

APPENDIX F PHYSICAL AND BIOLOGICAL MONITORING PROGRAM

PART 1 - REQUIRED MONITORING

1. Water Quality Monitoring

Borrow Site Location:

- Parameter: Turbidity - Nephelometric Turbidity Units (NTUs)
- Frequency: Every six hours during dredging.
- Background: At least 150 meters upcurrent from the dredge site, outside of any visible turbidity plume. Samples shall be collected from the surface and 1 meter above the bottom.
- Compliance: No more than 150 meters downcurrent from the dredge site, in the densest portion of any visible turbidity plume. Samples shall be collected from the surface and 1 meter above the bottom.

Beach Nourishment Site:

- Parameter: Turbidity - Nephelometric Turbidity Units (NTUs)
- Frequency: Every six hours during dredging.
- Background: At least 150 meters upcurrent from the discharge point, outside of any visible turbidity plume. Samples shall be collected from the surface and 1 meter above the bottom.
- Compliance: No more than 300 meters offshore and 1,000 meters downcurrent from the discharge point within the densest portion of any visible turbidity plume. Samples shall be collected from the surface and 1 meter above the bottom.

Weekly Summary: Weekly summaries of all monitoring data shall be submitted to the Office of Beaches and Coastal Systems and to the Southeast District Office within one week of analysis with documents containing the following information:

- (1) Permit number
- (2) Dates and times of sampling and analysis
- (3) A statement describing the methods used in collection, handling, storage and analysis of the samples
- (4) A map indicating the sampling locations and
- (5) A statement by the individual responsible for implementation of the sampling program concerning the authenticity, precision, limits of detection and accuracy of the data.

Monitoring Reports. Monitoring reports shall also include the following Information for each sample that is taken:

- (1) Time of day samples taken
- (2) Depth of water body
- (3) Depth of sample
- (4) Antecedent weather conditions
- (5) Tidal stage and direction of flow
- (6) Wind direction and velocity, and
- (7) Wave height.

The compliance locations given above shall be considered the limits of the temporary mixing zone for turbidity allowed during construction. If monitoring reveals turbidity levels at the beach compliance site greater than 29 NTUs above the associated background turbidity levels, construction activities shall cease immediately and not resume until corrective measures have been taken and turbidity has returned to acceptable levels.

2. Biological Monitoring

The Town shall submit a biological report within 90 days of completion of the post-construction survey and each annual survey. The report shall summarize the results of the biological surveys and the monitoring of the mitigation areas and identify any adverse impacts that would be attributable to the project. Each report shall compare the current conditions to a) the pre-construction baseline survey, b) the first postconstruction survey, and c) any previous annual survey(s) (where applicable). Each report shall contain an analysis and discussion of the video documentation in regards to any burial, subsidence, sedimentation, or trauma that has affected the marine algae, coral, sponges, or other related biological communities. In addition to the standard monitoring of physical stability and taxonomic lists of species, the plan should include ecological comparisons to adjacent hard bottom reefs that examine variables such as indices of recruitment for larval/juveniles, predation rates and prey vulnerability, and size structure of fish and selected invertebrates.

- a) Natural nearshore hardbottom: To verify that the project will not have an adverse affect on the natural nearshore reef located approximately 1,000 ft. to the north of the project, underwater surveys, with video documentation, of the nearshore hardbottom located north of the project area shall be taken immediately prior to construction, immediately after construction, and annually thereafter for a period of three years, unless otherwise determined by the Department following the third annual survey. DGPS navigational coordinates of the dives shall be referenced on the video transects and overlaid on recent aerial photography.
- b) Mitigation Artificial Reef. Underwater surveys of the mitigation artificial reef, with video documentation, shall be taken immediately prior to construction, immediately after construction, and annually thereafter for a period of three years, unless otherwise determined by the Department following the third annual survey. DGPS navigational coordinates of the dives shall be referenced on the video transects and overlaid on recent aerial

photography. If the three year monitoring survey indicates a reduction in the extent of the artificial reef, the Town shall submit a plan to make up the difference and implement the plan once approved by the Department.

