

**Florida Inland Navigation District (FIND)**  
**Sediment Quality Control/Quality Assurance Plan**  
**for**  
**Maintenance Dredging with Beach Placement**

**INTRACOASTAL WATERWAY**  
**0269646-001-JC**  
**ST. LUCIE COUNTY,**  
**FLORIDA**  
**13 March 2017**

**A. Plan Purpose and Objectives**

1. The purpose of the Sediment Quality Control (QC) and Quality Assurance (QA) Plan is to ensure that sediment placed on the beach meets the standards shown in Appendix A. To protect the environmental functions of Florida's beaches, only beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Geotechnical investigations and/or historical data for the project have indicated that the sediment located within the spatial limits of the permitted channel cut(s) meets the standards shown in Appendix A. Taylor Engineering (Taylor), on behalf of the FIND and St. Lucie County, has provided an analysis of the existing or native sediment and the sediment within the permitted dredge cuts that demonstrates its compatibility with the naturally occurring beach sediment. Based upon this information and the design of the maintenance dredge project, the Department of Environmental Protection (Department) has determined that beach placement of the sediment from the dredge area(s) will maintain the general character and functionality of the sediment occurring on the beach and in the adjacent dune and coastal system.
2. The QC provisions of the Plan reiterate the contract requirements placed on the selected contractor to perform all work within the construction tolerances of the authorized channel cut(s), to promptly modify dredging activity should sediments unsuitable for beach placement be encountered, and to take remedial actions should unsuitable material be placed on the beach. Sediment quality specifications are provided for the dredged material within a range of acceptable sand quality values which must be met for final acceptance. The sediment quality specifications take into account the variability of material within the channel and represent values which may reasonably be attained given what is known about the material to be dredged.
3. The QA provisions of the Plan outline the steps taken by the Taylor Quality Assurance Representative (QAR) and Project Delivery Team (PDT) to assure compliance of observations, sample collection, and testing of the placed sediments. In addition, reporting requirements are provided.

## **B. Risk Management**

1. This section outlines the responsibilities of Contractor and Taylor as they relate to the placement of dredged material on the beach. These responsibilities are in response to the acknowledged minimal risk that non-beach compatible sediments may exist in lenses within the channel and could be unintentionally placed on the beach.
2. The Taylor has performed geotechnical investigations to the standard of care in the industry and has relied on the linear nature of sedimentary deposits, and a limited number of samples to design the channel cuts. Taylor has the personnel and access to testing facilities to sample and test sediment that has been placed on the beach.
3. The Taylor will be directing the work to be done and has relied on its findings, which are based on limited borings as well as previous experience dredging this same template, in authorizing the project to go to construction. Taylor has experience with these types of projects, and has the authority to modify the project (within the constraints of the permits and available funding) in the event that non-beach compatible sediments are inadvertently placed on the beach.
4. The Contractor will be undertaking the work and will be relying on the Taylor's findings in constructing the project. The Contractor will have on-site quality control personnel who can identify obvious changes in sediment quality at the active placement location. The Contractor has or can acquire the equipment and personnel to remediate the beach if so required by the contract or further directed by Taylor. Based on the above discussion Taylor believes this project is low risk.
5. The Contractor will be provided with all available descriptions of sediment samples collected within the channel and will acknowledge at the preconstruction conference that he is aware of the quality of the sediment as described in the geotechnical data. This data will be presented in the construction specifications.

## **C. Beach Placement Sediment Quality Specifications**

1. Beach fill material shall be beach compatible and meet the specifications required by Florida Administrative Codes 62B-41.007 (j), 62B-33.002 (8) and 62B-33.0015. In addition, the fill shall meet the following requirements.
  - (a) Beach fill material shall be clean sand from a permitted source, free of construction debris, asphalt, clay balls, branches, leaves and other organics, oil, pollutants and any other non-beach compatible materials. The sand shall be similar to the existing beach sediments in color and texture and shall not contain rocks or large shell or any other non-beach compatible material in excess of 50% of background of the existing beach.

- (b) The final composite grain size of the fill material shall conform to the following, by weight measure (all sieve sizes refer to U.S. Std. sieves):
  - (c) not more than 10% finer than the No. 230 sieve
  - (d) not more than 5% coarser than the No. 4 sieve, and
  - (e) not more than 3.0 % coarser than 3/4-inch sieve.
2. The compliance values described above and summarized in Table 1 refer to the average values assessed over 10,000 square feet area of the placed fill material. Owing to the natural variability of the fill material, it is recognized that individual samples may deviate from the specified compliance values.

