ELEMENT 18 – Coastal Management Element

Plan Framework for Coastal Management

The purpose of this element is to provide for the protection of residents and property in those campuses or portions of campuses within the coastal area of the host community, and to limit expenditures, and where appropriate, restrict development, in those areas subject to destruction by natural disaster within the coastal high hazard area.

NOTE: While most of the 143-acre Florida Atlantic University campus is located along the Indian River Lagoon, and in the coastal zone, only a portion of the site is located in the coastal high hazard area. Additionally, portions of the Harbor Branch Property is maintained and operated by others. (Refer to Figures 18.1 through 18.5)

SUPPORTING DOCUMENTATION

1. BACKGROUND

Initial development of the property began in the late 1950’s. The Linkport channel was excavated from uplands, wetlands, and the spoil material was placed on the adjacent land, and it was also used to construct the two jetties which project out into the Indian River Lagoon toward the Intracoastal Waterway (ICW). The property east of Old Dixie Highway is relatively low in elevation, and it includes mosquito impoundments, managed by the St. Lucie County Mosquito Control.

Consistent with the minimum requirements for the preparation of this element, the following items are discussed relative to the site and the coastal environment:

2. EMERGENCY MANAGEMENT PLAN/HURRICANE PREPAREDNESS PLAN

The University maintains a plan entitled “Harbor Branch at Florida Atlantic University, Harbor Branch Campus and Off Site Labs, Continuity of Operations Plan” which functions as the facility’s emergency management/hurricane preparedness plan. The “Continuity of Operations Plan” was last revised in August, 2008. This document was reviewed and found to be substantially consistent with similar guidance provided by FEMA for such a plan. Additionally, this review was supplemented by personal interview with the Associate Director of the Physical Plant. The facility’s existing plan appears to be thorough and substantially in conformance with the FEMA guidelines.

Additionally, while not clearly stated in the plan, the following is also part of the plan based upon communication with Associate Director:

- The facility’s communication system includes land line phones that can be powered by a generator, cell phone, and UHF radios.
- Electronic files are backed and stored off site.
- The facility maintains a coordinated list of vendors/contractors who can be contacted for immediate response to meet the needs of the facility.

An area south of the existing channel and adjacent to the Maine Education Center and Conference building has been designated as a emergency staging area for the use of helicopter transport, etc. as can be seen in Figure 18.1. Future operations and development activities should consider the designation of such areas for emergency transport and the staging of equipment and supplies.
3. EXISTING SITE CONDITIONS

The existing land uses and existing facilities are identified and discussed in detail in the other elements of this document. The existing shoreline can be characterized by one of four conditions, Natural Mangrove Fringe, Natural Beach, Armored Rip-rap or Seawall. These conditions are reflected in the Existing Shoreline Conditions Map, Figure 18.1 and in the photographs 5-7, 10, and 26-29. The Natural Mangrove Fringe predominantly consisted of Red Mangroves with little exotic, nuisance vegetation. The Natural Mangrove Fringe along the two jetties is more disturbed with a significant amount of exotic, nuisance vegetation (Brazilian pepper, and Australian Pine) occurring. The only other area that appears to be not improved by some form of stabilization is a Natural Beach area located where the north jetty connects to the mainland. This natural beach area is low in elevation, (3' to 4' above mean sea level) and relatively narrow, (10' to 20' depending upon tide elevation). The backshore of this beach area is vegetated with native plants, (10' to 20' wide) as the property transitions to managed sod. The remaining shoreline of the site is improved with various seawall design sections.

While no recent Submerged Aquatic Vegetation (SAV) surveys have been conducted within the Linkport Channel, the channel is relatively frequently maintenance dredged. Therefore the likelihood of significant resources in the channel is relatively low. Maintenance dredging has occurred during the following periods:

<table>
<thead>
<tr>
<th>Date</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/14/1994</td>
<td>11,500 CY to -13' below MLW</td>
</tr>
<tr>
<td>10/18/1993</td>
<td>Unknown quantity</td>
</tr>
<tr>
<td>10/28/1986</td>
<td>8,000 CY</td>
</tr>
<tr>
<td>07/31/1986</td>
<td>37,500 CY</td>
</tr>
<tr>
<td>08/18/1978</td>
<td>23,000 CY</td>
</tr>
</tbody>
</table>

It appears that maintenance dredging has occurred approximately every 8 years, however the there is not a noticeable consistency of the amount of material typically removed. The spoil containment areas that have been used do not appear to be regularly maintained except for when dredging is needed.

