J O I N T
P U B L I C N O T I C E

CHARLESTON DISTRICT, CORPS OF ENGINEERS
1949 INDUSTRIAL PARK ROAD, ROOM 140
CONWAY, SOUTH CAROLINA 29526
and
THE S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Office of Ocean and Coastal Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405

REGULATORY DIVISION
Refer to: P/N SAC-2018-00319 12 MARCH 2018

Pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), Sections 401 and 404 of the Clean Water Act (33 U.S.C. 1344), and the South Carolina Coastal Zone Management Act (48-39-10 et.seq.), an application has been submitted to the Department of the Army and the S.C. Department of Health and Environmental Control by

Horry County Department of Engineering
c/o Coastal Science & Engineering
P.O. Box 8056
Columbia, South Carolina 29202

for a permit to conduct beach nourishment in the

ATLANTIC OCEAN

along a 1.1 mile (6,000 linear feet) section of Arcadian Shores beach located just southeast of Shores Drive, starting just west of Singleton Swash and terminating at the Apache Campground Pier, in Myrtle Beach, Horry County, South Carolina (Latitude: 33.7581°N, Longitude: -78.7898°W), Hand Quad.

In order to give all interested parties an opportunity to express their views

N O T I C E

is hereby given that written statements regarding the proposed work will be received by the **Corps** and **SCDHEC** until

30 Days from the Date of this Notice

from those interested in the activity and whose interests may be affected by the proposed work.

The proposed activity is a beach nourishment project along the beach of Arcadian shores. In detail, the work will include the placement of up to 475,000 cubic yards (cy) of beach-quality sediment along approximately 1.1 mile (6,000 linear feet) of shoreline. The project encompasses three reaches with Reach “1” beginning ~1,000 Linear feet (l.f.) south of Singleton Swash and extending north ~2,000 l.f. Reach “2” will extend 3,000 l.f. from Brigadune Condominiums to approximately Lake Arrowhead Road. Reach “3” will extend 1,000 l.f. north to

Apache Family Campground Pier. The applicant stated that sand will be obtained from an offshore borrow area. The proposed borrow area is located ~2.5 miles southeast and directly offshore of Arcadian Shores with rough dimensions of 6,000 l.f. by 2,600 l.f. (~360 acres) (Sheet 2 of 12). Nourishment sand will be excavated by ocean-certified hopper dredge, transported to a submerged pumpout line, then discharged onto the beach. The slurry will dewater naturally, then will be shaped and graded to slopes and elevations similar to the existing beach (Sheets 4 - 6 of 12). A storm berm will be constructed using nourishment sand along up to 4,000 l.f. of Arcadian Shores (Reach 2 and possibly portions of Reach 1 and Reach 3). No fill will be placed landward of existing native beach vegetation. The majority of the nourishment volume will be placed along Reach "2" which has experienced above-average erosion in recent years (Sheet 5 of 12). Plans call for nourishment to restore chronic and storm sand losses since the project area was last nourished in 2008 and to supplement the volume with extra material to sustain ~10 years of normal erosion before remedial action is required.

The applicant further stated that work under this permit application would be performed outside the prescribed turtle nesting season to the extent practicable (ie – construction between 1 November and 30 April). The applicant seeks to perform the work around the same time that ocean-certified dredging equipment is mobilized along the Grand Strand for similar federal work at Myrtle Beach, North Myrtle Beach, and/or Garden City/Surfside Beach (USACE 1993).

Specific Project Details Provided by the Applicant:

Nourishment Plan

Beach Nourishment

The nourishment design is based on the present condition of the beach, historical erosion rates, impacts from recent hurricanes, a target minimum beach volume, environmental consideration, and available budget. Existing sand deficits by section along the beach were determined by comparing beach volumes seaward of the existing foredune. A target minimum profile was defined in terms of a sand quantity per unit length of beach (cubic yards per foot—cy/ft) considered necessary to withstand normal seasonal changes in the profile while maintaining a continuous dry-sand beach. For Arcadian Shores, healthy sections of beach which meet this criterion were found to contain ~525 cy/ft measured to −20 ft NAVD datum (CSE unpublished beach monitoring data 2017). Each section of the beach was compared to this value to determine volume deficits.

The nourishment plan includes sufficient volume to restore the deficit between Singleton Swash and Apache Family Campground Pier plus advance nourishment to account for anticipated future erosion. Reach "1" and Reach "3" incorporate volumes to provide for a gradual transition (taper) between Reach "2" and unnourished sections of beach to the north and south. The advance nourishment volume is designed to accommodate a minimum of five years of normal erosion to over ten years of erosion before renourishment may be required. The final nourishment volume will depend on the bids for construction and the budget available. The minimum-scale project is anticipated to be ~400,000 cy with a maximum scale of ~475,000 cy. The applicant understands review of the application will be based on the maximum scope of work.

Table 1 lists the proposed fill lengths, volumes, and fill density by reach. Adjustment in fill volumes will be made according to beach conditions at the time of construction, but will seek to

maintain proportionate reductions along all reaches from the maximum volumes listed in Table 1. Reach 1 and Reach 3 are broad taper sections around Singleton Swash and the Apache Family Campground Pier. Reach 2 would contain ~60 percent of the nourishment volume upon initial placement.

Table 1. Proposed beach nourishment volumes by reach. *[Applicant's project baseline in feet (engineering nomenclature) extends from a point ~1,000 lf south of Singleton Swash to a point ~250 ft north of Apache Family Campground Pier.]

Reach	Stationing*	Locality	Length (ft)	Minimum Volume (cy)	Maximum Volume (cy)	Fill Density Range (cy/ft)
1	5+00–25+00	Around Singleton Swash	2,000	80,000	90,000	40.0–45.0
2	25+00–55+00	Commercial District	3,000	295,000	355,000	98.3–118.3
3	55+00–65+00	Apache Family Campground	1,000	25,000	30,000	25.0-30.0

Reach "1" crosses Singleton Swash (Sheet 04). Similar to nourishment operations in 2008 (CSE 2008), flow into and out of the swash will be maintained by temporary culverts through the nourishment berm. Upon completion of pumping operations, the temporary culverts will be removed and a channel will be re-established within the authorized corridor for the swash. The culverts are necessary to bridge the fill across the swash and to provide a gradual taper to downcoast areas. The culverts will maintain tidal flushing to Singleton Swash during construction operations.

Nourishment will be accomplished by ocean-certified hopper dredge and heavy equipment (bulldozers and loaders), shaping the fill on the beach similar to construction methods for the 2008 nourishment project (CSE 2008). Temporary sand-training dikes may be used to contain the slurry discharge parallel to the shore. Once the sand is pumped onto the beach, bulldozers will shape the fill into the design template from the backshore to the approximate mean sea-level (MSL) contour. Sand below MSL will be shaped and redistributed to a natural profile by waves. Sand fencing and/or native vegetation will be installed in strategic locations along a proposed storm berm (in accordance with state rules for fence placement) following nourishment.