- c) Hardbottom reef adjacent to the borrow areas, during construction phase surveys. Visual assessment of the condition and status of the benthic hardbottom community adjacent to the borrow area will be conducted at least once a week during periods of active dredging. During the survey, a qualified biologist using scuba will visually inspect the hardground areas that are adjacent to the borrow area. The biologist will note the general level of sediment and watch for indications of impact from sedimentation. Possible or imminent sediment impacts refer to identification of conditions or observations that indicate benthic organisms are being, or have been stressed by factors other than natural events. Thus, indications of possible impact will be based on comparative observations between borrow area locations and the “control” or comparison sites. In the event that an indication(s) of pending or imminent impact to benthic community components are documented during the construction surveys, the Department will be notified immediately of the possibility of increased sedimentation levels on the reefs. Notification will be by phone, radio or fax, and followed by a written report to be submitted within 24 hours, or on the next work day if the indicators are noted on a weekend or holiday. Indicators of possible of imminent impact include but are not limited to: (1) Standing sediment on hard corals, soft corals, sponge or other organisms that is not removed by normal currents or wave action; (2) Excessive mucus on hard corals, without indications of bleaching; (3) Excessively extruded polyps (e.g., sediment removal process); and (4) Mottling of color of benthic organisms (soft corals, algae, sponges, etc).

3. City of Lake Worth Emergency Sewage Outfall Monitoring

The Town shall conduct a pre and post construction assessment of the sewage outfall pursuant to the requirements of the City of Lake Worth Utilities Department. Any damage to the outfall caused by the project (e.g., due to contractor error or failure due to undermining caused by erosion into the borrow site, etc.) shall be restored by the Town to the satisfaction of the City of Lake Worth Utilities Department.

4. Bathymetric Monitoring

A hydrographic monitoring program shall be conducted for a minimum of three (3) years following completion of construction, unless otherwise determined by the Department following the third annual survey. The Town may incorporate the requirements of this monitoring plan into existing monitoring programs being conducted. The hydrographic monitoring program shall include the following:

- a) Beach and offshore profile surveys shall be conducted immediately prior to sand placement, immediately following completion of the project, and annually thereafter for a minimum of three (3) years following completion of construction, unless otherwise determined by the Department following the third annual survey. Profiles shall be surveyed at DEP reference monuments R-113 through R-129. The profile alignments shall be identical to the azimuths previously established for each monument. All beach profiles shall extend from the monument at least 1,500 feet seaward and out to the depth of closure if greater. Additional surveys may be required following a major storm as determined by the Department.

- b) The Town shall submit an engineering report and the monitoring data to the Office of Beaches and Coastal Systems within 90 days of completion of the post-construction survey and each annual survey. The survey data should be submitted on floppy disk in an ASCII format stored according to the Department's standards for file structure (contact the Office staff for additional information on specific requirements). The report should summarize the performance of the beach fill project, identify erosion and accretion patterns within the project limits and along the adjacent shorelines, verify the analyses that were conducted in the development of the design of the project, and identify any adverse impacts, which would be attributable to the project. Appendices should include plots of survey profiles and graphical presentations of volumetric and shoreline position changes for both the monitoring area and at each profile survey. Results should be analyzed for changes since the end of construction and between annual surveys. Monitoring reports shall be submitted to the Office of Beaches and Coastal Systems in Tallahassee and the Department's Southeast District office in West Palm Beach. Failure to submit reports in a timely manner constitutes grounds for revocation of the permit. When submitting this information to the DEP, please clearly include, at the top of each page or as a cover page to the submittal: "This information being provided in partial fulfillment of the monitoring requirements in Permit No. 0165332-001-JC."

