional subdivisions with mininum lot sizes and yards. Performance subdivisions facilitate subdivision layout around hazard areas. In addition, maximum density is based on a net acreage calculated by subtracting from gross acreage all natural lakes, ponds, rivers, marshes, and Class IV soils, which often correspond with hurricane hazard areas. Fairly stringent drainage regulations are also required for performance subdivisions.

(2) **Planned Development (PD) District:** This District, which allows for integrated uses of commercial and residential development, requires drainage control including stormwater retention. In addition, bonus points for increasing density are offered for PD's that are at least ½ mile inland of all coastland estuarine waters or for which all structures are located beyond the 100 year floodplain. Density for PDs shall be based on a net average calculated by subtracting from the gross acreage the 100 year floodplain areas, lakes and ponds, and shorelines. 50% of all floodplains must remain permanent open space.

(3) **High Density Development:** This provision allows for higher density development within the County's Urban Services Area. The density calculations and open space requirement is identical to that of the Planned Development District.

(4) **Conservation Overlay District (COD):** This District overlaps the entire unincorporated County and protects certain valuable natural resources. A number of these resources are hazard areas-oriented, (e.g. swamp forest, natural ponds, marshes, primary nursery area, barrier island-beach complex, and maritime shrub thickets). The protection provided includes varying setbacks, drainage regulations including stormwater retention, and preservation of 50-100% of the resource in its natural state.

D. New Hanover County Subdivision Regulations

The Subdivision Regulations presently require several sets of hurricane hazard information for developments. Subdivision plats require that 100 year floodplains, AECs, topography, marshes, watercourses, and other drainage features be shown. In addition, a drainage plan must be provided, although there are no criteria determining what a drainage plan must accomplish unless specified by the Zoning Ordinance. Finally, developers of subdivisions located on barrier islands must submit a map and description of the hurricane evacuation potential for the subdivision. This description must include descriptions of estimated road capabilities; bridges and low elevation points of subdivision roads; projected size and distribution of the subdivision populations; and estimates of mobilization, travel, and queuing delay times for safe evacuation.

E. New Hanover County Mobile Home and Travel Trailer Park Ordinance

No direct controls are mentioned in this Ordinance concerning hurricane hazard prevention for mobile home parks because of the previous controls defined by the Floodplain Ordinance. Anchoring, however, is required for all mobile home stands in accordance with the N. C. Uniform Standards Code for Mobile Homes, which should help prevent wind damage to mobile homes in the entire County. Travel Trailer Parks do not require any controls because of the mobility of the trailers.

F. New Hanover County Erosion and Sedimentation Ordinance

This Ordinance, although primarily concerned with erosion control, does include some indirect protection against hurricane hazards. The primary one is conern for maintenance of water course channels through reduction of sedimentation and by stating that an acceptable management measure of controlling stormwater runoff is promoting infiltration.

G. New Hanover County Off-Road Vehicle Ordinance

This Ordinance indirectly protects against hurricane hazards by restricting vehicles from being operated on dune areas in certain parts of the unincorporated County, including all of Masonboro Island and certain areas south of Snow's Cut. Vehicles, however, can be operated anywhere for emergency purposes or for public agency use. Inaddition, vehicles can be operated in certain areas south of Snow's Cut provided they are used only for transporation and not for racing, hire, or commercial use.

A. METHODS OF DEALING WITH STRUCTURES AND USES WHICH DO NOT CONFORM WITH HAZARD MITIGATION POLICIES

The New Hanover County Zoning Ordinance contains several provisions dealing with non-conforming uses.

(1) Non-conforming structures or uses generally may not be increased with regard to area occupied or with respect to dimensional restrictions such as yard or lot requirements. Key exceptions to this provision, however, are that a non-conforming single-family residential structure may be replaced by a larger one, and a mobile home may be replaced by a larger mobile home or by a single-family structure. New contruction, however, must meet Building Code requirements and zoning dimensional requirements.

(2) If a non-conforming structure is totally or partially destroyed, it may be replaced provided notice of intent is provided within six months and a building permit is obtained within twelve months. Reconstruction must meet Building Code requirements.

(3) If a non-conforming use is discontinued for more than 180 days, the property may thereafter be used only for conforming purposes.