Storm Berm

The nourishment plan incorporates a storm berm along up to 4,000 lf between stations 15+00 and 55+00. The storm berm will toe into the seaward face of the existing foredune and will be no higher than +8 ft NAVD with a crest width of ~50 ft. The seaward edge of the storm berm will be 1 on 4 or gentler, merging with the constructed berm at +6 ft NAVD. Proposed beach-fill sections are illustrated on Sheets 7–9 of 12*. Sand fencing and/or native dune grasses will be installed along the storm berm soon after completion of nourishment following South Carolina Department of Health and Environmental Control–Office of Ocean and Coastal Resource Management (SCDHEC–OCRM) specifications and guidance as given in proposed General Permit GP–17–SMD (public notice dated 9 February 2017).*

The alongshore limits of the storm berm will be determined based on conditions at the time of construction. No nourishment sand or dune construction will be performed over existing native vegetation. The applicant's goal for the storm berm is to re-establish a continuous sand buffer

to absorb "king tides" and minor storm surges along the Arcadian Shores commercial district without impact to the foredune or backshore development.

Borrow Area

The applicant, through its consultant–CSE, completed a sand search and confirmation borings for the proposed offshore borrow area. CSE reviewed available data on offshore sand deposits along the Grand Strand including results of US Geological Survey (USGS) studies (Barnhardt 2009), USACE surveys (USACE 1993, 1995, 1997), and earlier CSE surveys (Gundlach et al 1985, CSE 2008). For the proposed project, CSE delineated an ~400-acre search area contiguous with and partially overlapping the 2008 Arcadian Shores borrow area. Athena Technologies Inc obtained 15 new borings under CSE direction to supplement earlier borings in the area (CSE 2008). The data were analyzed and combined with previous borings to provide detailed information on sediment quality (CSE 2018—Geotechnical Data Analyses).

The proposed *borrow area based on cores obtained in late 2017 and on selected cores from 2007. Fifteen cores, available from the 2017 survey, and six cores from 2007 are contained within the boundaries of the proposed borrow area. The delineated borrow area is 2,600 ft wide and 6,000 ft long (in the shore-perpendicular direction) and encompasses ~360 acres. The core density averages ~1 core per 17 acres; core lengths average ~4.7 ft. Sheet* 10 of 12 *shows the bathymetry and core locations in and around the proposed borrow area.*

A cultural resource study is underway (magnetometer, side-scan, and shallow seismic surveys) in accordance with South Carolina state standards for such surveys to identify the presence of obstructions, vessel remains, or other objects that would adversely impact dredging operations or require protection. Tidewater Atlantic Research Inc (TAR—Dr. Gordon Watts) is conducting the survey for the applicant and has coordinated the trackline spacing and related specifications for the investigation with South Carolina State Historic Preservation Office (SCSHPO). Results will be submitted as soon as they are available (anticipated April 2018).

The proposed borrow area is in water depths between ~25 ft and 30 ft NAVD. Sheet 12 of 12 shows representative bathymetric sections through the borrow area. Because sand resources off the Grand Strand are limited (Barnhardt et al 2007, Barnhardt 2009), quality deposits tend to be relatively thin sand sheets perched on semi-lithified ancient sediments. Other federal projects and the 2008 Arcadian Shores nourishment have proven the feasibility of conducting nourishment via hopper dredges off the Grand Strand. Such equipment utilizes a mobile vessel that excavates shallow cuts, drawing sand into the hold then motoring to a pumpout point. The hopper dredge links to a submerged pipeline some small distance offshore, then pumps a sand-water slurry to the beach where it is shaped by bulldozers into the final grade and slopes specified under the final design. In the course of transferring sand from the hopper, finer material tends to wash out before being placed on the beach. Thus, the mean grain size increases incrementally between the borrow area and the final placement area (Dean 2002).

Sea Turtles

The Applicant proposes to construct the project outside of sea turtle nesting and hatching season to the extent practicable (May–October). Should portions of the project overlap with turtle nesting season, standard protection and monitoring actions will be completed to minimize impacts to sea turtles. Action items include:

- *Follow operation protocols for hopper dredging as recommended under the 1997 South Atlantic Regional Biological Opinion issued by National Marine Fisheries Service.*
- *Daily early morning surveys for sea turtles.*
- *Nest relocation by qualified personnel for nests laid in areas where they may be impacted by construction activities.*
- *Equipment storage will be off the beach to the maximum extent practicable and as far landward as possible. Temporary fencing or other measures will be utilized to prevent turtles from being trapped by equipment.*
- *Direct night-time lighting of the beach will be limited to the immediate construction area and shielded according to USFWS recommendations. If any turtles are observed in the construction area, activities will cease until the turtle(s) returns to the water and any nest is marked.*
- *Tilling of the nourished beach and compaction monitoring for three years after nourishment.*
- *Escarpment monitoring and leveling for three years after nourishment.*

Sediment Quality

The Applicant is proposing a borrow area which contains low percentages of gravel (>2 mm diameter) and shell material. While shell content ($CaCO_3$) constitutes ~9 percent of the borrow sediments, only about 1.5 percent is gravel size. This means nearly all the shell material is in the form of sand-sized particles. Such material is beneficial for beach stability (Kana & Mohan 1998) and is similar to the native sand quality along the Grand Strand. The "native" shell percentage along the Arcadian Shores beach in November 2017 was ~5.3 percent. The accompanying "Geotechnical Data Analyses" (CSE 2018) includes detailed comparisons between the native beach sediments and the proposed borrow sediments.
Specific monitoring during construction will include the following.

1) *The Applicant (through its Agent) will have qualified personnel under the direction of a South Carolina-registered professional engineer and professional geologist monitoring sediment quality on the beach during construction and correlating it with the borrow area conditions.*
2) *During construction, samples of the beach fill will be obtained at ~200-ft intervals and compared to the native and borrow area samples. Samples along one shore-perpendicular transect will be combined into one physical composite and sent to the laboratory for grain-size analysis. Samples will be analyzed as soon as possible but will not exceed five (5) days after collection. Sediment test results will be submitted monthly to USACE and SCDHEC–OCRM for review.*

3) *Additional sampling and frequent observation will be completed during the loading of the hopper dredge to check the quality of sand. The contractor will have observers monitoring* sediment quality on board the dredge and at the beach discharge point, and will immediately *report any significant changes in the discharge to the on-site technical representative so that decisions to avoid certain portions of the borrow area can be accomplished in a timely manner.*

4) *Upon completion of construction, the Applicant (through its Agent) will resample the project area and obtain representative samples of the beach fill using the same stations as the pre-project samples. Results will be compared with pre-project beach samples and borrow area sediment test results. Data will be submitted to the USACE and SCDHEC–OCRM in a comprehensive final report.*

5) *Relocation of the dredge. The dredge will be relocated to other subareas within the permitted borrow area if the following conditions are encountered:*

   a. *Evidence of high concentrations of mud persisting for more than 30 minutes in the slurry based on visual observation of the hopper bin or at the discharge pipe.*

   b. *Evidence of high concentrations of non-shell gravel such as chunks of limestone, marl, or similar cemented sediments, which accumulate in the hopper bin based on visual observation on board the dredge and monitoring of the slurry at the beach discharge point.*

   c. *Evidence of high concentrations of coarse shell material exceeding pebble-sized clasts (eg – oyster shells, quahogs, etc), which accumulate in the hopper bin based on visual observations on board the dredge and monitoring of the slurry at the beach discharge point.*

6) *Accumulations of mud rollers and coarse gravel material (ie – rock fragments, large shells). Because of the lag time between excavations in the borrow area and pump-out onto the beach, accumulations of mud rollers and coarse gravel material may occur before the dredge can be relocated. If such accumulations exceed the equivalent of one 15-cy dump truck per 100 linear feet of beach, the Applicant will arrange to pick up the coarse material using hand labor or a beach-sweeping device as soon as practicable upon completion of the section or upon completion of the project. To the extent practicable, such accumulations will be raked into stockpiles above the high-tide mark and will be removed prior to completion of the project.*

7) *Beach compaction tilling –The Applicant will perform tilling of the fill berm upon project completion as specified in the contract documents. Tilling will be accomplished to a depth of ~36 inches and will span the dry berm. The Applicant (through its Agent) will perform post-tilling compaction tests at ~500-ft intervals along the project area and will report the results to USACE and SCDHEC–OCRM following standard testing protocols.*

Monitoring Plan

The Applicant will establish and complete the following monitoring plan as part of the proposed project. Some of these action items were mentioned previously, but are included here for completeness.

