

**BONITA BEACH AND LOVERS KEY BEACH NOURISHMENT PROJECT
PERMIT NO. 0311811-004-JM**

**SEDIMENT QUALITY ASSURANCE / QUALITY CONTROL PLAN FOR BEACH
RESTORATION OR NOURISHMENT USING AN OFFSHORE BORROW AREA**

A. INTRODUCTION

Pursuant to Florida Administrative Code (F.A.C.) 62B-41.008 (1) (k) 4.b., permit applications for inlet excavation, beach restoration, or nourishment shall include a quality assurance/control plan that will ensure that the sediment from the borrow areas to be used in the project will meet the standard in 62B-41.007(2)(j), F.A.C (Exhibit 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.

The COUNTY has conducted geotechnical investigations that provide data concerning the character of the sediment and the quantities available within the spatial limits of the permitted borrow areas. The COUNTY has provided an analysis of the existing or native sediment and the sediment within the permitted borrow areas that demonstrates its compatibility with the naturally occurring beach sediment in accordance with Fla. Admin. Code r. 62B-41.007(2)(j). The sediment analysis and volume calculations were performed using established industry standards, and are certified by a Professional Engineer or a Professional Geologist registered in the State of Florida.

Based upon this information and the design of the borrow areas, the Department of Environmental Protection (Department) has determined that use of the sediment from the borrow areas will maintain the general character and functionality of the sediment occurring on the beach and in the adjacent dune and coastal system. Furthermore, this information and the borrow area design provides sufficient quality assurance/quality control (QA/QC) that the mean grain size and carbonate content of the sediment from the borrow areas will meet the requirements of 62B-41.007(2)(j), F.A.C.; hence, additional QA/QC procedures are not required for these sediment parameters during construction.

This plan outlines the responsibilities of each stakeholder in the Project as they relate to the placement of beach compatible material on the beach. These responsibilities are in response to the possibility that non-beach compatible sediments may exist within the borrow areas and could be unintentionally placed on the beach. The QC Plan specifies the minimum construction management, inspection and reporting requirements placed on the Contractor and enforced by the COUNTY, to ensure that the sediment from the borrow areas to be used in the Project meet the compliance specifications. The QA Plan specifies the minimum construction oversight, inspection and reporting requirements to be undertaken by the COUNTY or COUNTY's On-Site Representative to observe, sample, and test the placed sediments to verify the sediments are in compliance.

B. SEDIMENT QUALITY SPECIFICATIONS

The sediment from the borrow areas is similar in Munsell color and grain size distribution to the material in the existing coastal system at the beach placement site. The Department and the COUNTY acknowledge that it is possible that discrete occurrences of non-beach compatible sediments may exist within the permitted borrow areas that do not comply with the limiting parameters of 62B-41.007(2)(j) 1. – 5., F.A.C., or vary in Munsell color from the composite value. Furthermore, the Department may consider more restrictive values for the sediment parameters to ensure that the sediment from the borrow areas is similar in color and grain size distribution to the sediment in the existing coastal system at the beach placement site. Therefore, fill material compliance specifications for the sediment from the borrow areas proposed for this Project are provided in Table 1.

The compliance specifications take into account the variability of sediment on the native or existing beach, and are values which may reasonably be attained given what is known about the borrow area sediment. Beach fill material which falls outside of these limits will be considered unacceptable and subject to remediation.

Table 1: Sediment Compliance Specifications.

Sediment Parameter	Parameter Definition	Compliance Value
Max. Silt Content	passing #230 sieve	5%
Max. Shell Content*	retained on #4 sieve	5%
Munsell Color Value	moist Value (chroma = 1)	6 or lighter
The beach fill material shall not contain construction debris, toxic material, other foreign matter, coarse gravel or rocks.		

*Shell Content is used as the indicator of fine gravel content for the implementation of quality control/quality assurance procedures and 5% is consistent with the native beach gravel content.

C. QUALITY CONTROL PLAN

The contract documents shall incorporate the following technical requirements, or equivalent language that addresses the location of dredging, sediment quality monitoring on the beach, and, if necessary, remedial actions. The COUNTY will seek to enforce these contract requirements during the execution of work.

