

Joint Federal and State Application Form For Activities Affecting Waters of the United States Or Critical Areas of the State of South Carolina		This Space for Official Use Only																																																																										
<i>Authorities:</i> 33 USC 401, 33 USC 403, 33 USC 407, 33 USC 408, 33 USC 1341, 33 USC 1344, 33 USC 1413 and Section 48-39-10 et. Seq of the South Carolina Code of Laws. These laws require permits for activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. The Corps of Engineers and the State of South Carolina have established a joint application process for activities requiring both Federal and State review or approval. Under this joint process, you may use this form, together with the required drawings and supporting information, to apply for both the Federal and/or State permit(s).		Application No. _____ Date Received _____ Project Manager _____ Watershed # _____																																																																										
<i>Drawings and Supplemental Information Requirements:</i> In addition to the information on this form, you must submit a set of drawings and, in some cases, additional information. A completed application form together with all required drawings and supplemental information is required before an application can be considered complete. See the attached instruction sheets for details regarding these requirements. You may attach additional sheets if necessary to provide complete information.																																																																												
1. Applicant Last Name:		11. Agent Last Name (agent is not required): Traynum																																																																										
2. Applicant First Name:		12. Agent First Name: Steven																																																																										
3. Applicant Company Name: Town of Edisto Beach		13. Agent Company Name: Coastal Science & Engineering																																																																										
4. Applicant Mailing Address: 2414 Murray St		14. Agent Mailing Address: PO 8056																																																																										
5. Applicant City: Edisto Beach		15. Agent City: Columbia																																																																										
6. Applicant State: SC	7. Applicant Zip: 29438	16. Agent State: SC	17. Agent Zip: 29202																																																																									
8. Applicant Area Code and Phone No.: 843-869-2505		18. Agent Area Code and Phone No.: 803-799-8949																																																																										
9. Applicant Fax No.: 843-869-3855		19. Agent Fax No.: 803-799-9481																																																																										
10. Applicant E-mail: ihill@townofedistobeach.com		20. Agent E-mail: straynum@coastalscience.com																																																																										
21. Project Name: Edisto Beach Nourishment Project		22. Project Street Address: Palmetto Blvd																																																																										
23. Project City: Edisto Beach	24. Project County: Colleton	25. Project Zip Code: 29438	26. Nearest Waterbody: Atlantic Ocean																																																																									
27. Tax Parcel ID:		28. Property Size (acres): ~100 acres																																																																										
29. Latitude: 32 29'04.15"N		30. Longitude: 80 19'22.60"W																																																																										
31. Directions to Project Site (Include Street Numbers, Street Names, and Landmarks and attach additional sheet if necessary): From Charleston, take Hwy 17 south to Hwy 174. Turn left on Hwy 174 and continue to Edisto Beach town limits.																																																																												
32. Description of the Overall Project and of Each Activity in or Affecting U.S. Waters or State Critical Areas (attach additional sheets if needed) See Additional Sheets.																																																																												
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34. Type and quantity of Materials to Be Discharged <table style="width:100%; border: none;"> <tr><td>Dirt or Topsoil:</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Clean Sand:</td><td>819,000</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Mud:</td><td>76,000</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Clay:</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Gravel, Rock, or Stone:</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Concrete:</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Other (describe):</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>TOTAL:</td><td>835,000</td><td>cubic yards</td></tr> </table>		Dirt or Topsoil:	_____	<input type="checkbox"/> cubic yards	Clean Sand:	819,000	<input type="checkbox"/> cubic yards	Mud:	76,000	<input type="checkbox"/> cubic yards	Clay:	_____	<input type="checkbox"/> cubic yards	Gravel, Rock, or Stone:	_____	<input type="checkbox"/> cubic yards	Concrete:	_____	<input type="checkbox"/> cubic yards	Other (describe):	_____	<input type="checkbox"/> cubic yards	TOTAL:	835,000	cubic yards	35. Type and Quantity of Impacts to U.S. Waters (including wetlands). <table style="width:100%; border: none;"> <tr><td>Filling:</td><td>85</td><td><input checked="" type="checkbox"/> acres</td><td><input type="checkbox"/> sq.ft.</td><td>835,000</td><td><input checked="" type="checkbox"/> cubic yards</td></tr> <tr><td>Backfill & Bedding:</td><td>_____</td><td><input type="checkbox"/> acres</td><td><input type="checkbox"/> sq.ft.</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Landclearing:</td><td>_____</td><td><input type="checkbox"/> acres</td><td><input type="checkbox"/> sq.ft.</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Dredging:</td><td>75</td><td><input checked="" type="checkbox"/> acres</td><td><input type="checkbox"/> sq.ft.</td><td>835,000</td><td><input checked="" type="checkbox"/> cubic yards</td></tr> <tr><td>Flooding:</td><td>_____</td><td><input type="checkbox"/> acres</td><td><input type="checkbox"/> sq.ft.</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Draining/Excavation:</td><td>_____</td><td><input type="checkbox"/> acres</td><td><input type="checkbox"/> sq.ft.</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>Shading:</td><td>_____</td><td><input type="checkbox"/> acres</td><td><input type="checkbox"/> sq.ft.</td><td>_____</td><td><input type="checkbox"/> cubic yards</td></tr> <tr><td>TOTALS:</td><td>160</td><td>acres</td><td>_____</td><td>sq.ft.</td><td>_____</td><td>cubic yards</td></tr> </table>		Filling:	85	<input checked="" type="checkbox"/> acres	<input type="checkbox"/> sq.ft.	835,000	<input checked="" type="checkbox"/> cubic yards	Backfill & Bedding:	_____	<input type="checkbox"/> acres	<input type="checkbox"/> sq.ft.	_____	<input type="checkbox"/> cubic yards	Landclearing:	_____	<input type="checkbox"/> acres	<input type="checkbox"/> sq.ft.	_____	<input type="checkbox"/> cubic yards	Dredging:	75	<input checked="" type="checkbox"/> acres	<input type="checkbox"/> sq.ft.	835,000	<input checked="" type="checkbox"/> cubic yards	Flooding:	_____	<input type="checkbox"/> acres	<input type="checkbox"/> sq.ft.	_____	<input type="checkbox"/> cubic yards	Draining/Excavation:	_____	<input type="checkbox"/> acres	<input type="checkbox"/> sq.ft.	_____	<input type="checkbox"/> cubic yards	Shading:	_____	<input type="checkbox"/> acres	<input type="checkbox"/> sq.ft.	_____	<input type="checkbox"/> cubic yards	TOTALS:	160	acres	_____	sq.ft.	_____	cubic yards
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36. Individually list wetland impacts including mechanized clearing, fill, excavation, flooding, draining, shading, etc. and attach a site map with location of each impact (attach additional sheets if needed).

Impact No.	Wetland Type	Distance to Receiving Water body (LF)	Purpose of Impact (road crossing, impoundment, flooding, etc)	Impact Size (acres)
1	Subtidal Ocean Bottom	-	Excavation for Borrow Material	144.6
2	Subtidal Ocean Bottom	-	Beach Nourishment	-26
3	Intertidal Beach	-	Beach Nourishment	-87
Total Wetland Impacts (acres)				~257.6

37. Individually list all seasonal and perennial stream impacts and attach a site map with location of each impact (attach additional sheets)

Impact No.	Seasonal or Perennial Flow	Average Stream Width (LF)	Impact Type (road crossing, impoundment, flooding, etc)	Impact Length (LF)
Total Stream Impacts (Linear Feet)				0

38. Have you commenced work on the project site? YES NO If yes, describe all work that has occurred and provide dates.

39. Describe measures taken to avoid and minimize impacts to Waters of the United States:

Incorporating groin lengthening into the project design will improve nourishment longevity and extend the renourishment interval, reducing the frequency of dredging projects. Borrow material has been defined to match the beach and minimize silt-sized particles to reduce temporary turbidity associated with dredging activities. Project is proposed to be constructed during periods of low biological activity to minimize impacts to benthic organisms and the marine ecosystem.

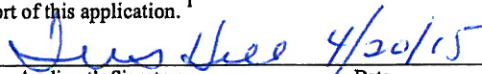
40. Provide a brief description of the proposed mitigation plan to compensate for impacts to aquatic resources or provide justification as to why mitigation should not be required (Attach a copy of the proposed mitigation plan for review).

See additional sheets

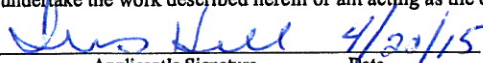
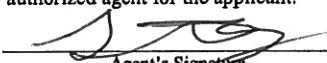
41. See the attached sheet to list the names and addresses of adjacent property owners.

42. List all Corps Permit Authorizations and other Federal, State, or Local Certifications, Approvals, Denials received for work described in this application.

43. Authorization of Agent. I hereby authorize the agent whose name is given on page one of this application to act in my behalf in the processing of this application and to furnish supplemental information in support of this application. ¹


 Applicant's Signature Date

44. Certification. Application is hereby made for a permit or permits to authorize the work and uses of the work as described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent for the applicant. ¹

 Date  Date

¹The application must be signed by the person who desires to undertake the proposed activity or it may be signed by a duly authorized agent if the authorization statement in blocks 11 and 43 have been completed and signed. 18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.