The existing shoreline uses appear to be programmed into different functional activities to minimize the potential for conflicts. The shoreline area appears to be limited to water dependent activities. Various security measures are employed, including fences, for controlled access. The marina area is used to moor small vessels which are used for different activities, (See photographs 8, 9, 11, and 14). Most of the shoreline is not used except for temporary mooring of vessels. The most active area of the shoreline is in the proximity of the Barrows Marine OPS Building, (See photographs 18 – 23). This work area and along the northern side of the channel functions as a boatyard for maintaining the various vessels at the facility as well as for the maintenance of vessels which may use the facility area under a temporary rental agreement.

Future operations and development activities should consider the need for future maintenance of waterfront facilities and the need for future dredging/ spoil management. The activities should consider the potential for impacts (direct, secondary and cumulative) to the existing estuarine environment. Proposed activities should be sequenced to avoid and minimize the potential for adverse environmental consequences associated with proposed activities; and mitigation of
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unavoidable impacts which are likely to occur as a result of development should provide a net environmental benefit.

4. COASTAL STRUCTURES

The waterfront facilities have been generally maintained over time, in the same footprint and condition as the original construction, (See photographs 5, 7, and 8). Seawall rehabilitation and a number of seawall repairs have taken place over the years. Rip-rap has also been placed in critical areas along the jetties where erosion has occurred. The jetties are subject to being overtopped, and it has been reported by the facility that significant erosion along the jetties has occurred. This shoreline should be monitored and maintained to minimize erosion and overtopping of the jetties.

The following agencies (local, state, and federal) are responsible for the review and authorization of regulated activities along the waterfront and in the estuarine environment. These agencies, in some cases, regulate activities under multiple programs and regulations regarding environmental quality:

Local
- St. Lucie County

State
- Florida Department of Environmental Protection
- Florida Fish and Wildlife Conservation Commission
- South Florida Water Management District

Federal
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. National Marine Fisheries Service

The facility has a copy of most all of the permits that have been discovered in the regulatory files of the Florida Department of Environmental Projection (and its predecessors) and the U.S. Army Corps of Engineers. A permit compliance audit has not been conducted and was not a part of this report.

Future operations and development activities should include a monitoring of regulatory changes that may affect the facility’s coastal features and include the monitoring and maintenance of all shorelines and coastal structures.

5. COASTAL HIGH HAZARD AREA AND FLOODING

According to the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), a portion of the Institute is located within Flood Zones VE, AE, and X. Based upon review of the St. Lucie County definition of Coastal High Hazard, the portion of the University property located within Flood Zone VE is designated as a special hazard area. Coastal High Hazard area is defined by an area subjected to high velocity waters caused by, but not limited to, hurricane generated waves. The base flood elevations for the multiple Flood Zones AE have been identified at 5.0 and 6.0 NGVD 1929. Flood Zone X is defined as areas of 500 -year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.
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While a large portion of the site is within the 100 year floodplain, as determined by FEMA, a portion of the site has been designated as a coastal high hazard area. This is equivalent to that area designated as Flood Zone VE, which is seaward of the coastal high hazard line as depicted in the Coastal High Hazard Map, Figure 18.2. FEMA's National Flood Insurance Program defines Zone VE within FIRM Maps, as part of Zone VE and V1-30, as follows: “Areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.” Existing improvements and infrastructure within the coastal high hazard area are limited to the following:

- The jetties and unimproved roads
- Electrical lines placed in exposed conduits along the ground and system components such as distribution panels.
- Water wells, lines and pumps. (North Jetty (Near terminus point) – 4 Saltwater Wells (SW-1, SW-2, SW-3, and SW-4), South Jetty (Near terminus point, behind retaining wall) – 2 Saltwater wells (SW-5 and SW-6)

Areas within the 100 year floodplain are subject to flooding and storm surge during hurricanes and tropical storms. In addition to buildings, infrastructure subject to potential flood damage include, HVAC systems, propane tanks, generators, above ground fuel storage tanks, electrical systems including transformers, sanitary lift stations and various mechanical systems (See Figures 18.3.1 through 18.3.3 and photographs 1-4, 11-13, 24, 25, 30 and 31). The facility acknowledges that the infrastructure associated with the south aquaculture area may be subject to significant damage during significant storm events.

A portion of the property has been designated as a COBRA zone as depicted on Figure 18.2. In this area, the development and extension of utility services is prohibited. Additionally, federal flood insurance is not available to infrastructure located in this area.

To the extent practicable, future operations and development activities should be located outside of the coastal high hazard area and COBRA zone. Infrastructure located within these areas should be maintained in functional order, otherwise they may no longer be vested improvements.