B. MEANS OF ENCOURAGING HOTELS, RESTAURANTS, AND SIMILAR LARGE COMMERCIAL STRUCTURES TO LOCATE OUTSIDE OF EROSION-PRONE AREAS.

The location of large commercial structures in erosion-prone areas is generally discouraged in the unincorporated County. Figure Eight and Masonboro Islands are zoned single-family residential. In addition, Masonboro Island along with Zeke's Island receive protection in their natural state as part of the National Estuarine Sanctuary Program. The other barrier island areas south of Snow's Cut under County jurisdiction are either State or Federally controlled as recreational and cultural/educational areas.

Large commercial structures are further discouraged from locating along other shorelines in the County by earlier discussed means. The Conservation Overlay District, for instance, requires more strict setbacks and drainage requirements for commercial structures than for residential structures.

C. MEANS OF ACQUISITIONS OF PARCELS LOCATED IN HAZARD AREAS OR RENDERED UNBUILDABLE, FOR THE PURPOSE OF PUBLIC ACCESS

Land acquisition gives more control to the County over development than any other technique. Acquisition, however, often may involve large costs and the removal of high-value properties from the tax base. The cost, however, is somewhat offset by removing the need for municipal and emergency services for that area and, if the acquired area is used for public access, the increase in value of nearby inland properties.

Land can be acquired either by fee-simple purchase of all property rights or by the purchase of easements. A positive easement would be to purchase partial interest to allow use of the land for an access trail. An example of a negative easement would be the restriction of development for purpose of preserving scenic vistas.

Interest in property can be obtained through purchase by negotiation or condemnation, land exchange, or donation. It should be noted that property owners receive significant tax benefits through donations of land. State and Federal funds may also be available for acquisition. The State Division of Coastal Management, for instance, administers a beach access fund. Federal funds can be made available from urban renewal funds and floodplain management funds.

The County presently has the earlier described policy 1.36(3) requiring that public access be insured. In addition, the County is nearing the final stages of preparing a County Water Access Plan that will provide an inventory of potential access sites to the County's ocean and estuarine waters, and list recommendations for acquisitions. The County already has four beach access areas. In addition, the County donated approximately 15 acres of property on Masonboro Island to the State to help place the Island into the National Estuarine Sanctuary Program. The County, however, presently has no policies governing acquisition of parcels immediately after a hurricane has rendered them unsuitable for building and when the owner may be more amenable to selling.

IV. POST-DISASTER RECONSTRUCTION PLAN

This post-disaster reconstruction plan presents proposed policies and procedures that may be implemented after a hurricane strikes. The proposed policies will be considered for incorporation into the Wilmington-New Hanover Land-Use Plan Update. The emphasis of these policies is to allow the County to reconstruct at a controlled pace that will result in more hurricane-resistant buildings and in fewer vulnerable developments.

It should be noted that responsibility for immediate cleanup and removal of debris in order to eliminate immediate health and safety hazards rests with NC DOT for roads and right-of-way. The County Administration, with the Director of Engineering and Facilities taking the lead role, is responsbile for overall coordination for cleanup and disposal with State and Federal offices. Debris clean-up and disposal is a more immediate function than that of directing reconstruction, which is the primary focus of this plan.

A. RESPONSIBLITY FOR RECONSTRUCTION

The responsibility for directing reconstruction should rest with the County Commissioners for several reasons. One, the Commissioners already have the authority and responsibility for directing growth. Their powers include emergency powers and the capability to enact ordinances and adopt the Land-Use Plan. Two, the Board of Commissioners is a permanent body that would be effective in making a smooth transition between the four earlier described phases (Preparedness, Response, Recovery, Mitigation) of the hurricane hazard planning cycle. The Commissioners' heavy involvement in the recovery phase would be particularly important in mitigation efforts.

The following policy, therefore, is recommended for adoption into the Land-Use Plan:

Policy: The County Board of Commissioners, after a hurricane strikes, shall be established as the recovery task force to oversee the implementation of this plan, to resolve policy issues as necessary, and to consider purchase of parcels located in hazard areas where structures have been destroyed.