AFFIDAVIT OF OWNERSHIP OR CONTROL

S. C. Department of Health and Environmental Control
Office of Ocean and Coastal Resource Management
Charleston Beaufort Myrtle Beach
953-0200 846-9400 238-4528
953-0201 (fax) 846-9810(fax) 238-4526(fax)

I hereby certify that I am the (check one):

- Record Owner
- Lessee
- Record Easement Holder
- Applicant To Record Owner For Easement
- Contract To Purchase Property

of the below described property situated in Colleton County, South Carolina; and that said property is all of that said property that is contiguous to and landward of the area in which the work proposed in the permit application is to be conducted. Furthermore, I certify that as record owner, lessee, or record easement holder, I have, or will have prior to undertaking the work, necessary approvals or permission from all other persons with a legal interest in said property to conduct the work proposed in the permit application.

WRITE LEGAL DESCRIPTION OF HIGHLAND (as described in deed, lease, etc.) BELOW OR WRITE "SEE ATTACHED" (in large bold letters) AND ATTACH A COPY OF THE DEED, LEASE, EASEMENT, OR MOST RECENT CERTIFIED PLAT OF THE PROPERTY. IF YOU ARE NOT THE RECORD OWNER, LESSEE OR EASEMENT HOLDER, YOU MUST ALSO SUBMIT WRITTEN PERMISSION FROM THE OWNER OF THE PROPERTY TO CARRY OUT THE PROPOSED ACTIVITY.

The beachfront on Edisto Beach is under the control of the Town of Edisto Beach

I also certify that the project as proposed does not cross any wetlands or areas below mean high water which is in the ownership of other private persons or public or private entities and that there is no disputed claim to the wetlands or areas below mean high water by private person or other entities due to a Kings Grant, State Grant, easement or conveyance or other legal document evidencing ownership of these areas.

Signature of Record Holder or Lessee

Sworn to and subscribed before me at Edisto Beach Town Hall, Colleton County, South Carolina, this 20th day of April, 2015.

Notary Public

My commission expires: Oct. 16, 2022

32. DESCRIPTION OF THE OVERALL PROJECT AND OF EACH ACTIVITY IN OR AFFECTING U.S. WATERS OR STATE CRITICAL AREAS

The proposed activity is a beach nourishment and groin lengthening project along Edisto Beach, SC (see Sheet 1). Work will include placement via hydraulic dredge of up to 835,000 cubic yards (cy) of beach-quality sediment along the ocean-facing shoreline and lengthening of up to 26 groins up to a cumulative total of 1,765 linear feet (lf). The overall project length is ~19,000 lf. The project area extends from the north end of the Edisto Beach State Park Campground to Edisto Street near the South Edisto River Inlet. A previous nourishment project (P/N 2005-1W-182-P) was successfully completed in May 2006 along Edisto Beach between Edisto Beach State Park and Groin 28 (850,000 cy; 18,258 lf) using a cutterhead dredge and offshore borrow area.

Relationship to Federally Approved Edisto Beach Storm Damage Reduction Project

The proposed project is similar in scope to the recently approved federal storm damage reduction project. The USACE, sponsored by the Town of Edisto Beach, completed extensive work in support of a feasibility study for a beach nourishment and groin lengthening project which would provide storm damage reduction for a 50-year project design life. Work accomplished by the USACE includes a Feasibility Report and Environmental Assessment, coastal engineering, economic analysis, structural inventory, geotechnical engineering, impact analysis, a biological assessment (BA) and essential fish habitat (EFH) assessment, 404(b)1 evaluation, and a hard bottom and cultural resource survey. The USACE also corresponded with local, state, and federal resource and regulatory offices and completed formal Section 7 consultation with USFWS, receiving a Biological Opinion (BO) in revised form on 14 March 2014. Documentation for the USACE project can be found at <http://www.sac.usace.army.mil/Missions/CivilWorks/NEPADocuments>.

The USACE plan calls for an initial nourishment of ~924,000 cy (based on 2008 conditions) and periodic renourishments of 476,000 cy every 16 years. The plan includes a +15 ft NAVD (~8 ft high above the berm) elevation dune along the front beach with a +7 ft NAVD elevation berm. A +14 ft NAVD dune without berm nourishment is incorporated along the shoreline of the South Edisto River. The USACE plan calls for lengthening 23 groins a cumulative total of 1,130 ft. Nourishment of the State Park is not included in the federal plan except for a taper section extending north from groin 1.

The federal plan was developed under the conditions of the *Economic and Environmental Principles and Guidelines for Water and related Land Resources Implementation Studies*, which essentially aim to contribute to National Economic Development (NED) by limiting the need for resources used for storm recovery which could be used elsewhere. This is accomplished by conducting a cost/benefit analysis for multiple alternatives and for individual locations within the project area. The requirement to maximize the benefit ratio can sometimes lead to less than ideal designs or elimination of desirable aspects of potential projects (for example, exclusion of any nourishment of the state park due to the low replacement cost of park infrastructure yielding a low cost/benefit ratio). While the project proposed in the permit application is similar in materials, methods, and overall design, it alters certain quantities of work to meet the preferred objectives of the Town while remaining within the Town's anticipated budget. Specific details of the differences between the USACE and the proposed Town project are provided in the following sections and are summarized below:

- 1) Nourishment Quantity – The USACE plan calls for an initial nourishment of 924,000 cy over 21,820 linear ft (including 16,530 lf of berm and dune nourishment and 5,290 ft of dune only nourishment). The proposed local project calls for nourishment between 420,000 and 835,000 cy, depending on the total level of groin lengthening possible within the Town’s budget.
- 2) Fill Limits – The USACE plan calls for nourishment extending from ~600 ft north of groin 1 (in the state park) to Big Bay Creek. The town plan includes nourishment of all of the shoreline bordering the camping section of the state park (ie ~3,300 ft measured north from groin 1) and the front beach from groin 1 to groin 29.
- 3) Dune Construction – The USACE plan includes a 15 ft wide dune at +15 ft elevation along the front beach and a 15 ft wide dune at +14 ft elevation along the shoreline bordering the South Edisto River. The town plan includes a small “starter” dune along limited sections of the beach presently lacking any dune features.
- 4) Groin Lengthening – The USACE evaluated multiple scenarios of beach fill and the resulting groin lengthening scenarios required to maintain each level of fill. The fill plans resulted in groin lengthening scenarios ranging from a total of 360 lf to 1,970 lf. The NED plan calls for 1,130 ft of lengthening. The Town plan includes a maximum total lengthening of 1,765 linear feet with individual groins being lengthened no more than 100 ft. The minimum groin lengthening for applicable groins will be 20 ft because of certain economies of construction (not all of the groins will be lengthened).
- 5) Groin Maintenance – The Town intends to perform maintenance to groins requiring repair, including restacking loose rock, adding additional grout, or reinforcing timber sections. These repairs will follow similar methodologies as previous projects and will not seek to increase the trapping capacity of most groins. Groins 29-32, which have not been grouted, will be restacked and grouted (if funding allows) to prevent further settlement of the loose stone. If any increase in the structure elevation results from the restacking and grouting effort, additional nourishment sand will be placed in each updrift cell to satisfy the increased trapping volume.

Nourishment Plan

The proposed plan calls for nourishment of up to 835,000 cy of sand along the oceanfront shoreline of Edisto Beach (see Sheets 02-03). The exact volume of nourishment sand will depend on the final groin lengthening plan available within the Town’s budget at time of construction. At a minimum, sufficient nourishment volume will be placed in each upcoast groin cell to exceed the trapping capacity of any lengthened groin. The applicant proposes to borrow sand from the northern shoal of the South Edisto River Inlet (Sheets 02, 08) The approximate areas of impact include ~13 acres above mean high water and ~244 acres below mean high water (including the borrow and beach fill areas).

Sheets 05-06 show representative nourishment sections in the project area. The fill berm will be placed at +7 ft NAVD to match the local dry-beach elevation. A low dune with the top at +10 ft NAVD (approximately equal to the FEMA 10-Year still-water flood elevation) may be built in areas lacking any dune features at the time of construction (potentially in groin cells 1-8). Due to the relatively coarse sands present along Edisto Beach, the natural beach slope is steeper than most beaches in South Carolina. The constructed slope will be built at 1 on 12 between the +7 ft berm and MHW. Following

construction, waves will distribute nourishment sand across the full beach profile into a natural configuration. Excess sand may be placed in cells requiring groin lengthening to facilitate groin construction.

The borrow areas and location of sediment borings are shown on Sheet 08. Borrow Area A consists of a 3,000 x 1,500 ft area (103.3 acres) adjacent to and seaward of the borrow area used in 2006 (measuring 3,200 x 1,000 ft). Borrow Area B is 1,000 x 1,800 ft (41.3 acres) and includes a majority of the borrow area used in the 2006 project. The proposed dredge limit is -16 ft MLLW (-19.5 ft NAVD), which is consistent with the limits in 2006. A 1-foot (ft) over-dredge depth will be included in the project specifications. Approximately 1,440,000 cy of beach compatible material is available in Borrow Area A based on a survey completed in August 2014. The proposed borrow area includes excess volume in order to allow for losses during pumping as well as to allow the dredge the opportunity to move if isolated pockets of poor sediment are encountered. Borrow Area B contains approximately 481,500 cy of material, though insufficient geotechnical data presently exists to confirm what volume is beach compatible. The applicant will coordinate with resource agencies to determine whether it is environmentally advantageous to use Area B in the proposed project should it contain sufficient suitable material.