PART 2 – REQUIRED MONITORING PLANS

1. Sand Quality Control Plan.

A Sand Quality Control Plan shall be provided and be subject to FDEP approval. The plan shall include: (a) a proposed sampling protocol to monitor the beach fill characteristics during construction; and (b) a contingency plan to remove coarse gravel from the beach fill material if it exceeds an amount that is not beach compatible as shall be defined in the Plan. The proposed Sand Quality Control Plan shall include a plan to monitor the sediment characteristics during construction to ensure that the beach fill will be generally free of rock and that there shall be no concentration greater than 0.7% at any one-sample area as prescribed by the Plan.

2. Juvenile Green Turtle Monitoring Plan.

Prior to issuance of the FDEP notice to proceed, a revised Mitigation Reef Plan (see Appendix E) shall be submitted to the FDEP for approval. The revised plan shall include surveys for the occurrence of juvenile green turtles in the mitigation reef area and control areas in concert with mitigation reef monitoring surveys. Visual assessments of juvenile green turtle occurrence shall be conducted via pedestrian surveys.

3. Biological Monitoring Study Plan

In order to determine if the ephemeral hardbottom in the surf zone is providing essential habitat to some component of the nearshore fish community that is not also provided by the mitigation, the Town shall submit a revised Mitigation Reef Plan to include provisions for monitoring and analysis to compare the utilization of the two habitat types within 1,000 feet of the project area (See Appendix E). In addition to fish species and age classes, the study will also look at colonization by macroalgae and utilization by marine turtles as feeding habitat. The plan shall provide details of the study with regard to methods used to compare the utilization of the habitat types, duration of the study, sampling sites, and monitoring frequency. The plan should include ecological comparisons that examine variables such as indices of recruitment for larval/juveniles, predation rates and prey vulnerability, size structure of fish and selected invertebrates, correspondence analysis and other statistical comparisons.

Within 30 days prior to the start of construction, the Town shall submit the following for FDEP approval:

- Turbidity Monitoring Qualifications. Construction at the project site shall be monitored closely to assure that turbidity levels do not exceed the compliance standards established in this permit. Accordingly, an individual familiar with beach construction techniques and turbidity monitoring shall be present at all times when fill material is discharged on the beach. This individual shall serve as site supervisor shall have authority to alter construction techniques or shut

down the dredging or beach construction operations if turbidity levels exceed the compliance standards established in this permit. The names and qualifications of those individuals performing these functions along with 24-hour contact information shall be submitted for approval.

- Biological Monitoring Qualifications. The names and qualifications of those individuals performing the biological monitoring shall be submitted for FDEP approval. All biological monitoring required by this permit shall be conducted by individuals having a good working knowledge of marine fish, algae, coral, and sponge taxonomy.

PART 3 - PRE-CONSTRUCTION CONFERENCE

At least 7 days prior to the planned commencement date of construction, the Town shall schedule a pre-construction conference to review the specific conditions of this permit with the contractors, work crews, the FDEP's staff representatives, and the marine turtle permit holder. The Town shall provide a minimum of 7 days advance written notification to the following offices advising of the date, time, and location of the pre-construction conference:

DEP Beaches and Coastal Systems, MS 300
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000
fax: (850) 488-5257

FWC - BPSM
Office of Environmental Services
620 South Meridian Street
Tallahassee, Florida 32399-1600
fax: (850) 921-4369

DEP - SLERP
400 North Congress Avenue
West Palm Beach, Florida 33401
fax: (561) 681-6780

Palm Beach County DERM
3323 Belvedere Road, Bldg. 502
West Palm Beach, FL 33406-1548
fax: (561) 233-2414

City of Lake Worth Utilities
Water Systems Superintendent
1900 2nd Avenue North
Lake Worth, FL 33460

PART 4 - MARINE SEA TURTLES

In order to ensure that marine turtles are not adversely affected by the construction activities authorized by this permit, the Town shall adhere to the following conditions:

- a. Prior to placement of fill over any hard bottom, a revised Mitigation Reef Plan (see Appendix E) shall be submitted to the FDEP for approval. The revised plan shall include surveys for the occurrence of juvenile green turtles in the mitigation reef area and control areas in concert with mitigation reef monitoring surveys. The occurrence of juvenile green turtles in the project area will be assessed during regularly scheduled field surveys referred to as “pedestrian surveys” as set forth in the FDEP permit.
- b. Beach nourishment shall be started after October 31 and be completed before May 1. During the May 1 through October 31 period, no construction equipment or pipes shall be stored on the beach.
- c. Construction related activities are authorized to occur on the nesting beach (seaward of existing coastal armoring structures or the dune crest) during the early (March 1 through April 30) nesting season under the following conditions:
 - i. A daily marine turtle nest survey of the nesting beach in the vicinity of the project (including areas of beach access) shall be conducted starting March 1 and continue until October 31. Only those nests that may be affected by construction activities shall be relocated. Nests requiring relocation shall be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Nest relocations in association with construction activities shall cease when construction activities no longer threaten nests. Nests deposited within areas where construction activities have ceased or will not occur for 65 days shall be marked and left in place unless other factors threaten the success of the nest. Such nests will be marked and the actual location of the clutch determined. A circle with a radius of ten (10) feet, centered at the clutch, shall be marked by stake and survey tape or string. No construction activities shall enter this circle and no adjacent construction shall be allowed which might directly or indirectly disturb the area within the staked circle.
 - ii. No construction activity may commence on any previously undisturbed section of adjacent beach more than 50 feet from the active work site until completion of the marine turtle survey each day unless the Town has made provisions for nighttime marine turtle surveys of the area prior to any work, including movement of equipment or pipes, in that area.

- d. It is the responsibility of the Town to ensure that the project area and access sites are surveyed for marine turtle nesting activity. All nesting surveys, nest relocations screening or caging activities etc. shall be conducted only by persons with prior experience and training in these activities and who is duly authorized to conduct such activities through a valid permit issued by the Fish and Wildlife Conservation Commission (FWC), pursuant to Florida Administrative Code 68E-1.
- e. If the beach nourishment project will be conducted during the period from November 1 through November 30, nest marking or nest relocation shall be initiated in accordance with the requirements outlined above at least 65 days prior to project initiation and continue through November 30.
- f. From March 1 through April 30 and November 1 through November 30, all project lighting shall be limited to the immediate area of active construction only and shall be the minimal lighting necessary to comply with U.S. Coast Guard and/or OSHA requirements. Stationary lighting on the beach and all lighting on the dredge shall be minimized through reduction, shielding, lowering, and appropriate placement of lights to minimize illumination of the nesting beach and water. Lighting on offshore equipment shall be minimized through reduction, shielding lowering, and appropriate placement of lights to avoid excessive illumination of the water, while meeting all U.S. Coast Guard and OSHA requirements.
- g. From March 1 through October 31, staging areas for construction equipment shall be located off the beach. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities.
- h. The Applicant shall arrange a meeting between representatives of the contractor, the FDEP, the FWC, and the permitted person responsible for egg relocation at least 30 days prior to the commencement of work on this project. At least 10 days advance notice shall be provided prior to conducting this meeting. This will provide an opportunity for explanation and/or clarification of the sea turtle protection measures.
- i. In the event a sea turtle nest is excavated during construction activities, all work shall cease in that area immediately and the permitted person responsible for egg relocation for the project should be notified so the eggs can be moved to a suitable relocation site.
- j. All fill material placed shall be sand that is similar to that already existing at the beach site in both coloration and grain size distribution and shall be suitable for marine turtle nesting.