B. LAND-USE PLANNING

Based upon the previous discussions, of the County's Land-Use Plan and implementing ordinance generally are effective in minimizing development in hurricane hazard areas. The floodplain is classified as Conservation and appropriate policies for growth and development have been previously adopted.

One present conflict, however, appears between existing Policy 2.3(1) and the implementing ordinances. This policy states:

> "Development activities within the 100 year floodplain shall be carefully controlled. If development must occur, low intensive uses such as open space, recreation, and agricultural activities shall be preferred."

The zoning and other ordinances, however, presently allow residential development within the floodplain. Although certain sections in the Conservation Overlay District and the floodplain open space provisions for High Density Development discourage development within the floodplain, other sections such as Performance residential allow clustering of the permitted number of units for a parcel within the area of the parcel encompassed by the floodplain. This situation may become exacerbated with the construction of the County sewer system. The sewer system will allow floodplain parcels to be developed which previously could not have been developed due to septic system unsuitability.

This problem, however, is mitigated by several factors besides the existence of the Conservation Overlay District. One, the County has fairly strict building standards in the Floodplain Ordinance that would reduce flooding damage. Two, the unincorporated County has no V zone erosion areas that either are not already devleoped or that are restricted from development by such factors as inclusion within the Estuarine Sanctuary Program. Three, the County does not face a significant hurricane evacuation problem compared with other Coastal communities as evidenced by the earlier Phase One Hurricane Evacuation Study.

Another problem may arise in the case of a major hurricane causing extensive damage. If buildings are damaged beyond repair, landowners will often attempt to upgrade their parcels' zoning in order to more intensely develop their property. The pressures and general highlevel of government activity following a hurricane may prevent a complete and comprehensive evaluation of upgrade rezoning requests. Therefore, the following proposed policy is suggested for inclusion in the Land-Use Plan:

Policy: In the event of a hurricane, the Board of Commissioners may declare a moratorium on the acceptance of any request for re-zoning other than for zoning to a less intense use, unless that zoning request is initiated by the County. The moratorium shall last up to 180 days, depending upon the severity of the hurricane damage.

C. PUBLIC UTILITIES AND FACILITIES

Hurricane damages may require the replacement or relocation of work, water and sewer facilities, and other utilities. The location of these capital facilites have a strong influence on the direction and intensity of growth. The previously discussed policies concerning the Urban Services Area establish priorities for replacing and locating utilities away from hazard areas and providing services to existing development first. It should be noted that it is generally politically infeasible to deny the restoration of service and utilites to developed areas.

New development in hurricane hazard areas is fairly well controlled by the Land-Use Plan and implementing ordinances, as previously discussed. In addition, the County's Sewer Plan is phased to concentrate on providing sewer services to existing developed areas before expanding to serve new ones.

The following policies, however, are suggested for inclusion in the Land-Use Plan to clarify and strengthen present policies governing provision of services.

Policy: In the event of extensive hurricane damage to public utilities that requires replacement or relocation of utilities, efforts shall be made to locate the utility away from hurricane hazard areas or to strengthen its construction.

Policy: In the case of widespread hurricane damage to the public utilities system, priority shall be given to those repairs that will restore service to as many persons as soon as possible.

Policy: In the event of a hurricane, the Board of Commissioners may declare a moratorium on the permitting of any new tie-ins to the County sewer or water system for a period of up to 180 days, depending on the severity of the hurricane damage.

Policy: In the event of a hurricane, the Board of Commissioners may request that a new assessment of hazard areas be performed, depending on the extent of flooding and the changes to shorelines and inlets caused by the hurricane.

D. RECONSTRUCTION STANDARDS

New Hanover County, as discussed earlier, has a fairly stringent Floodplain Ordinance and Building Code. In addition, it appears that the State Building Code will be revised to reflect the requirements of the Floodplain Ordinance and to mandate the adoption of wind resistance construction methods. As previously discussed, it should be noted that the New Hanover County Zoning Ordinance prohibits the expansion of non-conforming uses.

In order to facilitate the recovery process, however, the following policy is proposed for adoption:

Policy: In the event of a hurricane, the Board of Commissioners may declare a moratorium on the permitting of any new construction or any construction would increase the intensity of the land-use existing before the hurricane. The moratorium may last up to a period of 180 days, depending upon the severity of hurricane damages.

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