**Table 1- Sediment Compliance Specifications**

<b>Sediment Parameter</b>	<b>Parameter Definition</b>	<b>Compliance Value</b>
Maximum Silt Content	passing #230 sieve	10 percent
Maximum Fine Gravel Content	retained on #4 sieve	5 percent
Maximum Large Shell Content	retained on ¾ inch sieve	3 percent

**D. Quality Control**

1. The Contractor will be responsible for establishing such control as may be necessary to ensure that the construction tolerances are not exceeded. The contract documents will incorporate the following technical requirements, or equivalent language, that address the dredging location, sediment quality monitoring and reporting, modification of dredging activity, and remedial actions if necessary. Taylor will seek to enforce these contract requirements during the execution of work.

2. Positioning Equipment

Dredge plants will be equipped with horizontal and vertical control systems that provide the operator with the position of the excavation device, as appropriate. The electronic positioning equipment will be continuously operated to monitor the positioning of the dredge location(s). The dredge positioning equipment will have a horizontal accuracy equal to or better than a standard Differential Global Positioning System (DGPS), equal to or better than plus/minus 5 feet. Vertical positioning shall account for tides and have an accuracy of plus/minus 0.5 foot. If a known permit violation occurs, the dredge positioning data will be made available for review at the Taylor office.

3. Beach Observation

The Contractor will continuously visually monitor the material being placed on the beach for unacceptable material. If occasional debris, trash, rocks, or silty materials appear on the beach during dredging operations and appear to exceed background or existing levels, the Contractor will remediate as specified in the contract. The excavation location of unacceptable material will be provided with the DEP notification required in the Remediation Action section below. If the contractor’s QC personnel observe a significant

pattern of non-compliant material, such as streaking, a lens or non-compliant material, they will contact the QAR within 60 minutes.

4. If the material exhibits an unusual color, abnormally foul odor or produces a petroleum sheen, dredging shall be discontinued immediately by lifting or moving the excavation device and the discharge pipe flushed clean by continuing to pump water only through the line. Once the line has been flushed clear of solids, pumping may be discontinued. The QAR shall be notified immediately in this situation.
5. Noncompliant Material Handling Provision

The Contractor shall have plans and equipment available for use to handle any noncompliant material encountered during dredging. Any debris placed on the beach shall be handled under the guidelines set forth in Section E below.

#### **E. Quality Assurance**

1. Taylor may use the contractor's daily reports, plans, and sample descriptions to determine where the Contractor may dredge to avoid placement of unacceptable materials. Taylor will adjust the construction operation to avoid placement of the unacceptable material on the beach to the greatest extent practicable. Taylor will determine where non-beach compatible material will be disposed of if encountered. Remediation actions are discussed in Section F below.
2. Taylor will enforce the construction contract and FDEP permits related to sediment quality in accordance with the following:
  - (a) Construction observation by the Taylor Quality Assurance Representative (QAR) will be performed during periods of active placement. Most observations will be conducted during daylight hours. However, random nighttime observations may be conducted.
  - (b) The Taylor QAR will provide oversight. The QAR shall be an individual with training or experience in beach placement, construction inspection, and testing; and is knowledgeable of the project design and permit conditions.
  - (c) The project QC provisions to be implemented by the Contractor will be discussed as a matter of importance at the coordination meeting. The Contractor will be required to acknowledge the goals and intent of the above described QC Plan at the coordination meeting.
  - (d) Taylor will review the Contractor's daily reports which characterize the nature of the sediments encountered at the channel area and placed on the beach with attention to the presence of rock, rubble, shell, silt, or debris that exceeds acceptable limits. The Taylor will review the dredge positions in the Contractor's Daily Report.