- k. To ensure that the requirements for similarity of fill material to native beach sands are met, the Town shall submit a Sand Quality Control Plan as required in the notice to proceed requirement above.
- l. Immediately after completion of the beach nourishment project and prior to February 15 for 3 subsequent years, sand compaction shall be monitored in the area of restoration in accordance with a protocol agreed to by the FDEP, the U.S. Fish & Wildlife Service, and the Applicant. At a minimum, the protocol provided below shall be followed. If required, the area shall be tilled to a depth of 36 inches. All tilling activity must be completed prior to February 15. A report on the results of compaction monitoring shall be submitted to the FDEP prior to any tilling actions being taken. An annual summary of compaction surveys and the actions taken shall be submitted to the FDEP. This condition shall be evaluated annually and may be modified if necessary to address sand compaction problems identified during the previous year.
- m. Compaction sampling stations shall be located at 500-foot intervals along the project area. One station shall be at the seaward edge of the dune/bulkhead line (when material is placed in this area); one station shall be midway between the dune line and the high water line (normal wrack line); and one station shall be located just landward of the high water line.
 - i. At each station, the cone penetrometer shall be pushed to a depth of 6, 12, and 18 inches three times (three replicates). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lie over less compact layers.
 - ii. Replicates shall be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth shall be averaged to produce final values for each depth at each station. Reports shall include all 27 values for each transect line, and the final 9 averaged compaction values.
 - iii. If the average value for any depth exceeds 500 psi for any two or more adjacent stations, then that area shall be tilled prior to February 15. If values exceeding 500 psi are distributed throughout the project area but in no case do those values exist at two adjacent stations at the same depth, then consultation with the FDEP shall be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling shall not be required.
- n. Prior to sea turtle nesting season (March 1st), an annual visual survey for escarpment formation shall be conducted within the project area. This survey shall be conducted following beach nourishment and for three years thereafter.

Escarpments that exceed 18 inches in height for a distance of 100 feet shall be leveled to the natural beach contour before March 1st. An annual summary of this survey and any action taken shall be submitted to the FDEP.

- o. During marine turtle nesting season (March 1st to October 31st), weekly visual surveys for escarpment formation shall be conducted within the project area. These surveys shall be conducted for three nesting seasons following beach nourishment. An annual summary of these surveys and any action taken shall be submitted to the FDEP together with the annual survey data from item (n) above of this permit. Weekly surveys shall include:
 - i. The number of escarpments and their location relative to DNR-DEP reference monuments shall be recorded. Notations on the height of any escarpments shall be included (0 to 18 inches, 18 inches to 4 feet, 4 feet or higher) as well as the maximum height of all escarpments.
 - ii. Escarpments that exceed 18 inches in height for a distance of 100 feet shall be reported in writing to the FDEP within 3 days of the survey. This report shall include the number and location of nests in the vicinity of the escarpment. Upon written notification, the Town shall level escarpments in accordance with mechanical methods prescribed by the FDEP.
 - iii. Any escarpments that exceed 18 inches in height for a distance of 100 feet shall be leveled to the natural beach contour by March 1. If weekly surveys during the marine turtle nesting season document subsequent reformation of escarpments that exceed 18 inches in height for a distance of 100 feet, then the FDEP shall be contacted immediately to determine the appropriate action to be taken. Upon written notification, the Town shall level escarpments in accordance with mechanical methods prescribed by the FDEP.
- p. Reports on all nesting activity shall be provided for the initial nesting season and for a minimum of two additional nesting seasons by January 31 of the following year. Monitoring of nesting activity in the two seasons following construction shall include daily surveys and additional measures required by the FDEP as outlined in the table below. Reports submitted shall include daily report sheets or a summary of the field sheets noting all activity, nesting success rates, hatching success rates of all relocated nests, hatching success of a representative sample of nests left in place (if any), dates of construction and names of all personnel involved in nest surveys and relocation activities. All information shall separate data from areas that receive fill from those that do not receive fill or control areas. These control areas shall be of similar length to the project area. Two or more years of existing preconstruction monitoring data should be submitted with the first postconstruction monitoring report, and prior to each renourishment.