6. BEACH AND DUNE SYSTEMS

The site is located on the Indian River Lagoon and not on the Atlantic Ocean. Therefore, there are no existing beach and dune systems, in the traditional sense with regard to this element, on the University property. There are no apparent records which document erosion or accretion trends.

Based upon review of readily available historic aerial images from the Florida Department of Transportation Surveying and Mapping Office, the historical photography suggests that the natural shoreline (mean high water line) has been relatively stable since 1958, (See Figure 18.4.1 and 18.4.2 and photographs). It does not appear that the facility’s presence has caused any erosion impacts to the shoreline.

The presence of the manmade jetties does not appear to have contributed to adverse erosion or accretion along the shoreline. However, the stability of the shoreline along the jetties is not as clear. There is photographic evidence that the length of the jetties has reduced from the original dredge and fill activity (Figure 18.4.2). There is also evidence of filling along the edge of the unimproved road on the jetties, and through verbal communication, filling has occurred on the jetties after they have been overtopped (Photographs 5 – 7).
While much of this natural shoreline is in conservation, and there are apparent mangrove plantings occurring along portions of the shoreline, there does not appear to be any existing University programs focused on protecting or restoring the property’s shoreline. However, there doesn’t appear to be a need for additional beach protection or enhancement measures for the property.

Future operations and development activities should consider maintaining the conservation areas, monitoring the shoreline erosion and erosion control measures should be considered in areas where apparent erosion occurs.

7. POINT AND NON-POINT SOURCE POLLUTION

Known point source and potential non-point sources of pollution exist onsite, which have a potential to discharge to the adjacent coastal waters. Point source locations typically consist of stormwater outfalls and outfall pipes that may or may not exist on site associated with wastewater discharge from the package plants and reverse osmosis/filtration systems. Potential non-point pollution sources include potentially untreated stormwater runoff from adjacent roads and outdoor work areas. Additionally, locations where generators and various materials are stored, which are subject to exposure to rain and coastal flooding, these areas are potential pollution sources (Photographs 1 – 4). Potential contaminants could include diesel fuel, gas, oil, hydraulic fluids, and solvents (Figure 18.5 and Photographs 8, 9, 15, 16, 18 – 23). These areas should be relocated as practicable or protected and flood proofed as practicable. In the case of where portable fuels tanks occur, in the event of coastal flooding, these tanks should be moved to higher ground or placed in protected areas.

It appears that all hazardous materials are stored within a building within a secured area (Photograph 25). The on-site waste water treatment plant facility’s percolation pond is considered to be a point-source pollution area, as it has the potential to discharge during a storm or surge event (Photograph 30). Specific areas where best management practices should be employed are in the Marina area, waste water treatment plant area, the Properties Building area, and in the Marine OPS area.

The University should develop and maintain a Stormwater Pollution Prevention Plan for the property. Future operations and development activities should consider providing stormwater management and industrial wastewater management BMP’s and implementing the BMP’s of the DEP’s Clean Marina Program and Clean Boatyards program.

8. PUBLIC ACCESS FACILITIES

Based upon personal interviews, the only areas designated for public access are the Ocean Discovery Center and Johnson Education Center. All other facilities are for limited with controlled access to those authorized to use the facility.

Future operations and development activities should consider public access needs for the facility.
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References