1. Electronic Positioning and Dredge Depth Monitoring Equipment. The Contractor will continuously operate electronic positioning equipment, approved by the COUNTY, to monitor the precise positioning of the excavation device location(s) and depth(s). A Differential Global Positioning System (DGPS) or equivalent system providing equal or better accuracy will be used to determine the horizontal position and will be interfaced with an appropriate depth measuring device to determine the vertical position of the bottom of the excavation device. The horizontal

positioning equipment will maintain an accuracy of +/- 3.0 feet. The vertical positioning equipment will maintain a vertical accuracy of +/-0.5 feet with continuous applicable tidal corrections measured at the borrow areas.

2. Dredge Location Control. The Contractor is required to have, in continuous operation on the dredge, electronic positioning equipment that will accurately compute and plot the position of the dredge. Such fixes, and the accompanying plots, will be furnished to the COUNTY's On-Site Representative daily as part of the QC Reports. The electronic positioning equipment will be installed on the dredge so as to monitor, as closely as possible, the actual location of the excavation device(s). The location of the master antenna on the dredge and the distance and direction from the master antenna to the bottom of the excavation device will be reported on the Daily Reports. A printout of the excavation device positions in State Plane Coordinates, the excavation device depths corrected for tide elevation and referenced to the North American Vertical Datum of 1988 (NAVD88) and the time, will be maintained using an interval of two (2) minutes for each printed fix. A printed and computer file (in ASCII format) copy of the position data will be provided to the COUNTY as part of the daily report. The Contractor will prepare a plot of the data that includes the State Plane Coordinate grid system and the borrow area limits. The format of the plot may be subject to approval by the COUNTY. No dredging will take place outside of the borrow area limits (horizontal and vertical limits) as shown on the drawings.

3. Dredging Observation. The Contractor will be responsible for establishing such control as may be necessary to insure that the allowable excavation depths and spatial limits are not exceeded. If the Contractor encounters noncompliant sediment during dredging, the Contractor will immediately cease dredging, relocate the dredge into compliant sediment, and will verbally notify the COUNTY's On-site Representative, providing the time, location, and description of the noncompliant sediment. The Contractor will also report any encounters with noncompliant sediment in the Contractor's Daily Report, providing depth and location in State Plane Coordinates of said materials within the borrow area. The Contractor, in cooperation with the COUNTY, will use the dredge positioning records, plans, and vibrocore descriptions to determine where the Contractor may dredge to avoid additional placement of noncompliant sediment. The Contractor will adjust his or her construction operation to avoid the noncompliant sediment to the greatest extent practicable.

4. Beach Observation. The Contractor will continuously visually monitor the sediment being placed on the beach. If noncompliant sediment is placed on the beach, the Contractor will immediately cease dredging, relocate the dredge into compliant sediment, and verbally notify the COUNTY's On-site Representative, providing the time, location, and description of the noncompliant sediment. The Contractor will also report any encounters with noncompliant sediment in the Contractor's Daily Report, providing depth and location in State Plane Coordinates of said materials within the borrow area. The Contractor will take the appropriate remediation actions as directed by the COUNTY.

5. Excavation Requirements. The Contractor will excavate within the approved boundaries and up to but not exceeding the maximum depths of the borrow areas in a uniform and continuous

manner. If directed by the COUNTY, the Contractor will change the location and/or depth of excavation within the borrow area limits.

6. Vibracore Logs and Grain Size Data. The Contractor will be provided with all descriptions of sediment vibracore borings collected within the borrow areas, and will acknowledge that he is aware of the quality of the sediment as described in the sediment vibracore logs. These logs and grain size data will be presented in the construction specifications.

D. QUALITY ASSURANCE PLAN

The COUNTY will seek to enforce the construction contract and Department permits related to sediment quality. In order to do so, the following steps shall be followed:

1. Construction Observation. Construction observation by the COUNTY's On-Site Representative will be performed routinely; an inspection shall be performed for each 10,000 CY of placed material during construction. Most observations will be conducted during daylight hours; however, random nighttime observations shall be conducted if necessary.