- q. Upon locating a dead, injured, or sick endangered or threatened sea turtle specimen, initial notification must be made to the Florida Department of Environmental Protection at 1-800-DIAL FMP. Care should be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

PART 5 - MANATEES

In order to ensure that manatees are not adversely affected by the construction activities authorized by this permit, the Town shall adhere to the following conditions:

- a. The Town/contractor shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel are responsible for observing water-related activities for the presence of manatee(s), and shall implement appropriate precautions to ensure protection of the manatee(s).
- b. The Town/contractor shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees, which are protected under the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, and the Florida Manatee Sanctuary Act of 1978. The Town and/or contractor may be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.
- c. Prior to commencement of construction, the prime contractor involved in the construction activities shall construct and display at least two temporary signs (placards) concerning manatees. For all vessels, a temporary sign (at least 8.5" X 11") reading "**Manatee Habitat/Idle Speed In Construction Area**" will be placed in a prominent location visible to employees operating the vessels. In the absence of a vessel, a temporary sign (at least 2' X 2') reading "**Caution: Manatee Area**" will be posted in a location prominently visible to land based, water-related construction crews. A second temporary sign (at least 8.5" X 11") will be located prominently adjacent to the displayed issued construction permit and shall read:

"Caution: Manatee Habitat. Idle speed is required if operating a vessel in the construction area. All equipment must be shutdown if a manatee comes within 50 feet of the operation. A collision with and/or injury to a manatee shall be reported immediately to the Florida Marine Patrol at 1-800-DIAL-FMP (1-800-342-5367) and the U. S. Fish and Wildlife Service at (1-904-232-2580) for north Florida or (1-561-562-3909) for south Florida."

Note: Temporary notices are to be removed by the Town upon completion of construction.

- d. Siltation barriers shall be properly secured so that manatees cannot become entangled, and monitored at least daily to avoid manatee entrapment. Barriers shall not block manatee entry to or exit from essential habitat and shall be made of material in which manatees cannot become entangled.

- e. All vessels associated with the project shall operate at "no wake/idle" speeds at all times while in waters where the draft of the vessel provides less than a four foot clearance from the bottom and vessels shall follow routes of deep water whenever possible. Boats used to transport personnel shall be shallow-draft vessels, preferably of the light-displacement category where navigational safety permits. All vessels will follow routes of deep water whenever possible.
- f. If a manatee(s) is sighted within 100 yards of the project area, all appropriate precautions shall be implemented by the Contractor to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet of a manatee. If a manatee is closer than 50 feet to moving equipment or the project area, the equipment shall be shut down and all construction activities shall cease to ensure protection of the manatee. Construction activities shall not resume until the manatee has departed the project area.
- g. The contractor will maintain a log detailing sightings, collisions, or injuries to manatees should they occur during the contract period. A report summarizing incidents and sightings shall be submitted to the FWCC Bureau of Protected Species Management, 620 South Meridian Street, Tallahassee, Florida 32399-1600 and to the U. S. Fish and Wildlife Service, 6620 Southpoint Drive South, Suite 310, Jacksonville, Florida 32216-0912. This report must be submitted within 90 days of completion of the activities conducted in accordance with the permit.
- h. Any collisions with a manatee or sighting of any injured or incapacitated manatee shall be reported. The Contractor shall also immediately report any take of a manatee to the Florida Marine Patrol "Manatee Hotline" (800) 342 5367 as well as the U.S. Fish and Wildlife Service, Jacksonville Endangered Species Field Station (904) 232 2580 and the Florida Department of Environmental Protection (DEP), Office of Protected Species at (904) 922-4330.

Within 15 days, following project completion, a report summarizing the above incidents and sightings, including a list and addresses of all observers utilized during the construction will be submitted to the following:

- Florida DEP Office of Protected Species 3900 Commonwealth Blvd. Mail Station 245 Tallahassee, Florida 32399
- U.S. Fish and Wildlife Service, 6620 Southpoint Drive South-Suite 310, Jacksonville, Florida 32216
- Chief, Environmental Resources Branch, U.S. Army Corps of Engineers (CESAJ PD E), P.O. Box 4970, Jacksonville, Florida 32232-0019
- Florida Marine Patrol's District 8 Office, 2510 2nd Avenue North, Jacksonville Beach, Florida 32250