The USACE feasibility study included a geotechnical and cultural resource component to define a borrow area containing sufficient material for the 50-year project. This included obtaining 77 borings over a 15,000 ft by 7,000 ft area encompassing the northern shoal of the South Edisto River Inlet delta and collection of native beach samples at 34 locations over the length of Edisto Beach. For the present project, the applicant used results of the USACE study, along with an additional 8 borings in a targeted subarea within the USACE study limits, to define a borrow area containing material closely matching the recipient beach.

The native beach (between Big Bay Creek and Edingsville Beach) showed an average grain size of 0.404 millimeter (mm) (composited from the dune, berm, beach face, and low-tide-terrace), which includes finer samples from the shoreline along the inlet. The beach within the proposed project limits contains more coarse sediment, averaging 0.487 mm with a shell content of 24.8 percent. Within the proposed Borrow Area A, the average grain size measured 0.547 mm with a shell content of 25.9 percent, fine-grained-material content of 1.0 percent, and coarse-grained material (>2mm) content of 10.7 percent. One boring was obtained in Borrow Area B in August 2014, showing clean sand with a mean grain size of 0.648 mm with 40.1 percent shell content (most of which was small shell hash <2.0 mm). Future borings will confirm the compatibility of the material within Area B and refine the data coverage in Area A.

Work is expected to be accomplished via hydraulic (cutterhead) dredge outside of sea turtle nesting season. The dredge would cut into the borrow area from the South Edisto River and sand would be pumped to the beach via a submerged pipeline. A booster pump may be required to provide sufficient power to reach the northern fill limits. Once sand reaches the shore, it will be spread to the design template by bulldozers. Various equipment typical of beach nourishment projects will be used throughout the project, including loaders, 4x4 vehicles, delivery trucks, survey vessels, barges, and tugs. Equipment will be restricted from vegetated areas to the maximum extent practicable.

Groin Lengthening

Lengthening of certain groins was incorporated into the USACE project for the primary reason of maintaining an adequate berm width to support the protective dune and berm which aid in storm damage reduction. Essentially, several of the groins are too short to hold a beach width capable of maintaining a dune and berm capable of withstanding seasonal fluctuations in the shoreline position. The rationale and methods for the USACE groin lengthening plan are given in Section 9 of Appendix A of the USACE Feasibility Study. CSE completed an independent groin lengthening feasibility study in 2013 (CSE 2013a,b), obtaining two alternatives for lengthening. One alternative was based on an ideal beach profile (similar in nature to the USACE method, but using a more substantial beach profile) while the other was based on comparison of the widths of vegetated areas and existing groin conditions. The applicant also received input from local citizens and the Town's Beachfront Management Committee.

Results of the above studies were compiled into a proposed groin lengthening plan which calls for extension of up to 26 groins a cumulative total of up to 1,765 linear feet. The maximum extension for a single groin would be limited to 100 ft (see Sheet 04). The USACE feasibility study did not identify materials or methods of construction for the extensions. The applicant proposes to use steel, aluminum, or a vinyl composite sheet piles to extend each groin. Each 20 ft pile will be driven to the established grade and capped with a concrete cap set with a top elevation of -1 ft to -2 ft NAVD (Sheet 07). Armor stone will be placed around the sheet piles to provide scour protection. A connection consisting of formed and poured concrete or grouted stone will be installed to link the existing groin to the new sheet pile extension to make a continuous structure.

The original groins were built by SC Department of Transportation and were constructed solely of timber with a typical slope of ~1 on 50. Deterioration of the timber led to the addition of armor stone and in some cases, overall shortening of some groins. A 1995 project (P/N 94-1T-009-P) restacked loose stone and added grout in the void spaces to make a monolithic structure, but did not lengthen the groins. The proposed extensions will attempt to adjust the profile of the groins to match modern design guidelines, which include a beach face section sloping to match the native beach and horizontal low-tide-terrace section. The slope of the extension will be determined by the length of each extension and the existing profile of each groin, but will seek to match the native beach to the maximum extent practicable (generally 1 on 15 to 1 on 20).

Per state regulations, enough sand to meet or exceed the trapping capacity of each extension will be placed into the updrift (north) groin cell of any lengthened groin. Trapping capacity was determined by applying the Brunn (1952) rule to each extension and assuming a triangular fillet extending four times the length of the extension. This method was based on recent observations at Hunting Island, SC (Traynum et al 2010) and Folly Beach, SC and is considered conservative (requiring more sand) as it assumes a 1 to 1 ratio of groin lengthening to increased berm width. For the maximum 100 ft individual groin lengthening, ~15,500 cy of sand are required in each applicable cell to meet the trapping capacity of the extension. If all groins are lengthened the maximum distance provided in Sheet 04, the total trapping volume is ~221,000 cy.

Groins 29-32 presently consist of loose armor stone without grout or timber. This allows sand to pass through the structure and can result in slumping of the stone. The applicant intends to restack the

loose stone of these groins and add grout to make a monolithic structure. This will prevent future slumping of the loose stone and reduce the footprint of the groin. Loose rock around the edges of each structure will be consolidated into the body of the groin, and grout similar to the material present on groins 1-28 will be added in the void spaces to solidify the structure. The slope of the groin will be maintained at the natural slope of the beach in the area. Any increase in trapping capacity will be minimal (5-10 cy/ft); however, the applicant will add sand to the updrift cell to satisfy the increased trapping volume.

The effort is not intended to increase trapping capacity or lengthen any of the groins, but prevent future problems associated with continued slumping. It is also beneficial economically and environmentally to conduct these operations while work is being done on other groins. Restacking and grouting of groins 29-32 will only be conducted if sufficient funds are available.

33. OVERALL PROJECT PURPOSE AND THE BASIC PURPOSE OF EACH ACTIVITY IN OR AFFECTING U.S. WATERS

The purpose of the proposed project is for beach and dune restoration and preservation, including;

- Restoring a recreational beach
- Restoring protective dunes
- Extending longevity of nourishment sand and increasing the renourishment interval
- Protecting park infrastructure and maintaining revenues dependent on park attendance

The project will not involve federal funds.

History

Edisto Beach is a four-mile-long barrier island with an additional one mile of beach fronting St. Helena Sound. The island is situated between Jeremy Inlet and South Edisto River Inlet, but is also strongly influenced by the tidal deltas of North Edisto Inlet and St. Helena Sound. The two deltas define a littoral cell encompassing Botany Bay Island, Edingsville Beach, and Edisto Beach. There is a general divergence of sand transport away from the center of the littoral cell with sand shifting north toward Deveaux Bank and sand moving south from Edingsville Beach to Edisto Beach.

During the past century, depletion of the sand supply along Edingsville Beach and Botany Bay Island has left a low washover beach and exposed marsh at the seaward edge. The result is high erosion rates and insufficient downcoast movement of sand toward Edisto Beach. Edingsville Beach has been retreating at upward of 15 feet per year (ft/yr) (Stephen et al 1975, CSE 2003). Further, the sediments being supplied to Edisto Beach tend to have a high proportion of mud and shells derived from the eroding marsh deposits. By the 1950s, erosion near the Pavilion (Groin 1) on Edisto Beach reached upward of 10 ft/yr. The downcoast end of Edisto Beach at 'The Point' and along St. Helena Sound has generally remained accretional during the past century.

Erosion along Edisto Beach led to construction of the first groins in 1948 near the Pavilion. During the next decade, 17 groins were built from north to south in an attempt to halt the loss of sand, or at least to slow its southerly movement. However, erosion continued downcoast of the structures as each group of groins was built, sometimes to 'The Point' where houses were washed out (CSE 2001). This prompted construction of more groins up to 1975. Groin 34 (the last one built) is situated along the South Edisto River Inlet shoreline, about 3,000 ft from Big Bay Creek.

The sand-trapping capacity of individual groins impacts erosion rates along the beachfront. Gaps in deteriorating groins allow sand piping and leaking, which results in erosion within the groin cell and accretion downcoast. Conversely, when updrift groins are repaired and their trapping capacity is restored, downcoast areas may erode (unless repairs are accompanied by nourishment). Sand volumes around 'The Point' area (at the southern tip of Edisto Beach) are particularly influenced by the condition of groins along the oceanfront (Kana et al 2004).

In the mid 1950s, erosion near the Pavilion had progressed so far that groins alone were not sufficient to protect Palmetto Boulevard. The South Carolina Highway Department combined groin construction with the first nourishment of Edisto Beach in 1954 using sand, shells, and mud from the marsh behind

the island. Excavations created the “boat basin” and reclaimed nearly 1.2 miles of shoreline between groins 1 and 12. Although dredging volumes totaled 830,000 cy, much of the material was unsuitable for the beach, washing away quickly because it was too fine. The coarser sand and broken shells remained, adding to the accumulations of sediment derived from Edingsville Beach.

In April 1995, selected areas of Edisto Beach were nourished (a total of ~155,000 cy placed between groins 1 to 17 and groins 24 to 28), and groins were repaired [CSE 1996(a,b), 1997, 1999, 2001]. The borrow area was located ~2,500 ft off ‘The Point’ at the southern tip of Edisto Beach and was characterized by coarse, beach-quality sand. By summer 2001 (six years after construction), roughly one-third of the nourishment volume was still present in the project area (CSE 2001). With erosion of the 1995 nourishment sand, Edisto’s groins became more exposed and therefore effective for sand retention. Thus, less sand was available to downcoast areas, which was the case some years after the 1954 nourishment project as well. Between 2001 and 2006, erosion downcoast of the groin field accelerated (CSE 2006).