2. On-Site Representative. The COUNTY will provide on-site observation by individuals with training or experience in beach restoration and nourishment and construction inspection and testing, and who are knowledgeable of the Project design and permit conditions.

3. Pre-Construction Meeting. The Project QA/QC Plan will be discussed as a matter of importance at the pre-construction meeting. The Contractor will be required to acknowledge the goals and intent of the herein described QA/QC Plan, in writing, prior to commencement of construction.

4. Contractor's Daily Reports. The COUNTY will review the Contractor's Daily Reports which characterize the nature of the sediments encountered at the borrow areas and placed along the Project shoreline, with specific reference to moist sand color and the occurrence of rock, rubble, shell, silt or debris that exceeds acceptable limits. The COUNTY will review the dredge positions in the Contractor's Daily Report.

5. On Call. The COUNTY will be continuously on call during the period of construction for the purpose of making decisions regarding issues that involve QA/QC Plan compliance.

6. Addendums. Any addendum or change order to the Contract between the COUNTY and the Contractor will be evaluated to determine whether or not the change in scope will potentially affect the QA/QC Plan.

7. During Construction Sampling for Visual Inspection. To assure that the fill material placed on the beach is in compliance with the permit, the COUNTY's On-Site Representative will conduct assessments of the beach fill material as follows:

- a. During excavation and fill placement activities, the COUNTY's On-Site Representative will collect a sediment sample 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 assure the material meets the sediment compliance parameter specified in this Plan. If deemed necessary, quantitative assessments of the sand will be conducted for grain size, silt content, shell content and Munsell color using the methods outlined in Section D.8.b. 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 COUNTY for at least 60 days after project completion.
- b. If the COUNTY determines that the beach fill material does not comply with the sediment compliance specifications in this QA/QC Plan, the COUNTY will immediately instruct the Contractor to cease material excavation operations and take whatever actions necessary to avoid further discharge of noncompliant sediment. The Contractor, in cooperation with the COUNTY, will use the dredge positioning records, plans, and vibracore descriptions to determine where the Contractor may dredge to avoid additional placement of noncompliant sediment. The Contractor will adjust his or her construction operation to avoid the noncompliant sediment to the greatest extent practicable. The sediment inspection results will be reported to the Department.

8. Post-Construction Sampling for Laboratory Testing. To assure that the fill material placed on the beach was adequately assessed by the borrow area investigations and design, the COUNTY will conduct assessments of the sediment as follows:

- a. Post-construction sampling of each acceptance section and testing of the fill material will be conducted to verify that the sediment placed on the beach meets the expected criteria/characteristics determined from the geotechnical investigation and borrow area design process. Upon completion of an acceptance section of constructed beach, the COUNTY will collect two (2) duplicate sand samples at each Department reference monument profile line to quantitatively assess the grain size distribution, moist Munsell color, shell content, and silt content for compliance. The COUNTY 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 a minimum of 18 inches deep within the limits of the constructed berm. The COUNTY 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 COUNTY 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 the COUNTY. All samples and laboratory test results will be labeled with the Project name, FDEP Reference Monument Profile Line designation, State Plane (X,Y) Coordinate location, date sample was obtained, and "Construction Berm Sample."

- b. All samples will be evaluated for visual attributes (Munsell color and shell content), sieved in accordance with the applicable sections of ASTM D422-63 (Standard Test Method for Particle-Size Analysis of Soils), ASTM D1140 (Standard Test Method for Amount of Material in Soils Finer than No. 200 Sieve), and ASTM D2487 (Classification of Soils for Engineering Purposes), and analyzed for carbonate content. The samples will be sieved using the following U.S. Standard Sieve Numbers: 3/4", 5/8", 3.5, 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230.
- c. 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; 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. registered in the State of Florida. A statement of how the placed fill material compares to the sediment analysis and volume calculations from the sand search investigation and borrow area design shall be included in the sediment testing results report. The COUNTY will submit sediment testing results and analysis report to the Department within 90 days following completion of construction.
- d. In the event that a section of beach contains fill material that is not in compliance with the sediment compliance specifications, then the Department will be notified. Notification will indicate the volume, aerial extent and location of any unacceptable beach areas, and the remediation planned.