Beach Surveys – The Applicant will conduct topographic and bathymetric beach surveys before and after the project, and for a minimum of three years post project. Surveys will be conducted at profiles not to exceed 500 ft in spacing in the alongshore direction and will encompass the beach between a point landward of the stable dune and extend to depths of −25 ft NAVD, or a distance of ~2,500 ft from the shoreline, whichever is closer. Post construction surveys will compare beach volumes and contour positions to before-and-after project conditions to document beach volume changes and identify erosion hotspots. Annual reports will be submitted to USACE and SCDHEC–OCRM.

Borrow Area Surveys – The Applicant will conduct pre-project, post-project, and out-year bi-annual bathymetric surveys of the utilized dredge area. Surveys will encompass the boundaries of the dredge area and will include a minimum 400 ft buffer along the outside of the area. Surveys will be completed using track lines at a spacing not to exceed 100 ft. Out-year surveys will be completed in Years 1 and 3 following construction. Data will be used to determine infilling rates and topographical changes to the seafloor. Results will be included in annual monitoring reports in conjunction with the beach surveys.

Sediment Monitoring – Beach – Pre and post nourishment beach sediment samples will be taken at the same stations sampled before construction (see "Geotechnical Data Analyses"—CSE 2018). At each station, samples will be obtained using a push core at the toe of the dune, crest of the berm, mid beach face, and shallow underwater zone. Samples will be dried and tested for grain size distribution and shell content. Results will be included in a comprehensive project report.

Proposed Mitigation:

The applicant offered no compensatory mitigation for the proposed impacts.

Project Purpose:

The project purpose is storm damage reduction.

NOTE: This public notice and associated plans are available on the Corps' website at: http://www.sac.usace.army.mil/Missions/Regulatory/PublicNotices .

The District Engineer has concluded that the discharges associated with this project, both direct and indirect, should be reviewed by the South Carolina Department of Health and Environmental Control in accordance with provisions of Section 401 of the Clean Water Act. As such, this notice constitutes a request, on behalf of the applicant, for certification that this project will comply with applicable effluent limitations and water quality standards. The work shown on this application must also be certified as consistent with applicable provisions of the Coastal Zone Management Program (15 CFR 930). This activity may also require evaluation for compliance with the S. C. Construction in Navigable Waters Permit Program. State review, permitting and certification is conducted by the S. C. Department of Health and Environmental Control. The

District Engineer will not process this application to a conclusion until such certifications are received. The applicant is hereby advised that supplemental information may be required by the State to facilitate the review.

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Implementation of the proposed project would impact ~40 acres of intertidal beaches and ~360 acres of adjacent subtidal ocean bottom utilized by various life stages of species comprising the shrimp, and snapper-grouper management complexes. The District Engineer's initial determination is that the proposed action would not have a substantial individual or cumulative adverse impact on EFH or fisheries managed by the South Atlantic Fishery Management Council and the National Marine Fisheries Service (NMFS). The District Engineer's final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the NMFS.

Pursuant to the Section 7 of the Endangered Species Act of 1973 (as amended), the Corps has reviewed the project area, examined all information provided by the applicant, and the District Engineer has determined, based on the most recently available information that the project may affect the Loggerhead Sea Turtle (*Caretta caretta*), Kemp's Ridley Sea Turtle (*Lepidochelys kempii*), Leatherback Sea Turtle (*Dermochelys coriacea*), Hawksbill sea turtle (Eretmochelys imbricate), Green Sea Turtle (*Chelonia mydas*), Piping Plover (*Charadrius melodus*), Seabeach amaranth (Amaranthus pumulus), and the Red Knot (*Calidris canutus rufa*) and/or designated critical habitat. Additionally, the District Engineer has determined that the proposed project may affect, not likely to adversely affect, West Indian Manatee (*Trichechus manatus*), Humpback Whale (*Megaptera novaengliae*), Blue whales (Balaenoptere musculus), Sei whales (Balaenoptera borealis), Sperm whales (Physeter microcephalus), Fin whale (Balaenoptera physalus), Atlantic sturgeon (Acipenser oxyrinchus), Shortnose sturgeon (Acipenser brevirostrum), and North Atlantic Right Whale (*Eubalaena glacialis*). A biological assessment (or other similar document) detailing our analysis of the potential effects of the action will be provided to the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service.

Pursuant to Section 106 of the National Historic Preservation Act (NHPA), this public notice also constitutes a request to Indian Tribes to notify the District Engineer of any historic properties of religious and cultural significance to them that may be affected by the proposed undertaking.

In accordance with Section 106 of the NHPA, the District Engineer has consulted South Carolina ArchSite (GIS), for the presence or absence of historic properties (as defined in 36 C.F.R. 800.16)(*l*)(1)), and has initially determined that no historic properties are present; therefore, there will be no effect on historic properties. To ensure that other historic properties that the District Engineer is not aware of are not overlooked, this public notice also serves as a request to the State Historic Preservation Office and any other interested parties to provide any information they may have with regard to historic properties. This public notice serves as a request for concurrence within 30 days from the SHPO (and/or Tribal Historic Preservation Officer).

The District Engineer's final eligibility and effect determination will be based upon coordination with the SHPO and/or THPO, as appropriate and required and with full consideration given to the proposed undertaking's potential direct and indirect effects on historic properties within the Corps-identified permit area.

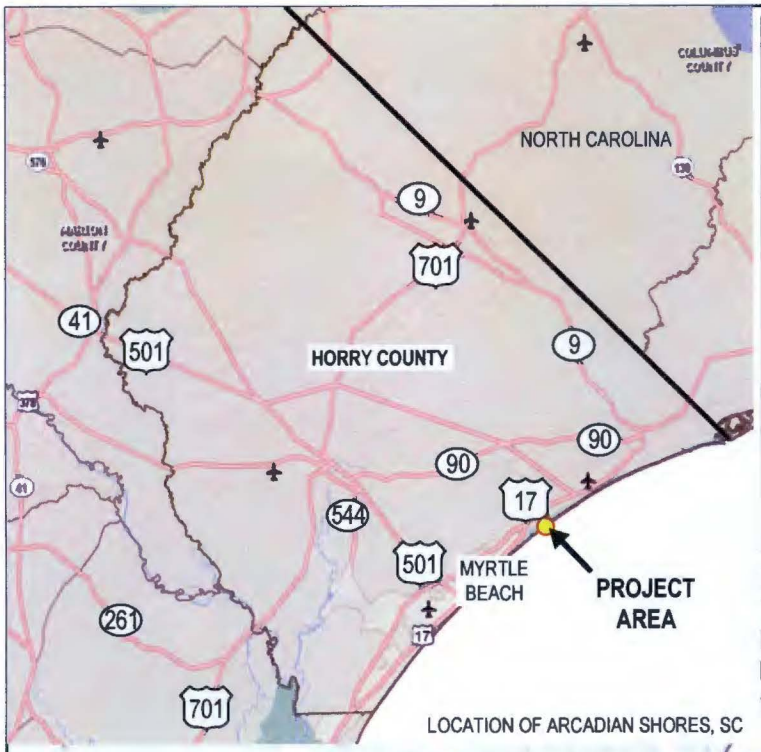
Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for a public hearing shall state, with particularity, the reasons for holding a public hearing.