A 2006 beach restoration project was necessitated by increased erosion rates in downcoast areas, insufficient protection for beachfront properties, and insufficient beach width to support dune formation and recreational beach access. Whereas in 1995, a relatively small nourishment quantity was required to satisfy trapping of the groins after repairs, the 2006 project involved nourishment volumes that greatly exceeded the trapping capacity of the groins.

Engineered by CSE, the project was constructed between March and May of 2006 by Great Lakes Dredge & Dock Company (GLDD) of Oakbrook (IL). The length of the project area was 18,258 linear feet, including 3,200 linear feet in the state park area. Fill volumes varied along the beach with the goal of achieving a standard, minimum profile volume of at least 100 cy/ft (+9 ft to -7 ft NGVD’29) for the length of the project area. Average design fill volumes were 20–70 cy/ft. The greatest volumes were added to the park and updrift areas in anticipation of sand moving south.

The total volume of sand added during the 2006 restoration was 877,647 cy, of which 181,728 cy (20.7 percent) were placed along the park (north of Groin 1) and 695,919 cy (79.3 percent) were placed along the Town (between groins 1 and 27) (CSE 2006). The Town of Edisto Beach and South Carolina Department of Parks Recreation and Tourism sponsored the project with a combination of local, county, and state funds. Details of the restoration project and nourishment volumes are given in the 2006 project final report (CSE 2006).

Performance of the 2006 Nourishment Project

Edisto Beach lost between 39,000 cy and 212,000 cy annually between 2008 and 2011 (CSE 2014). It was much more stable from 2011 to 2013, losing a total of ~14,000 cy. Erosion increased from 2013-2014, with the beach losing ~67,500 cy (2.4 cy/ft) from September 2013 to August 2014. Since 2006, the project areas have lost ~449,000 cy while unnourished areas have gained ~133,300 cy. Overall, 67 percent of the volume placed in 2006 is accounted for in July 2014 with 49 percent of the nourishment volume still present within the project boundaries. In most areas, the project is performing well, containing 15–25 cy/ft more sand than was present in 2005; however, several cells lack

protective dunes and setbacks of houses are narrow. Project reaches presently retain between 32.7 and 60.4 percent of the nourishment volume.

The northern end of the project area (Upcoast 1 and Reach 1) has been the most erosional since 2006. Erosion has essentially eliminated the dry beach fronting most of the houses in Cells 1–5. Houses have no appreciable dune protection or dry berm. CSE (2012) found that groin lengths in this area compared to the location of houses are less than areas with long-term, stable vegetation and are not capable of holding sufficient sand to maintain a dune. It is likely that without groin lengthening, nourishment sand will erode rapidly from these cells, as was the case following the 2006 project. The remainder of the Town’s oceanfront maintains a vegetative buffer in front of the houses but lacks sufficient dune volume for FEMA standards.

Alternatives Considered — Several detailed alternatives were evaluated by the USACE in the federal feasibility study including:

- Do nothing (the “Future Without Project Conditions section).
- Hard Structures (breakwaters, seawalls, groins).
- Soft Stabilization (dune and/or berm nourishment)
- Non-structural measures (retreat, relocation, demolition, elevating structures, etc).

The USACE analysis determined that a combination of nourishment and groin lengthening provided the greatest net benefits. The proposed project is consistent with the USACE plan, though modifies certain design elements (such as dune height, length of individual groins, and inclusion of the State Park) so that the project can be tuned to the applicant’s anticipated budget. Due to the similarity between the plans, and that the applicant sponsored the USACE study, the applicant requests that the analysis of alternatives included in the USACE feasibility study be applied to this application and project.

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34. TYPE AND QUANTITY OF MATERIALS TO BE DISCHARGED

All excavations will involve beach-quality sand similar in texture to the native beach. Edisto Beach has a much higher shell content than typical beaches in South Carolina. The majority of the shell is less than 2 mm (shell hash) and is similar in nature to coarse sand, though large shells are abundant. The applicant intends to match the character of the native beach by placing sand containing similar coarse sand and shell hash as presently exists on the beach. The USACE borrow area is situated further offshore, and holds finer sand.

The excavation area is a high-energy ocean shoal on the northern side of the South Edisto River Inlet. The material is mostly medium to coarse sand and crushed shell with isolated lenses of fine-grained material and large shells. Sediment characteristics of borings obtained within the proposed borrow area are given in Table 1 and details were provided in Section 32 of this application. The applicant proposes to excavate sufficient sand to provide up to 835,000 cy of in-place nourishment. Excavation will be accomplished via hydraulic (cutterhead) dredge. It is estimated that no more than 2 percent by volume of the material is silt or mud (grains <0.0625 mm). Fine-grained material will be entrained in the slurry and dispersed at the beach pumping site. The applicant proposes a borrow area with a volume exceeding the nourishment requirement to allow the dredge to relocate if isolated pockets of poor material are encountered. This will ensure that only beach-quality material is placed on the beach. Based on an August 2014 survey, the borrow areas contain ~1.9 million cubic yards of material. Additional borings (yet to be collected) will allow the applicant to refine a borrow area more closely matching the expected nourishment volume. The final area will be submitted to agencies prior to construction.

TABLE 1. Composite mean grain size for cores in proposed borrow areas A and B (Sheet 01). The mean size is computed to a base dredging elevation of -19.5 ft NAVD. [**weighted based on boring recovery length*]

Core	Bottom Elevation (ft NAVD)	Mean Grain Size (mm)	% Shell	% Mud	% Coarser than 2mm
EB 1	-13.8	1.464	53.9	0.0	32.6
EB 2	-15.5	0.243	10.0	0.0	1.7
EB 3	-19.8	0.555	28.0	0.1	14.6
EB 4	-17.7	0.263	15.5	0.1	7.4
EB 19	-18.5	0.529	25.8	0.0	2.4
USACE 10	-23.9	1.059	44.1	0.4	17.2
USACE 11	-27.2	0.433	24.9	1.4	8.9
USACE 12	-21.6	0.406	17.8	3.1	11.5
USACE 18	-18.1	0.436	22.9	2.5	3.8
USACE 20	-22.7	0.450	24.5	1.8	15.1
Borrow A Average*		0.547	25.9	1.0	10.7
EB T-1	-14.7	0.648	40.1	0.0	13.4
Native Beach		0.487	24.8	trace	5.4

40. MITIGATION

The proposed project is designed to restore and maintain a dry-sand beach and dune system along Edisto Beach. Benefits of the project include restored and expanded habitat for sea turtles and beach flora and fauna, protection of structures, improved aesthetics, and improved recreational opportunity. Impacts of beach nourishment projects are well understood and, when designed properly and the site allows, limited to temporary impacts to the immediate beach and borrow area. The applicant proposes that due to the restorative nature of the project, no mitigation should be required for the proposed project. The applicant actively monitors and improves the beach as opportunities arise, including improving beach access, installing sand fencing to facilitate natural dune building, and planting native vegetation to improve habitat and dune formation.

Recommended Permit Conditions

The applicant proposes to complete the monitoring efforts outlined in the USFWS Biological Opinion (modified by letter 14 March 2014). The monitoring includes:

- Construction window of 1 November – 30 April, unless an alternate window is recommended by resource agencies.
- Regular sediment quality monitoring during construction.
- Sea turtle monitoring during nesting season (1 May – 31 October).
- Beach compaction and escarpment monitoring.
- Minimizing construction impacts (lighting, equipment access and storage, etc).
- Lighting surveys.
- Post-construction beach profile monitoring and groin impact analysis.