- St. Lucie County Storm Surge Zones, prepared by Florida State Emergency Response Team (SERT) April 2008
- St. Lucie County Existing Land Use in Coastal Hazard Zones, Florida Department of Community Affairs, Division of Community Planning, May 1, 2006
- St. Lucie County COBRA Zones Figure 7-12 from Ch. 7 of Comprehensive Plan. Prepared November 17, 2000
- Harbor Branch at Florida Atlantic University, Harbor Branch Campus and Off Site Labs, Continuity of Operations Plan, Prepared by Harbor Branch’s Safety Committee and Crisis Management Team, Last Revised on August 2008
  - Attachment A: Harbor Branch Oceanographic Institute Hurricane Procedures Plan
  - NOTE: This document was prepared with guidance from FEMA: Continuity of Operations Programs, prepared by Office of National Security Coordination.
- Coastal Barrier Resources Act (COBRA) of 1982, Coastal Barrier Improvement Act
- Technical Bulletin 1-93: Openings in Foundation Walls for Buildings Located within Special Flood Hazard Areas in accordance with the National Flood Insurance Program. Prepared by FEMA
- Technical Bulletin 2-93: Flood Resistant Material Requirements for Buildings Located within Special Flood Hazard Areas in accordance with the National Flood Insurance Program. Prepared by FEMA
- Technical Bulletin 3-93: Non-Residential Floodproofing – Requirements and Certification for Buildings Located within Special Flood Hazard Areas in accordance with the National Flood Insurance Program. Prepared by FEMA
- Technical Bulletin 7-93: Wet Floodproofing Requirements for Buildings Located in Coastal High Hazard Areas in Accordance with the National Flood Insurance Program. Prepared by FEMA
- Technical Bulletin 8-93: Corrosion Protection for Metal Connectors in Coastal Areas for Structures Located in Coastal High Hazard Areas in Accordance with the National Flood Insurance Program. Prepared by FEMA
- St. Lucie County Comprehensive Plan, Chapter 7 Coastal Management Element. Prepared by St. Lucie County Board of Commissioners and Department of Growth Management. Adopted January 9, 1990 revised January 6, 2004
Photograph 1 – Fixed Generator and Fuel Tanks; located in the ORA area of the site, east of the South Aquaculture Greenhouse C1-4, an electrical diesel generator is shown elevated on a block foundation that has a roof structure. Adjacent to the generator are two mobile diesel fuel tanks.
Photograph 2 – Gas Tanks; located in the ORA area of the site, east of the South Aquaculture Greenhouse C1-4, north of Photograph 1. This image depicts propane tanks protected by bollards. There is an electric transformer unit located north of these tanks. Perspective is in the north direction.
Photograph 3 – Transformer; located in the ORA area of the site east of the South Aquaculture Greenhouse C1-4, north of Photograph 1. Perspective is directed northwest.
Photograph 4 – Fixed Generator; located in the ORA area of the site, east of the South Aquaculture Greenhouse B1-3, an diesel generator is shown elevated on a block foundation that has a roof structure. Perspective is directed west.
Photograph 5 – Rip-Rap Material; located on the eastern tip of the manmade jetty. This is a typical view of both the north and south jetties.
Photograph 6 – Open area located on the south jetty, looking southwest.
Photograph 7 – Recycled concrete material used as shoreline armoring rip-rap protection for the south jetty. Perspective is directed northwest, looking in the channel.
Photograph 8 - Small Boat Marina; located south of the Linkport Channel. Depicted in the image is the seawall structure.
Photograph 9 – Small Boat Marina; this area has been identified as a non-point source of pollution.
Photograph 10 – Mangrove fringe located adjacent to the seawall structure in the vicinity of the Small Boat Marina.
Photograph 11 – A fueling station is located at the Small Boat Marina. The station is protected by bollards.
Photograph 12 – Above Ground Storage Fuel Tank; the location of the fuel tank is just north of the Small Boat Marina building facility. A secondary container wall structure is incorporated for spill/leak containment mitigation.
Photograph 13 – Above Ground Storage Fuel Tank; (same as in Photograph 12) secondary containment is maintained by wall structure. The location of the tank is north of the Small Boat Marina building facility.
Photograph 14 – Small Boat Marina Building Facility. Flooproofing techniques include elevated foundation footprint as noted by view of ±6” concrete lip at building access points.
Photograph 15 - Outdoor storage of maintenance facility located south and adjacent to the Properties Building. This has been identified as a non-point source pollution area.
Photograph 16 - Exterior view of Properties Building. Perspective is in the north direction. This has been identified as a non-point source pollution area.
Photograph 17 – Vehicular fueling station located southeast of the Properties Building. Fueling station is protected by bollards.
Photograph 18 – Miscellaneous equipment storage located in front of the High Bay building. The depicted storm drain inlet discharges to the Fire Pond to the north of this area.
Photograph 19 – This location is just east of the High Bay building facility. The image depicts the marine railway dock system in position for vessel maintenance.
Photograph 20 – Maintenance yard east of the High Bay building facility, just west of the marine railway dock system.
Photograph 21 – Marine railway dock system and vessel maintenance area. Perspective directed east looking out to Linkport Channel.
Photograph 22 - Marine railway dock system and vessel maintenance area. Perspective directed south.
Photograph 24 – Above Ground Storage Fuel Tank; located adjacent to the Utility Building and Equipment area north of the High Bay building facility. Perspective is looking northwest.
Photograph 26 – Natural Beach shoreline northwest of commencing point of the north jetty. Perspective is directed northwest.
Photograph 27 - Natural Beach shoreline northwest of commencing point of the north jetty. Perspective is directed east.
Photograph 28 - Natural Beach shoreline northwest of commencing point of the north jetty. Perspective is directed west.
Photograph 29 - North Shoreline along transition from shoreline to north jetty land feature. Perspective is directed east and origin point in northeast of the Johnson House.
Photograph 30 – Onsite Wastewater Treatment Facility.
Photograph 31 - Onsite Wastewater Treatment Facility accessory building.