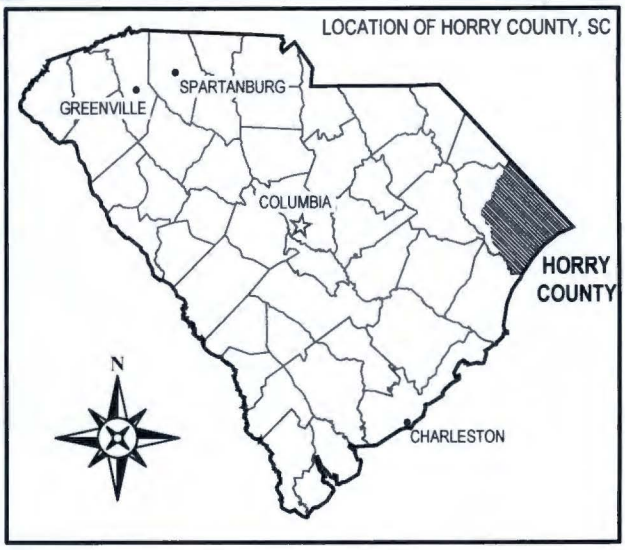
The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the activity on the public interest and will include application of the guidelines promulgated by the Administrator, Environmental Protection Agency (EPA), under authority of Section 404(b) of the Clean Water Act and, as appropriate, the criteria established under authority of Section 102 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the project must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the project will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production and, in general, the needs and welfare of the people. A permit will be granted unless the District Engineer determines that it would be contrary to the public interest. In cases of conflicting property rights, the Corps cannot undertake to adjudicate rival claims.

The Corps is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this project. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the activity. **Please submit comments in writing, identifying the project of interest by public notice number, to the following address:**

U.S. Army Corps of Engineers
ATTN: REGULATORY DIVISION
1949 INDUSTRIAL PARK ROAD, ROOM 140
CONWAY, SOUTH CAROLINA 29526

If there are any questions concerning this public notice, please contact Rob Huff, Watershed Manager, at (843) 365-4239.





Directions:
Take U.S. Hwy 17 North from Charleston, S.C., through Myrtle Beach. Turn right onto Lake Arrowhead Road. Turn left on Kings Road, then turn right on back Vale Drive. Back Vale Drive ends at the oceanfront 200 feet north of the Apache Campground Pier.

LOCATION OF ARCADIAN SHORES, SC

Project Location
Latitude: 33°45'23.50" N
Longitude: 78°47'35.40" W

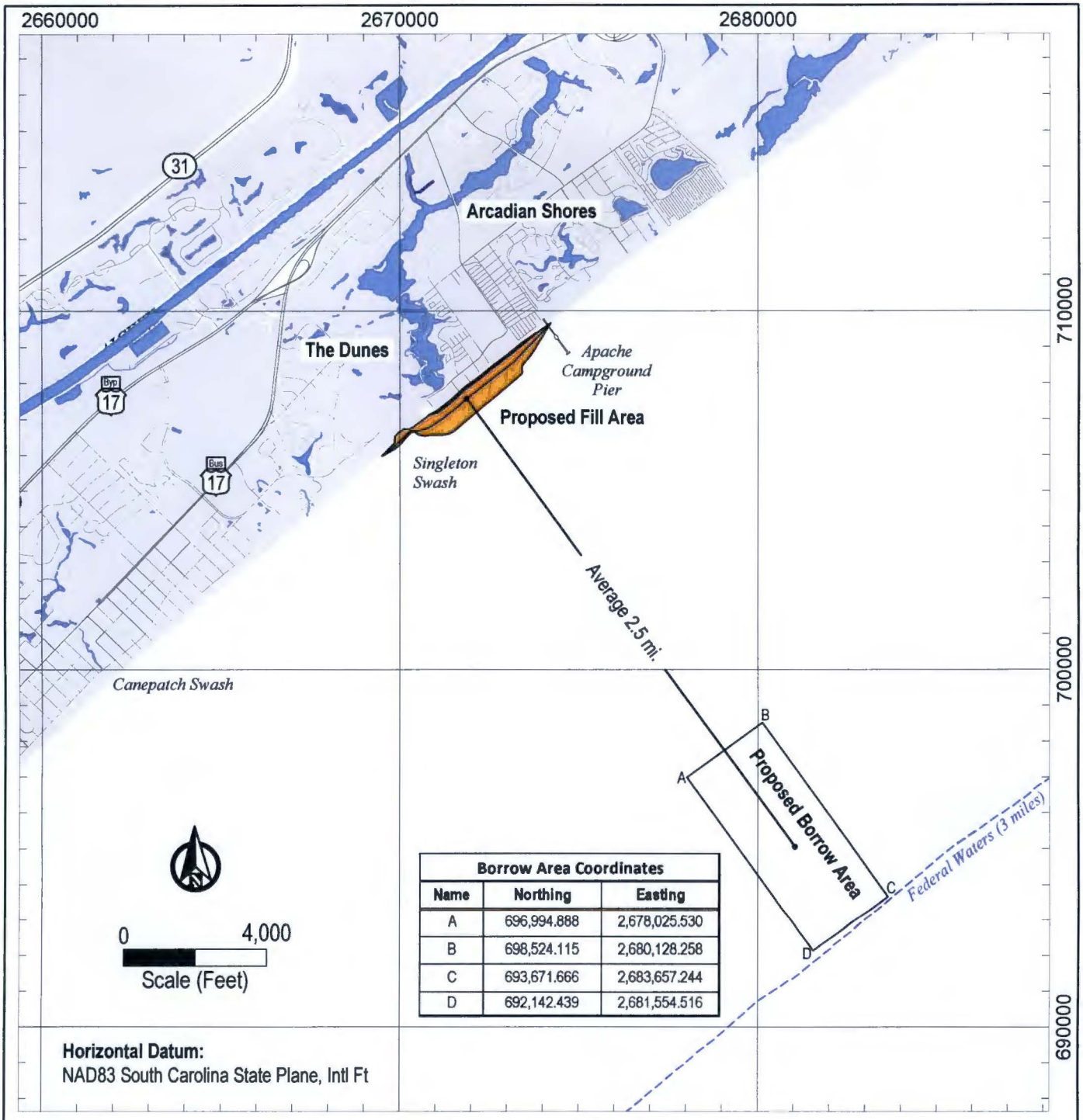
APPLICANT:
C/O ARCADIAN SHORES
HORRY COUNTY I & R DIVISION
4401 PRIVETTS RD CONWAY, SC 29526

AGENT:
COASTAL SCIENCE & ENGINEERING
PO BOX 8056
COLUMBIA, SC 29202

DRAWING TITLE:
BEACH NOURISHMENT VICINITY MAP

SCALE:	AS SHOWN
DATE:	2 Mar 2018
TMS#	-
PROJECT #:	2477

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
Sheet 1 of 12



Borrow Area Coordinates		
Name	Northing	Easting
A	696,994.888	2,678,025.530
B	698,524.115	2,680,128.258
C	693,671.666	2,683,657.244
D	692,142.439	2,681,554.516