- (e) The QAR or a designated alternate will be available during the period of construction for the purpose of making decisions regarding issues that involve QA/QC Plan compliance.
3. If non-compliant material or a pattern of non-compliant material continues for more than 1 to 2 hours, the QAR will inform and consult with the Project Manager or Project Engineer (PM/PE) and determine if dredging should be discontinued in this area of the project. If dredging is discontinued in an area, the PM/PE will call an emergency PDT meeting on the next available business day. The PDT will discuss the disposition of the area in question as well as the appropriate beach remediation which may be required. The QAR and PM/PE will determine where dredging operations can be feasibly relocated into another area and continue dredging in the project footprint.
  4. Any modification to the Contract between Taylor and the Contractor will be evaluated by Taylor to determine whether or not the change in scope will potentially adversely affect the above described QC Plan.
  5. To assure that the fill material placed on the beach is in compliance with the permit, Taylor will conduct assessments of the beach fill material at not less than 200-foot intervals of newly constructed berm to visually assess grain size, Munsell color, shell content, and silt content. The sample shall be a minimum of 1 U.S. pint (approximately 200 grams). This assessment will consist of handling the fill material to ensure that it is predominantly sand, to note the physical characteristics, and to assure the material meets the sediment compliance parameters specified in this Plan. Each sample will be archived with the date, time, and location of the sample. The results of these daily inspections, regardless of the quality of the sediment, will be appended to or notated on the Contractor's Daily Report. All samples will be stored by the Taylor for at least 30 days after project's physical completion. If deemed necessary by the QAR, testing by a Taylor-approved laboratory of the material will be conducted by the Contractor for grain size, shell and silt content as described in Section G.
  6. Taylor will have the authority to determine whether the material placed on the beach is acceptable or unacceptable. If the QAR determines that the beach fill material does not comply with the sediment compliance specifications in this QC/QA Plan, the QAR will inform the Contractor and PM/PE. The PM/PE will promptly determine the appropriate course of action. If necessary, the PDT will determine if further material excavated from this area should be placed in an alternate location.
  7. In the event that Taylor determines that a section of beach contains material that is not in compliance with the permit, then the FDEP will be notified. Notification will indicate the volume, aerial extent, location of any unacceptable beach areas and any planned remediation. Additional testing may be required to delineate the area of unacceptable material at the discretion of the PDT.
  8. In order to determine if an area greater than 10,000 square feet of beach fill is noncompliant, the following procedures will be performed by the Contractor with Taylor oversight:

- (a) Upon determination that the first random surface grab sample (a minimum of one will be taken) is noncompliant, a minimum of five additional surface grab samples will be taken at a 25-foot spacing in all directions and visually analyzed. If the additional samples are noncompliant, then additional samples can be taken at 25-foot spacing in all directions until the aerial extent is identified.
- (b) The samples will be visually compared to the sediment quality specifications denoted in Table 1. If deemed necessary, testing by a USACE-approved laboratory of the material will be conducted for grain size, shell and silt content as described in Section G.
- (c) A site map will be prepared depicting the location of all samples and the boundaries of all areas of non-compliant fill. The total square footage will be determined; the site map and laboratory analyses will be provided to Taylor and forwarded to FDEP.

## **F. Remediation Actions**

1. The QAR shall have the authority to determine whether the material placed on the beach is compliant or noncompliant. If placement of noncompliant material occurs, the QAR will inform the contractor that remediation action is required as specified in the contract. Should a situation arise during beach placement that cannot be corrected by the remediation methods described within this QC/QA Plan, the FDEP will be notified. The typical remediation actions for each sediment parameter are as follows:
  - (a) Silt: blending the noncompliant fill material with compliant fill material within the adjacent construction berm sufficiently to meet the compliance value, or removing the noncompliant fill material.
  - (b) Shell: blending the noncompliant fill material with compliant fill material within the adjacent construction berm sufficiently to meet the compliance value or removing the noncompliant fill material.
  - (c) Munsell color: blending the noncompliant fill material with compliant fill material within the adjacent construction berm sufficiently to meet the compliance value or removing the noncompliant fill material.
  - (d) Coarse gravel: screening and removing the noncompliant fill material.
  - (e) Construction debris, toxic material, or other foreign matter: removing the noncompliant fill material.
2. All fill material that cannot be remediated will be removed from the beach and transported to an appropriate location approved by Taylor and located landward of the Coastal Construction Control Line.
3. Post-Remediation Testing

Re-sampling shall be conducted by the contractor following any remediation actions in accordance with the protocols described in Section E.8a and 8b. Samples will be archived by the USACE.

4. Reporting

A post-remediation report containing a site map will be prepared depicting the location of all samples and the boundaries of all areas of remediation actions. The site map, laboratory analyses, and volume of noncompliant fill material will be provided to the USACE and forwarded to FDEP within 120 days.