E. REMEDIATION

1. Compliance Area. If a sample does not meet the compliance value for construction debris, toxic material, other foreign material, coarse gravel, or rock, the COUNTY shall determine the aerial extent and remediate regardless of the extent of the noncompliant material. If a sample is noncompliant for the silt content, shell content, or Munsell color and the aerial extent exceeds 10,000 square feet, the COUNTY shall remediate.

2. Notification. If an area of newly constructed beach does not meet the sediment compliance specifications, then the Department (JCPCCompliance@dep.state.fl.us) will be notified. Notification will indicate the aerial extent and location of any areas of noncompliant beach fill material and remediation planned. As outlined in Section E.4, the COUNTY will immediately undertake remediation actions without additional approvals from the Department. The results of any remediation will be reported to the Department following completion of the remediation activities, and shall indicate the volume of noncompliant fill material removed and replaced.

3. Sampling to determine extent. In order to determine if an area greater than 10,000 square feet of beach fill is noncompliant; the following procedure will be performed by the COUNTY:

- a. Upon determination that the first sediment sample is noncompliant, at minimum, five (5) additional sediment samples will be collected at a 25-foot spacing in all directions and assessed. If the additional samples are also noncompliant, then additional samples will be collected at a 25-foot spacing in all directions until the aerial extent is identified.
- b. The samples will be visually compared to the acceptable sand criteria. If deemed necessary by the COUNTY, quantitative assessments of the sand will be conducted for grain size, silt content, shell content, and Munsell color using the methods outlined in Section D.8.b. Samples will be archived by the COUNTY.
- c. A site map will be prepared depicting the location of all samples and the boundaries of all areas of noncompliant fill.
- d. The total square footage will be determined.
- e. The site map and analysis will be included in the Contractor's Daily Report.

4. **Actions.** The COUNTY shall have the authority to determine whether the material placed on the beach is compliant or noncompliant. If placement of noncompliant material occurs, the Contractor will be directed by the COUNTY on the necessary corrective actions. Should a situation arise during construction that cannot be corrected by the remediation methods described within this QA/QC Plan, the Department will be notified. The 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 and replacing it with compliant 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 and replacing it with compliant 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 and replacing it with compliant fill material.
- d. Coarse gravel: screening and removing the noncompliant fill material and replacing it with compliant fill material.
- e. Construction debris, toxic material, or other foreign matter: removing the noncompliant fill material and replacing it with compliant fill material.

All noncompliant fill material removed from the beach will be transported to an appropriate upland disposal facility located landward of the Coastal Construction Control Line.

5. Post-Remediation Testing. Re-sampling shall be conducted following any remediation actions in accordance with the following protocols:

- a. Within the boundaries of the remediation actions, samples will be taken at maximum of 25-foot spacing.
- b. The samples will be visually compared to the acceptable sand criteria. If deemed necessary by the COUNTY, quantitative assessments of the sand will be conducted for grain size, silt content, and Munsell color using the methods outlined in Section D.8.b. Samples will be archived by the COUNTY.
- c. A site map will be prepared depicting the location of all samples and the boundaries of all areas of remediation actions.

6. Reporting. A post-remediation report containing the site map, sediment analysis, and volume of noncompliant fill material removed and replaced will be submitted to the Department within 7 days following completion of remediation activities.

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
Beaches, Inlets and Ports Program
Office of Resilience and Coastal Protection
Florida Department of Environmental Protection
2600 Blair Stone Road, Rm 510B
Tallahassee, Florida 32399-2400
phone: (850) 245-7539
e-mail: JCP.Compliance@dep.state.fl.us

EXHIBIT 1
STATE OF FLORIDA RULE FOR BEACH FILL QUALITY

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

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 ϕ) and 4.76mm (-2.25 ϕ) (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:

1. Greater than 5 percent, by weight, silt, clay or colloids passing the #230 sieve (4.0 ϕ);
2. Greater than 5 percent, by weight, fine gravel retained on the #4 sieve (-2.25 ϕ);
3. Coarse gravel, cobbles or material retained on the 3/4 inch sieve in a percentage or size greater than found on the native beach;
4. Construction debris, toxic material or other foreign matter; and
5. Not result in cementation of the beach.

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.