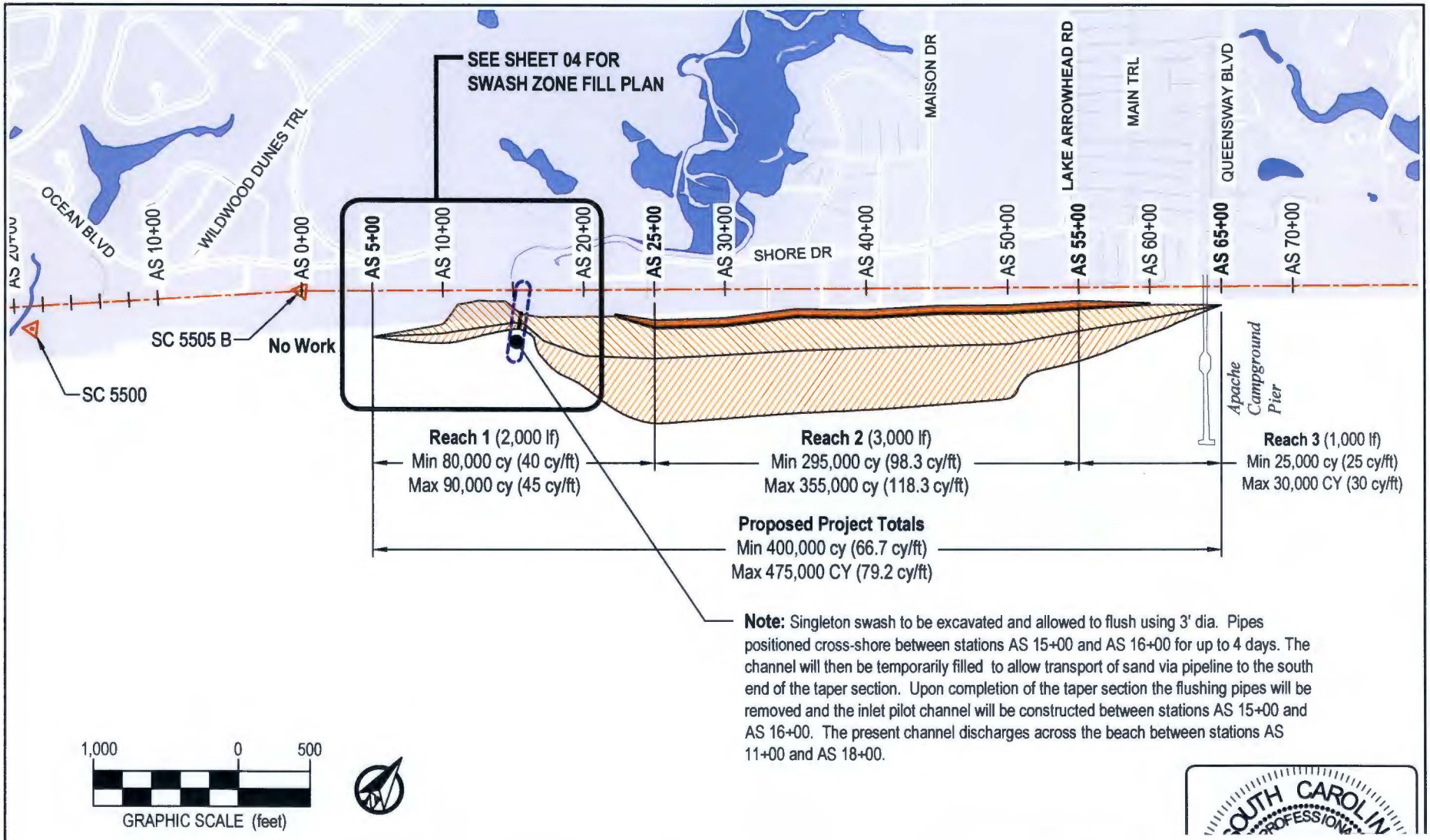
APPLICANT:
C/O ARCADIAN SHORES
HORRY COUNTY I & R DIVISION
4401 PRIVETTS RD CONWAY, SC 29526

AGENT:
COASTAL SCIENCE & ENGINEERING
PO BOX 8056
COLUMBIA, SC 29202

DRAWING TITLE:
Overall Project Plan

SCALE:	AS SHOWN
DATE:	2 Mar 2018
TMS#	-
PROJECT #:	2477

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
Sheet 2 of 12



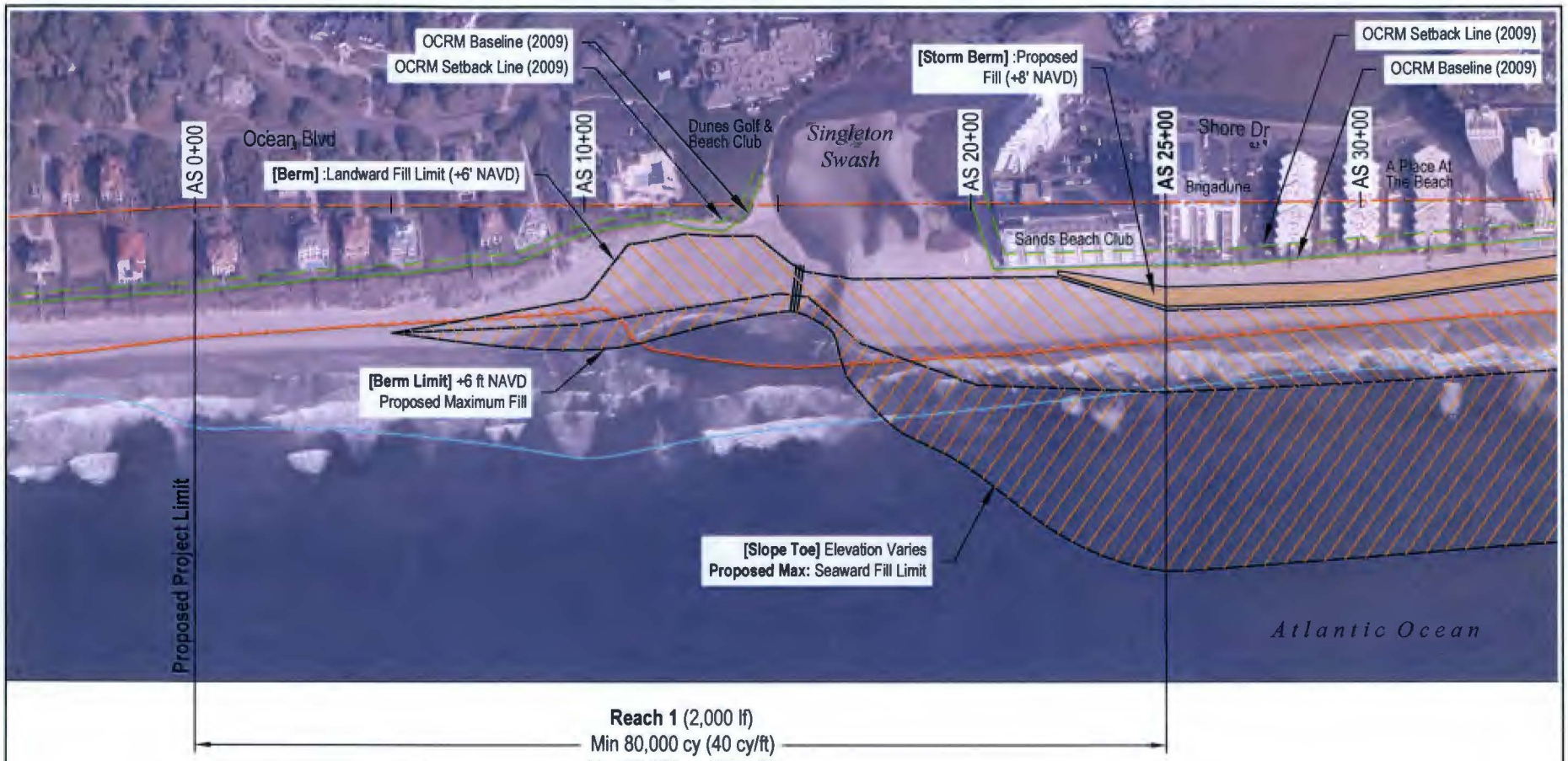
Note: Singleton swash to be excavated and allowed to flush using 3' dia. Pipes positioned cross-shore between stations AS 15+00 and AS 16+00 for up to 4 days. The channel will then be temporarily filled to allow transport of sand via pipeline to the south end of the taper section. Upon completion of the taper section the flushing pipes will be removed and the inlet pilot channel will be constructed between stations AS 15+00 and AS 16+00. The present channel discharges across the beach between stations AS 11+00 and AS 18+00.