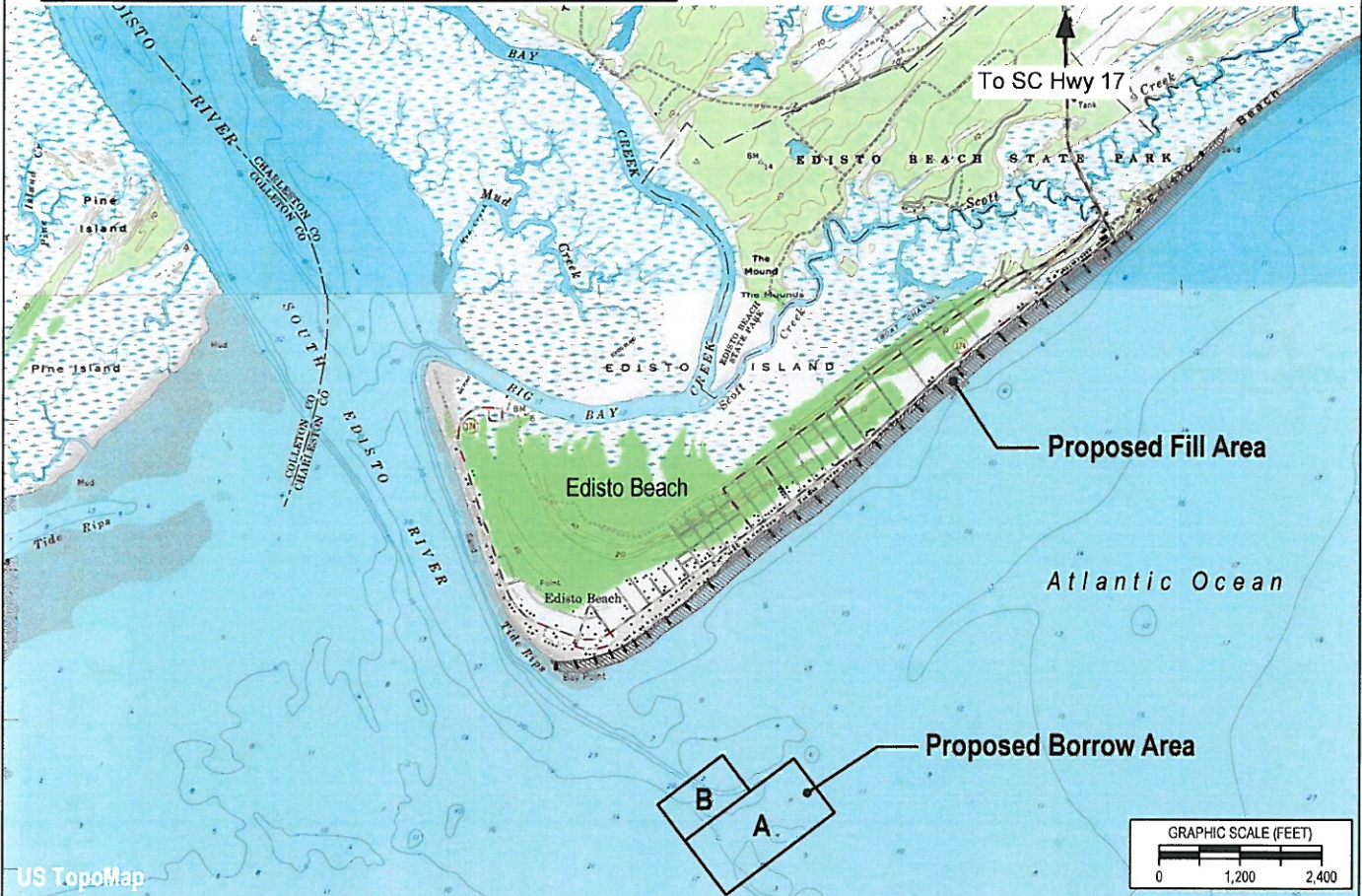
DIRECTIONS FROM SC HWY 17:

TAKE SC HWY 174 TOWARD EDISTO BEACH.
 FOLLOW HWY 174 TO PALMETTO BLVD.
 PROJECT EXTENDS NORTH ~3,300 FEET
 INTO EDISTO BEACH STATE PARK AND
 SOUTH ~16,000 FEET, JUST SOUTH OF
 BILLOW STREET AT POINT ST.

PROJECT LOCATION:

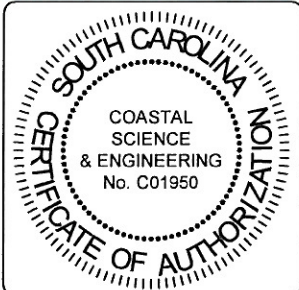
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Longitude: 80° 19' 020" W



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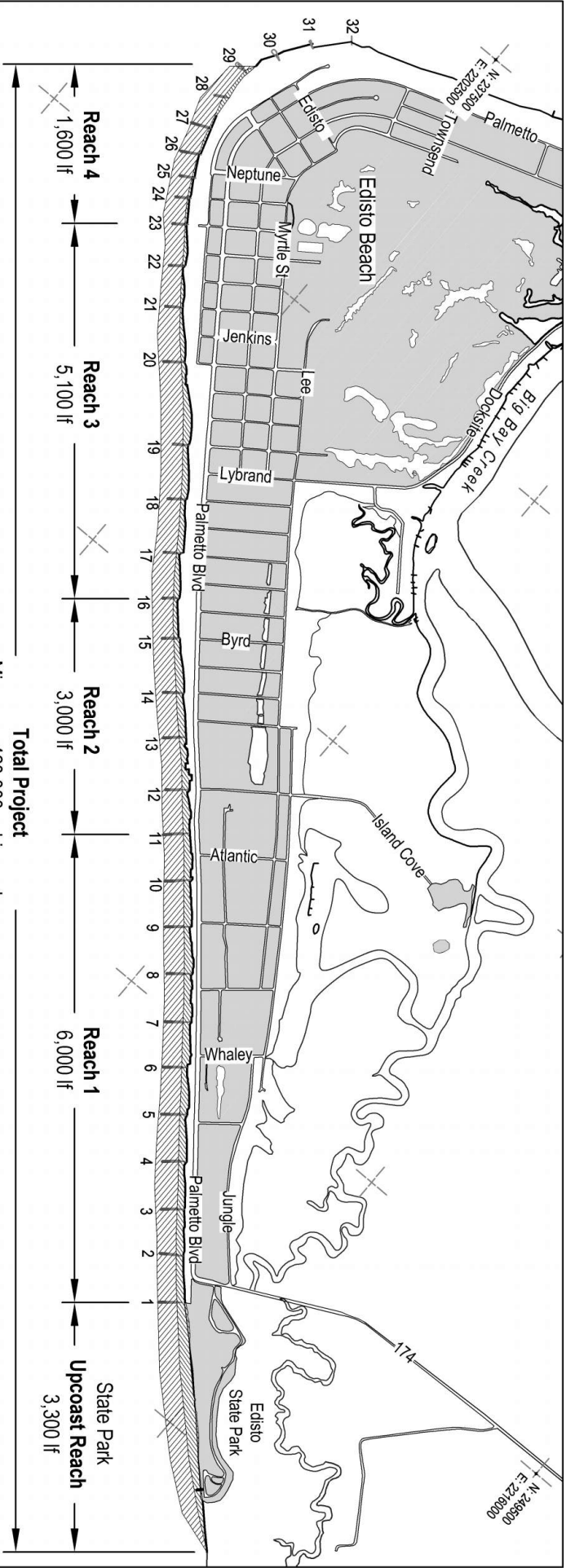
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PROJECT: Beach Nourishment
 & Groin Extension



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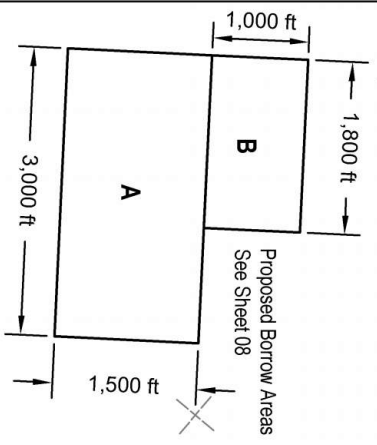
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DATE: 23 April 2015
TMS#
PROJECT #: 2416

01

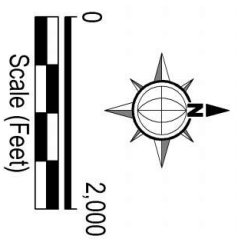


Reach 4 1,600 If
 Reach 3 5,100 If
 Reach 2 3,000 If
 Reach 1 6,000 If
 Upcoast Reach 3,300 If

Total Project
 Minimum 420,000 cubic yards
 Maximum 835,000 cubic yards
 Project Length ~19,000 ft



Atlantic Ocean



N: 232500
 E: 221450

N: 241500
 E: 221850

N: 249500
 E: 221600

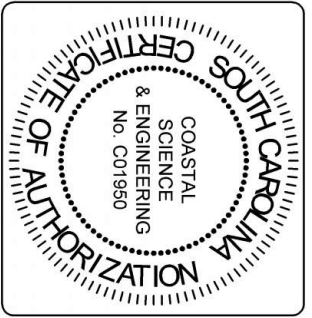
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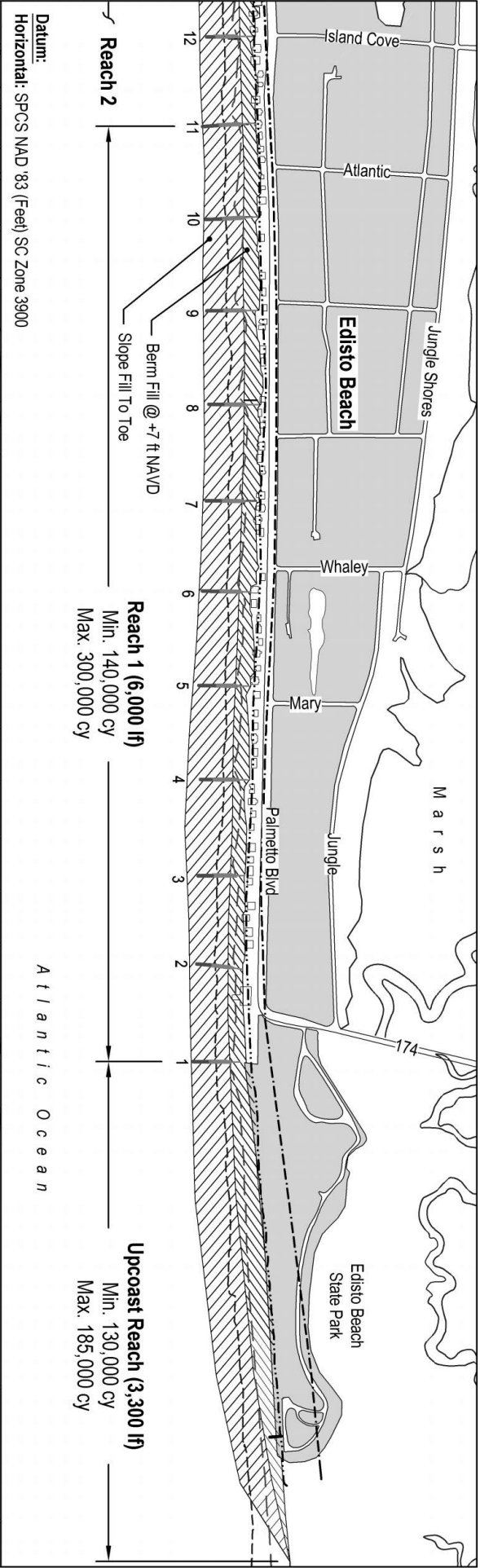
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DRAWING TITLE:
 OVERALL PROJECT PLAN