**G. Post-placement Sampling for Laboratory Testing**

1. In order to facilitate post-placement sampling, Taylor will be notified by the Contractor approximately two weeks prior to the completion of dredging. To assure that the fill material placed on the beach was adequately assessed by the dredge material investigation, Taylor will conduct assessments of the sediment as follows:
  - (a) Post-placement sampling and testing of the fill material will be conducted to verify that the sediment placed on the beach meets the expected criteria/characteristics provided during from the geotechnical investigation. For each 500-ft long section of beach placement, the Taylor Representative will collect two (2) duplicate sand samples, preferably at a FDEP reference monument profile line, to quantitatively assess the grain size distribution, moist Munsell color, shell content, and silt content. If the beach placement area is less than 1,000 feet, then duplicate samples shall be collected at a minimum of three (3) sample locations evenly spaced along the length of the beach placement area. The Taylor representative will collect the sediment samples of a minimum of 1 U.S. pint (at least 200 grams) each from the bottom of a test hole 6 to 18 inches deep within the limits of the constructed berm. The Taylor representative will visually assess grain size, Munsell color, shell content, and silt content of the material by handling the fill material to ensure that it is predominantly sand, and further to note the physical characteristics. The Taylor representative will note the existence of any layering or rocks within the test hole. One sample will be sent for laboratory analysis while the other sample will be archived by Taylor. All samples and laboratory test results will be labeled with the Project name, FDEP Reference Monument Profile Line designation, date sample was obtained, and "Berm."
2. All samples will be evaluated for visual attributes (Munsell color and shell content), sieved in accordance with the applicable sections of ASTM D 6913 Particle Size Analysis of Soils, ASTM C 136 Sieve Analysis of Aggregates, and analyzed for carbonate content if applicable. The samples will be sieved using the following U.S. Standard Sieve Numbers: ¾", 3/8", 3.5, 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230. The testing shall be performed by a Taylor-validated laboratory.
3. A summary table of the sediment samples and test results for the sediment compliance parameters shall accompany the complete set of laboratory testing results. The column

headings will include: Sample Number; State Plane (X, Y) Coordinate location, Mean Grain Size (mm); Sorting Value; Silt Content (%); Shell Content (%); Munsell Color Value; and a column stating whether each sample MET or FAILED the compliance values found in Table 1. The sediment testing results will be certified by a P.E. or P.G. from the testing laboratory. Taylor will submit sediment testing results and analysis report to FDEP within 90 days following beach placement.

4. In the event that a section of beach contains fill material that is not in compliance with the sediment quality specifications, then FDEP will be notified. Notification will indicate the volume, aerial extent and location of any unacceptable beach areas and remediation planned.

## **H. Reports and Notices**

1. All reports or notices relating to this permit shall be emailed and sent to the Department at the following locations:

DEP Bureau of Beaches & Coastal  
Systems JCP Compliance Officer  
Mail Station 300  
3900 Commonwealth Boulevard  
Tallahassee, Florida 32399-3000

Phone: 850-414-7716

E-mail: [JCP.Compliance@dep.state.fl.us](mailto:JCP.Compliance@dep.state.fl.us)

## APPENDIX A - Florida DEP Rules on Beach Fill

### 62B-41.007 (2) (j), F.A.C.

1. To protect the environmental functions of Florida's beaches, only beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Such material shall be predominately of carbonate, quartz or similar material with a particle size distribution ranging between 0.062mm (4.0 $\phi$ ) and 4.76mm (-2.25 $\phi$ ) (classified as sand by either the Unified Soils or the Wentworth classification), shall be similar in color and grain size distribution (sand grain frequency, mean and median grain size and sorting coefficient) to the material in the existing coastal system at the disposal site and shall not contain:
  - a. Greater than 5 percent, by weight, silt, clay or colloids passing the #230 sieve (4.0 $\phi$ );
  - b. Greater than 5 percent, by weight, fine gravel retained on the #4 sieve(-2.25 $\phi$ );
  - c. Coarse gravel, cobbles or material retained on the 3/4 inch sieve in a percentage or size greater than found on the native beach;
  - d. Construction debris, toxic material or other foreign matter; and
  - e. Materials that will result in cementation of the beach.
2. If rocks or other non-specified materials appear on the surface of the filled beach in excess of 50% of background in any 10,000 square foot area, then surface rock should be removed from those areas. These areas shall also be tested for subsurface rock percentage and remediated as required. If the natural beach exceeds any of the limiting parameters listed above, then the fill material shall not exceed the naturally occurring level for that parameter.

### 62B-41.007 (2) (k), F.A.C.

1. Pursuant to subsection 62B-41.005(15), F.A.C., sandy sediment derived from the maintenance of coastal navigation channels shall be deemed suitable for beach placement with up to 10% fine material passing the #230 sieve, provided that it meets the criteria contained in subparagraphs (j)2. through 5. above and water quality standards. If this material contains between 10% and 20% fine material passing the #230 sieve by weight, and it meets all other sediment and water quality standards, it shall be considered suitable for placement in the nearshore portion of the beach.