APPLICANT:
C/O ARCADIAN SHORES
HORRY COUNTY I & R DIVISION
4401 PRIVETTS RD CONWAY, SC 29526

AGENT:
COASTAL SCIENCE & ENGINEERING
PO BOX 8056
COLUMBIA, SC 29202

DRAWING TITLE:
BEACH NOURISHMENT PROJECT FILL AREA

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
Sheet 3 of 12



Datum:
Horizontal: NAD83 South Carolina State Plane, Intl Foot
Verticle: Feet NAVD
Data Source: *CSE via trimble RTK GPS Nov 2017*
Photo Source: *NOAA 2017*

OCRM Baseline
OCRM Setback Line
MHHW (+2.05 ft NAVD)
MLLW (-2.97 ft NAVD)

Proposed Storm Berm (+8 ft NAVD)
Proposed Berm Fill (+6 ft NAVD)
Proposed Slope Fill (Slope 1on 20)

0 400
Scale (Feet)

SOUTH CAROLINA PROFESSIONAL ENG. No. 24737

APPLICANT:	*AGENT:*	*DRAWING TITLE:*
C/O ARCADIAN SHORES HORRY COUNTY I & R DIVISION 4401 PRIVETTS RD CONWAY, SC 29526	COASTAL SCIENCE & ENGINEERING PO BOX 8056 COLUMBIA, SC 29202	**REACH 1 (Swash Zone)** **Nourishment Fill**

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
Sheet 4 of 12

Datum:
Horizontal: NAD83 South Carolina State Plane, Intl Foot
Verticle: Feet NAVD
Data Source: *CSE via trimble RTK GPS Nov 2017*
Photo Source: *NOAA 2017*

- *OCRM Baseline*
- *OCRM Setback Line*
- *MHHW (+2.05 ft NAVD)*
- *MLLW (-2.97 ft NAVD)*
- Proposed Storm Berm (+8 ft NAVD)
- Proposed Berm Fill (+6 ft NAVD)
- Proposed Slope Fill (Slope 1on 20)

0 400
Scale (Feet)

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AGENT:
COASTAL SCIENCE & ENGINEERING
PO BOX 8056
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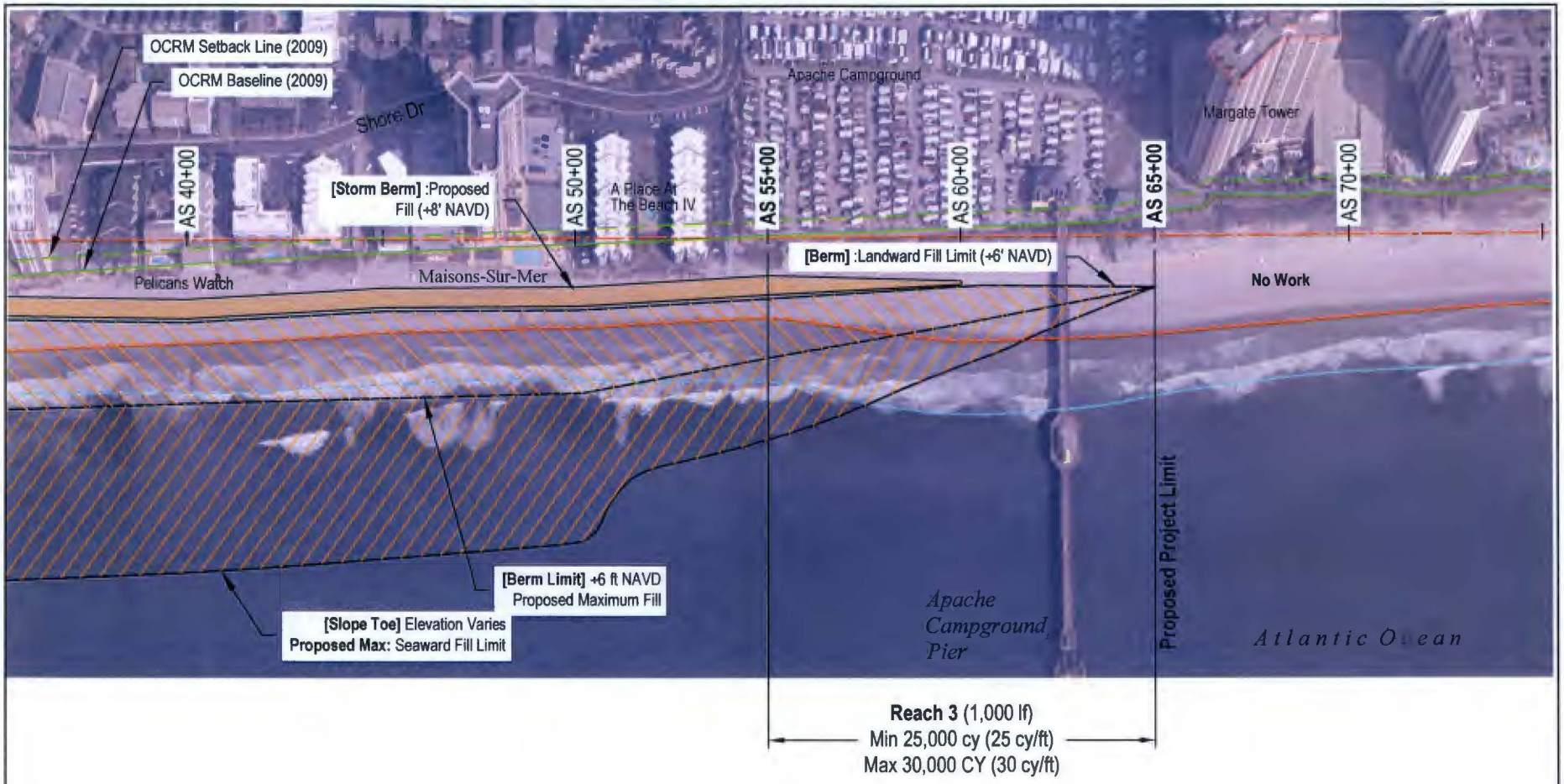
DRAWING TITLE:
REACH 2
Nourishment Fill