Scale:	As Shown	Sheet #:	02
Date:	Revised 17Apr2015	Permit #:	
Project #:	2416		



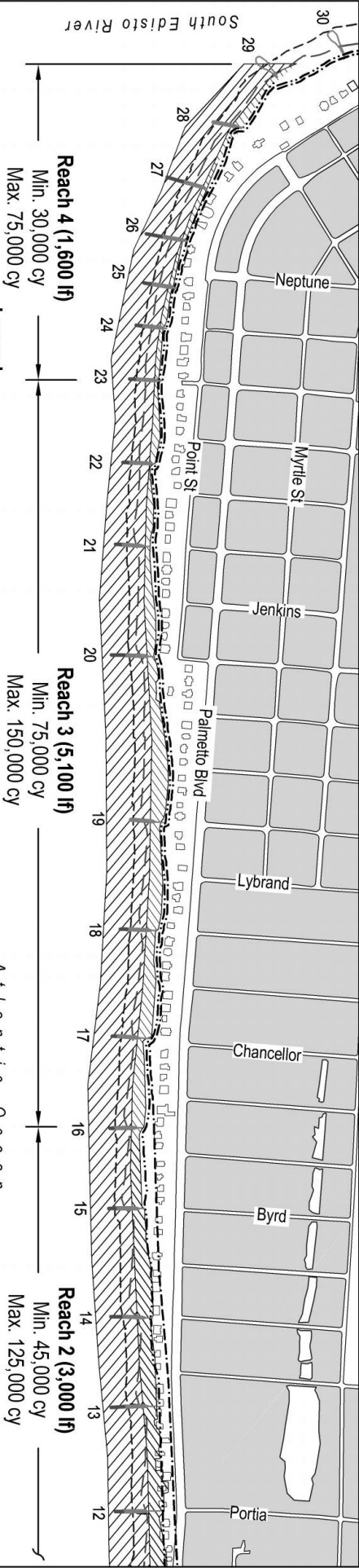


Datum:
Horizontal: SPCS NAD 83 (Feet) SC Zone 3900

Reach 2

Reach 1 (6,000 lf)
Min. 140,000 cy
Max. 300,000 cy

Upcast Reach (3,300 lf)
Min. 130,000 cy
Max. 185,000 cy

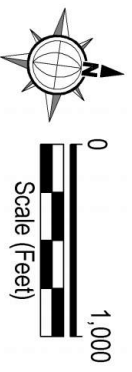


Reach 4 (1,600 lf)
Min. 30,000 cy
Max. 75,000 cy

Reach 3 (5,100 lf)
Min. 75,000 cy
Max. 150,000 cy

Reach 2 (3,000 lf)
Min. 45,000 cy
Max. 125,000 cy

- Legend**
- Mean High Water 2.41 ft NAVD
 - Mean Low Water -3.33 ft NAVD
 - OCRM Setback Line (2009)
 - OCRM Baseline (2009)
 - Nourishment Impact Area
 - Existing Groin / Extension (See Table On Sheet 04)



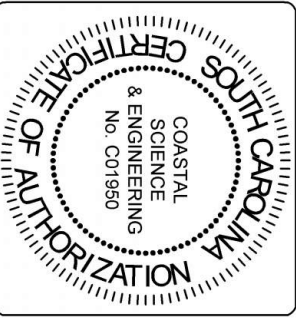
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DRAWING TITLE:
PROJECT FILL PLAN

Scale: As Shown
Date: Revised 17Apr2015
Permit #: 2416
Project #: 2416

Sheet #: **03**



Groin No.	Estimated Maximum Extension (ft)
1	90
2	85
3	90
4	90
5	100
6	100
7	90
8	90
9	95
10	95
11	95
12	45
13	80
14	65
15	40
16	20
17	20
18	40
19	0
20	80
21	30
22	30
23	30
24	30
25	40
26	95
27	100
28	0



29	Maintenance - Restack existing rock and grout
30	
31	
32	

Datum Notes:
 Horizontal: SPCS NAD 83 (Feet) SC Zone 3900
 Vertical: NAVD 88 (Feet)
 Image: IMC 25 May 2011
 Contour positions based on measurements collected in July 2014.

Legend
 --- Mean High Water 2.41 ft NAVD
 - - - Mean Low Water -3.33 ft NAVD
 - · - · - OCRM Setback Line (2009)
 - - - - OCRM Baseline (2009)

See Sheets 05-06 For Typical Fill Profiles

Scale (Feet)

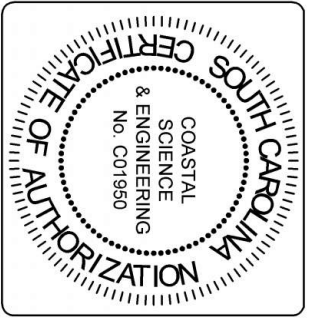
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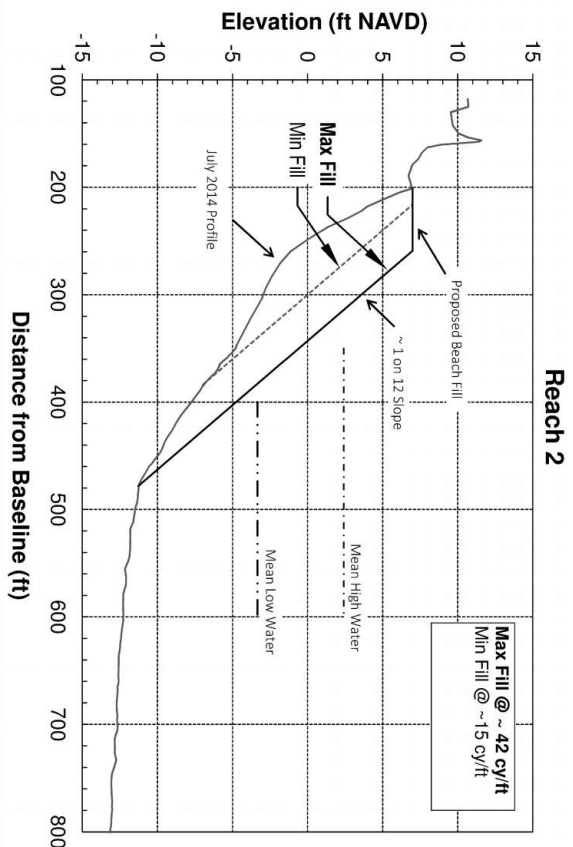
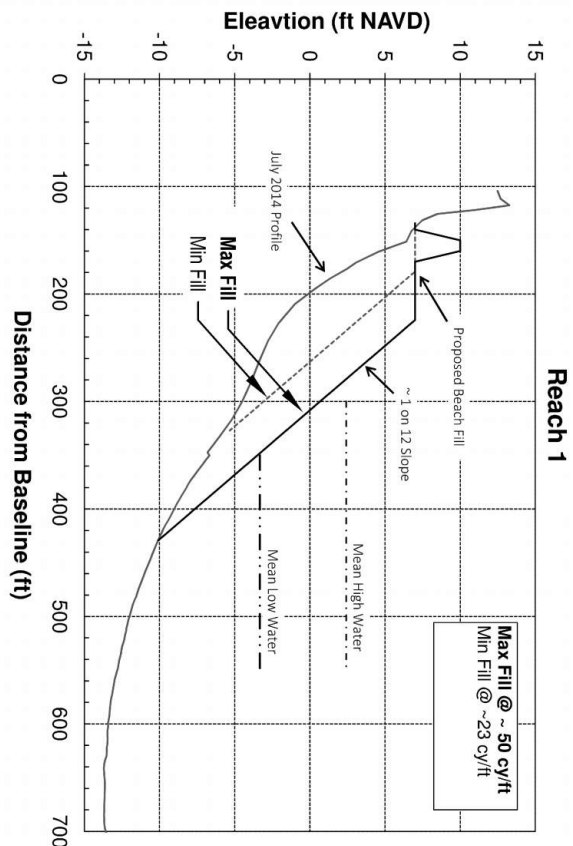
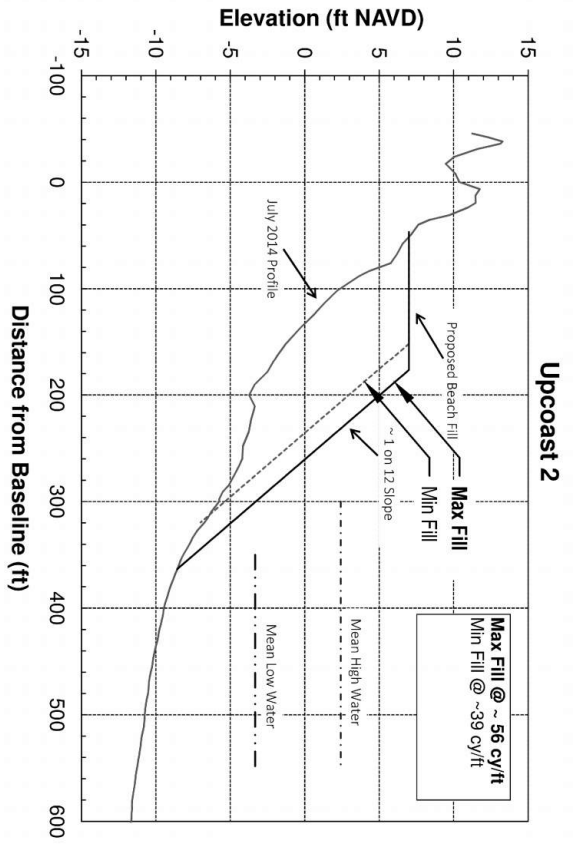
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DRAWING TITLE:
 GROIN EXTENSION PLAN
 GROINS 1-28