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
Sheet 5 of 12



Datum:
Horizontal: NAD83 South Carolina State Plane, Intl Foot
Verticle: Feet NAVD
Data Source: *CSE via trimble RTK GPS Nov 2017*
Photo Source: *NOAA 2017*

OCRM Baseline
OCRM Setback Line
MHHW (+2.05 ft NAVD)
MLLW (-2.97 ft NAVD)

Proposed Storm Berm (+8 ft NAVD)
Proposed Berm Fill (+6 ft NAVD)
Proposed Slope Fill (Slope 1on 20)

0 400
Scale (Feet)

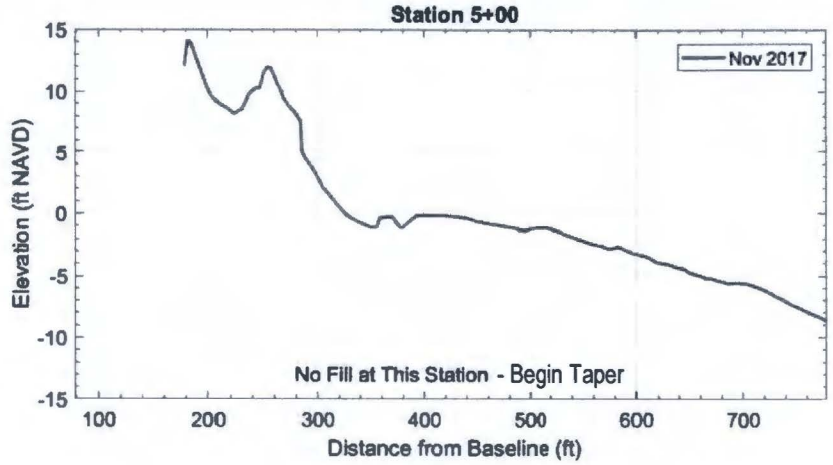
SOUTH CAROLINA PROFESSIONAL ENG No. 24737

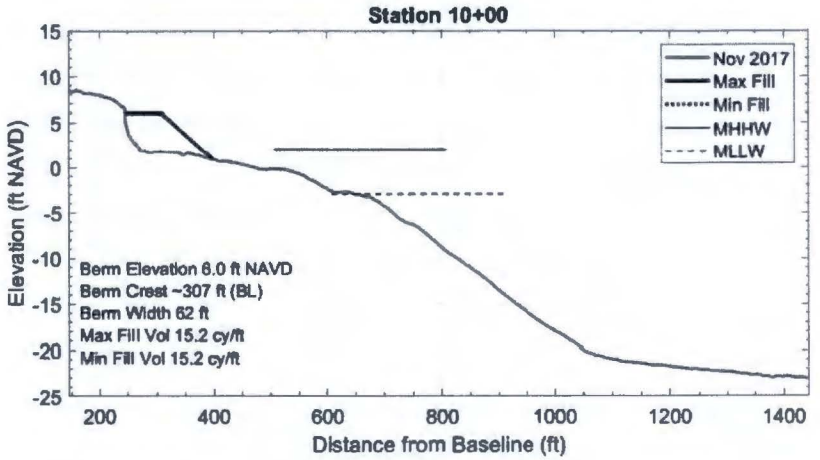
APPLICANT:
C/O ARCADIAN SHORES
HORRY COUNTY I & R DIVISION
4401 PRIVETTS RD CONWAY, SC 29526

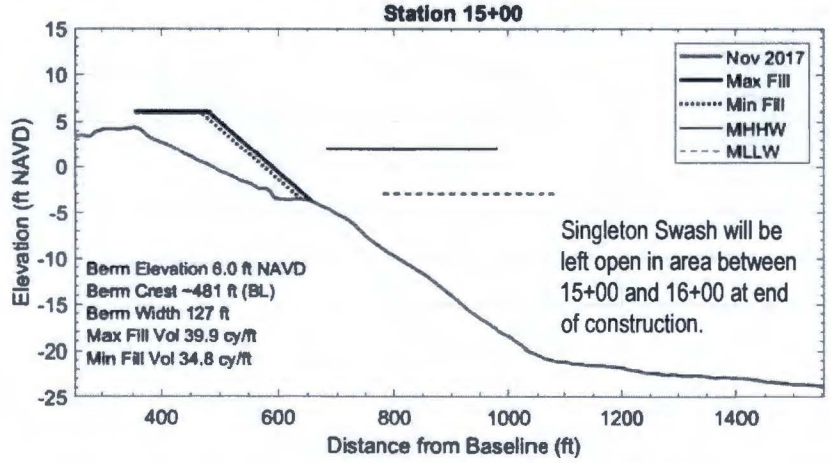
AGENT:
COASTAL SCIENCE & ENGINEERING
PO BOX 8056
COLUMBIA, SC 29202

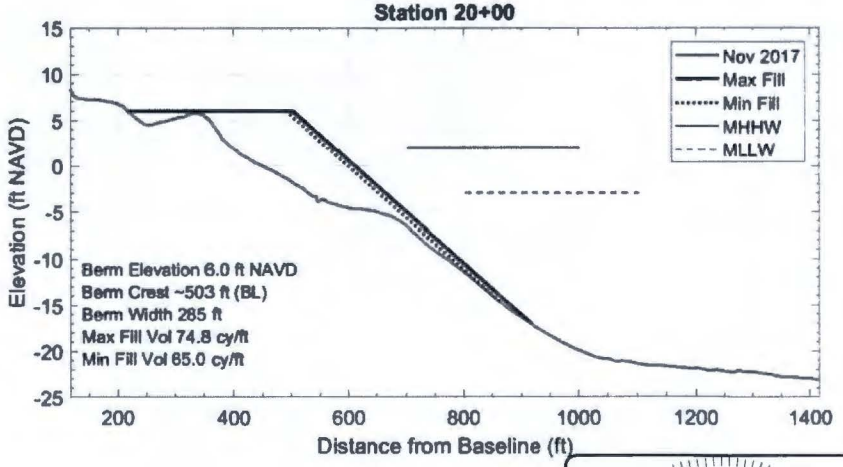
DRAWING TITLE:
REACH 3 (Taper Section)
Nourishment Fill

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
Sheet 6 of 12









SOUTH CAROLIN... PROFESSIONA...