Scale: As Shown
 Date: Revised 17Apr2015
 Permit #:
 Project #: 2416

Sheet #: **04**



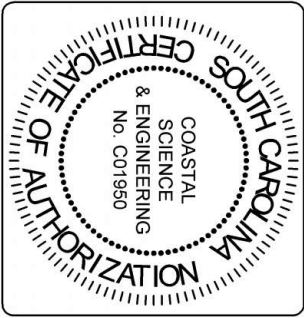


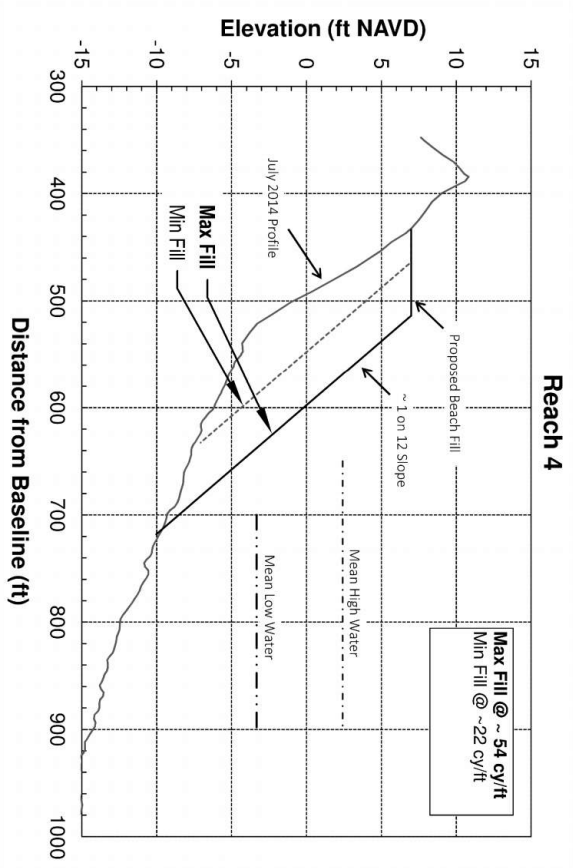
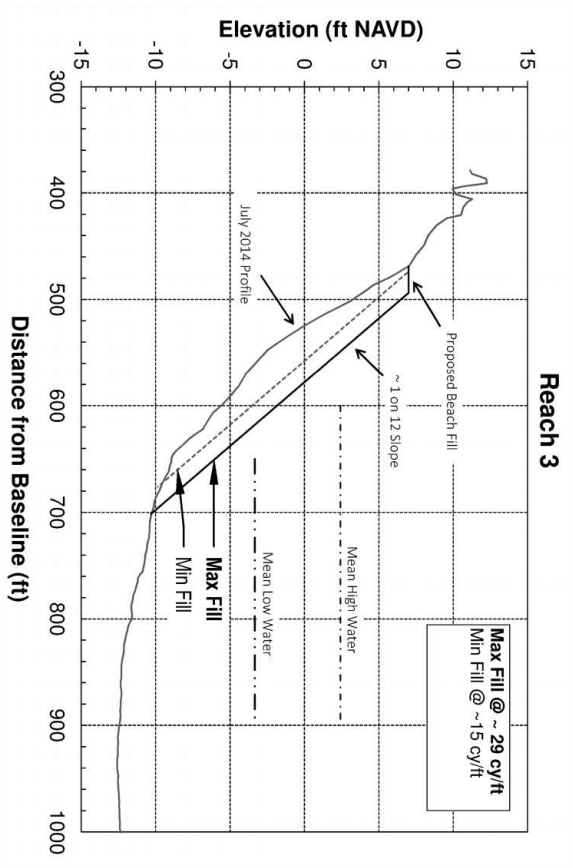
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DRAWING TITLE:
TYPICAL FILL PROFILES
UPCOAST & REACH 1 - 2

Scale:	As Shown	Sheet #:	05
Date:	23 April 2015		
Permit #:			
Project #:	2416		



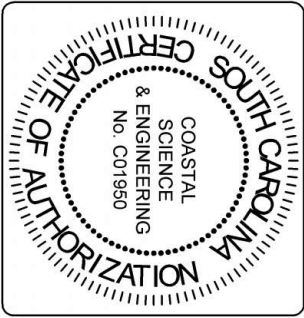


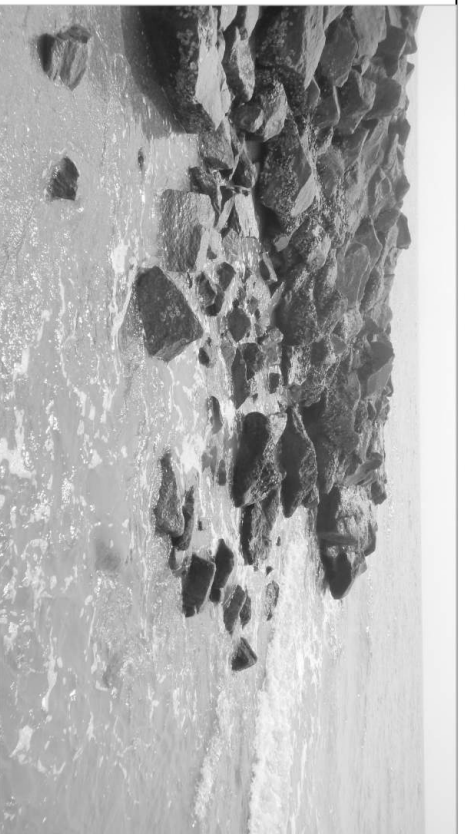
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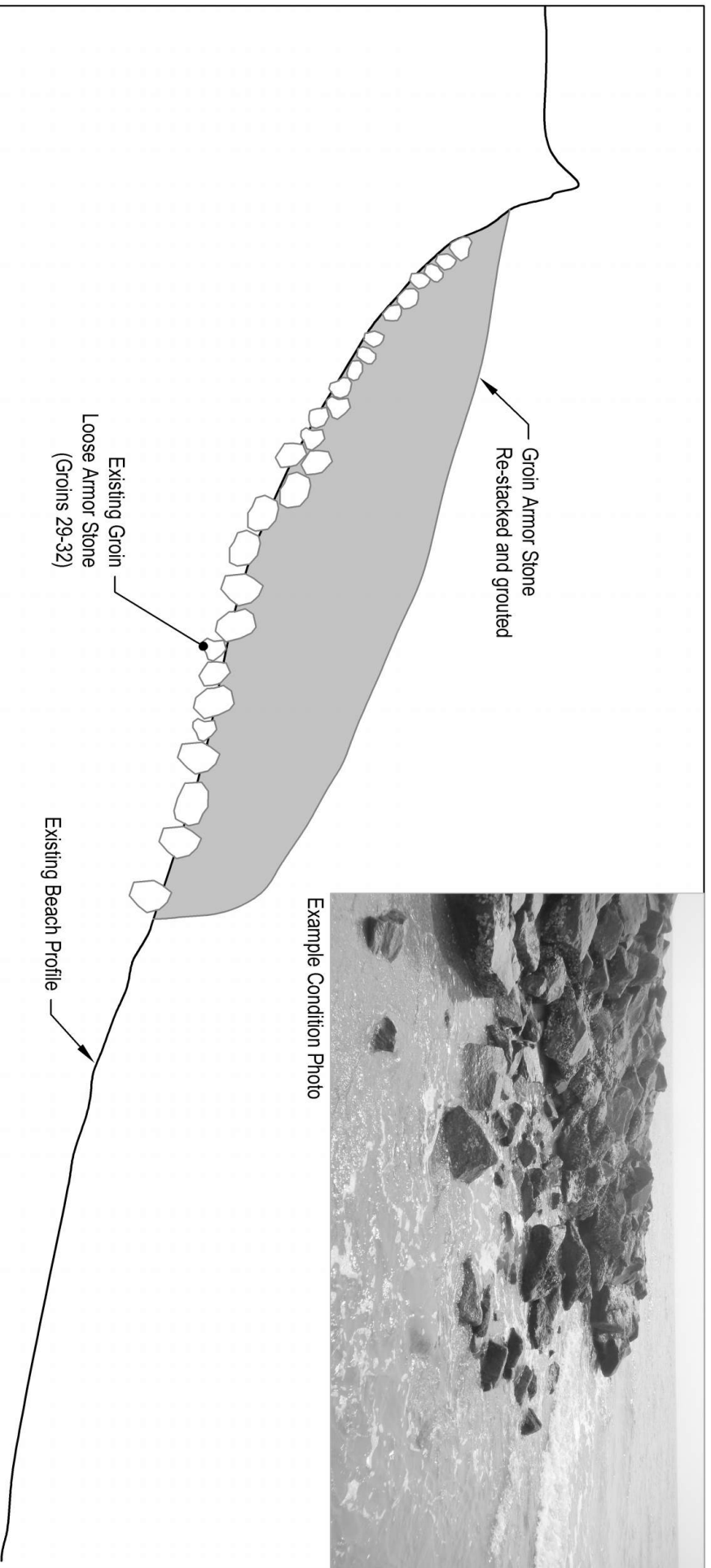
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TYPICAL FILL PROFILES
 REACH 3 - 4

Scale:	As Shown	Sheet #:	06
Date:	23 April 2015		
Permit #:			
Project #:	2416		





Example Condition Photo



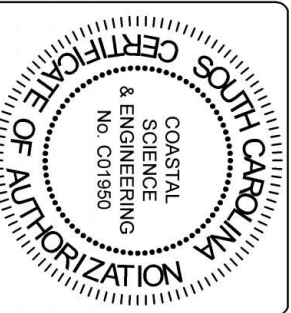
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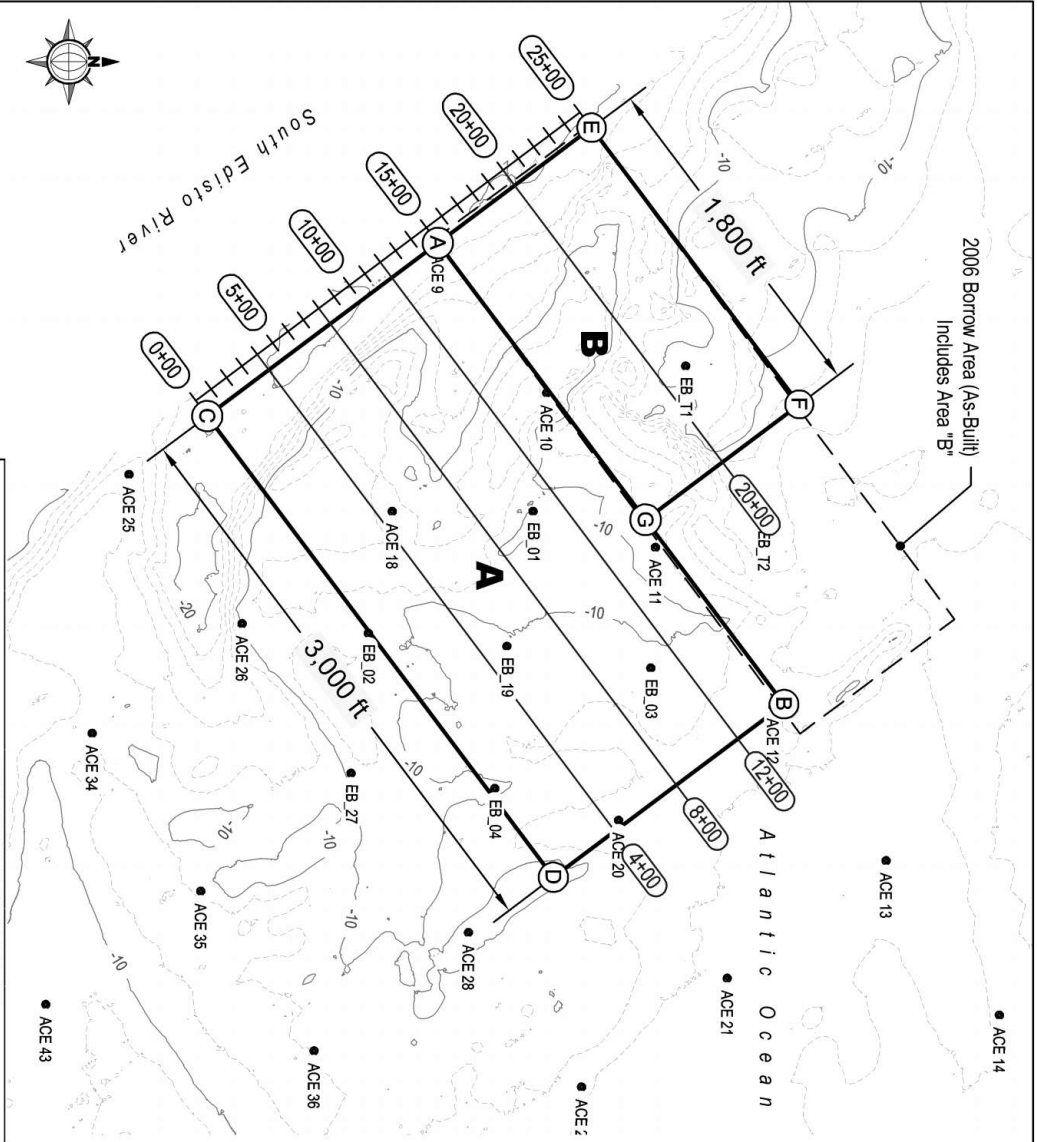
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DRAWING TITLE:
GROIN MAINTENANCE
 Groins 29-32

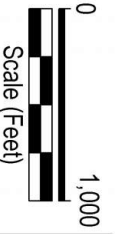
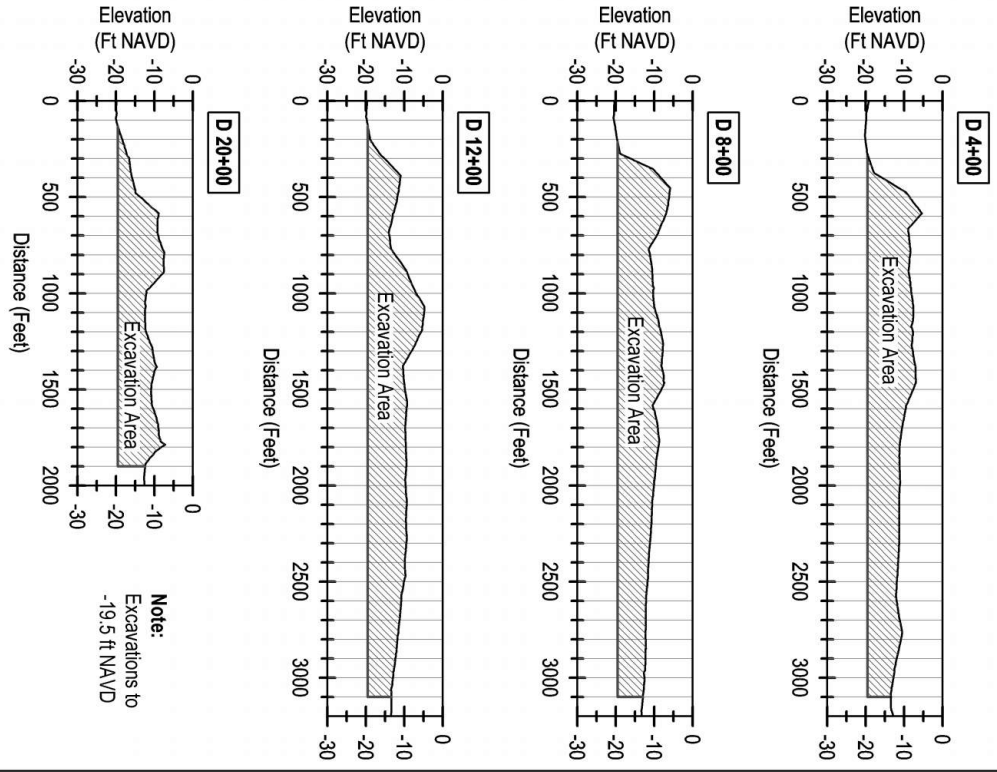
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Date:	Revised 17Apr2015		
Permit #:			
Project #:	2416		





Datum Notes:
 Horizontal: SPCS NAD 83 (Feet) SC Zone 3900
 Vertical: NAVD 88 (Feet)
 Bathymetry Shown Collected July 2014

BORROW AREA COORDINATES					
POINT	NORTHING	EASTING	POINT	NORTHING	EASTING
A	231,170.759	2,207,530.143	E	232,022.741	2,206,913.363
B	232,987.670	2,209,917.365	F	233,112.888	2,208,345.697
C	228,783.536	2,209,347.054	G	232,317.147	2,208,951.334
D	230,600.447	2,211,734.277			



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DRAWING TITLE:
 BORROW AREA DETAILS
 & SECTIONS

Scale: As Shown
 Date: 23 April 2015
 Permit #: 2416
 Project #: 2416

Sheet #: **08**