APPLICANT:	AGENT:	DRAWING TITLE:	SC / DA / TM / PR
C/O ARCADIAN SHORES HORRY COUNTY I & R DIVISION 4401 PRIVETTS RD CONWAY, SC 29526	COASTAL SCIENCE & ENGINEERING PO BOX 8056 COLUMBIA, SC 29202	**Nourishment Fill Sections**	

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
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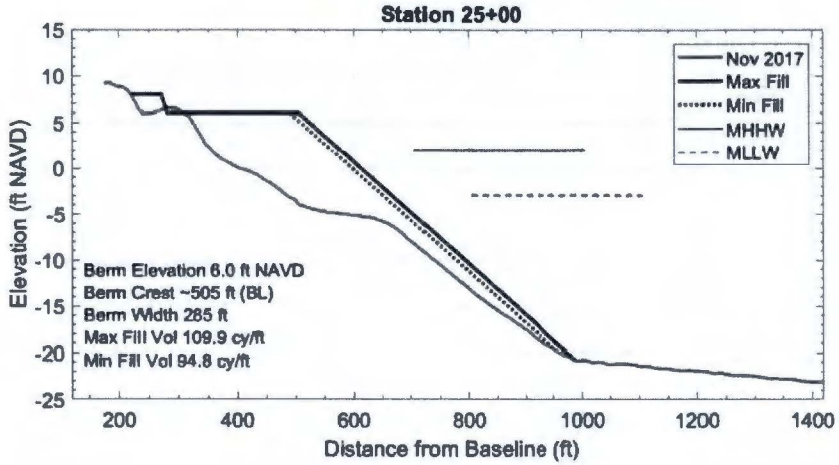
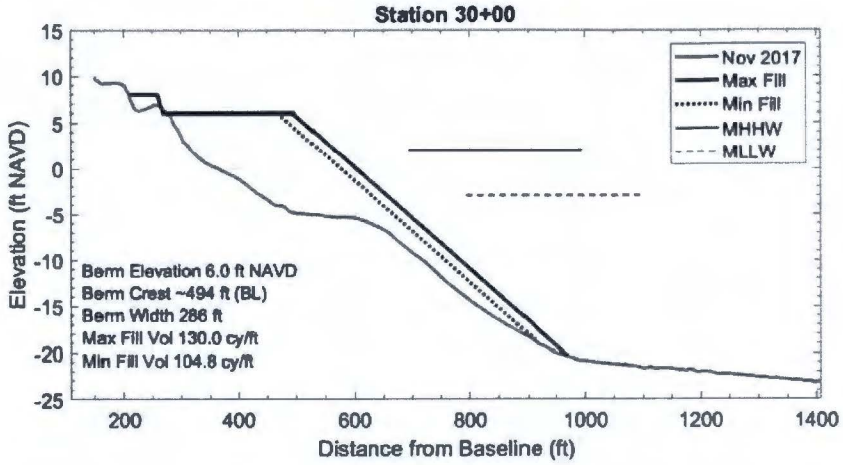
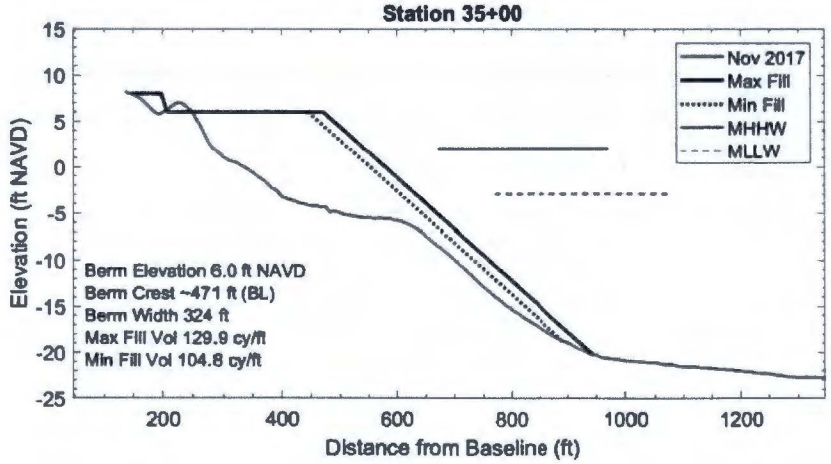
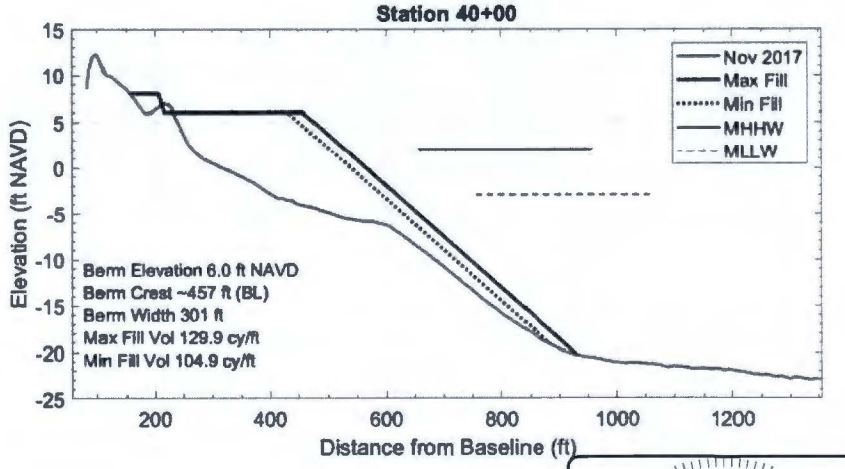








SOUTH CAROLIN
PROFESSIONA

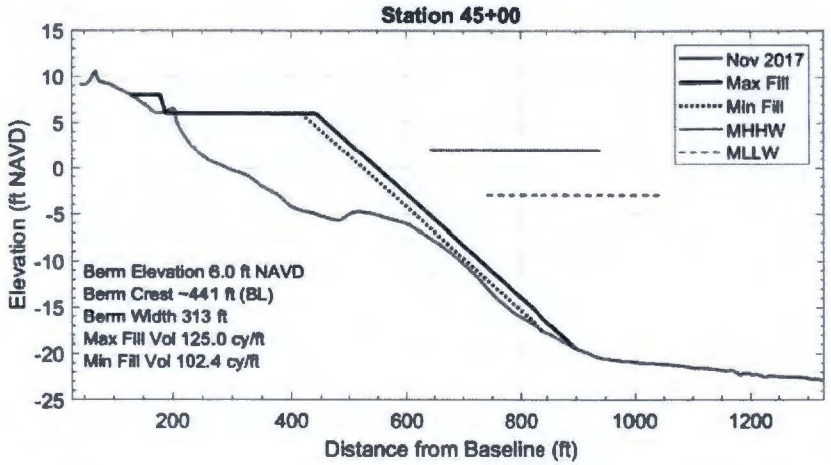
APPLICANT:
C/O ARCADIAN SHORES
HORRY COUNTY I & R DIVISION
4401 PRIVETTS RD CONWAY, SC 29526

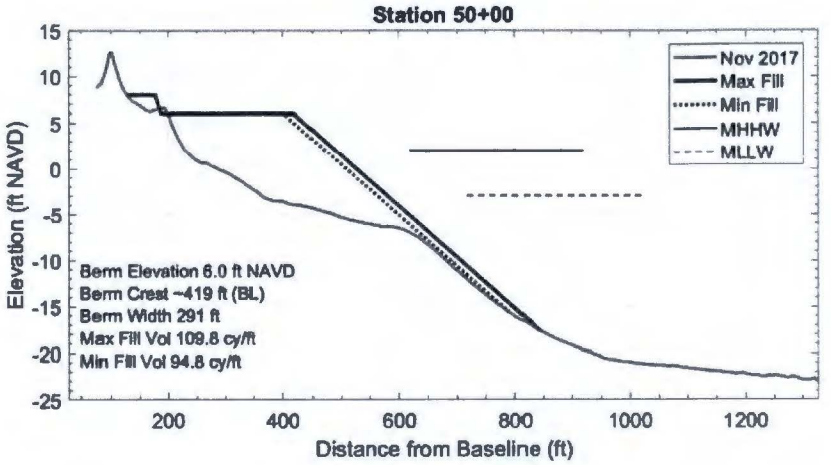
AGENT:
COASTAL SCIENCE & ENGINEERING
PO BOX 8056
COLUMBIA, SC 29202

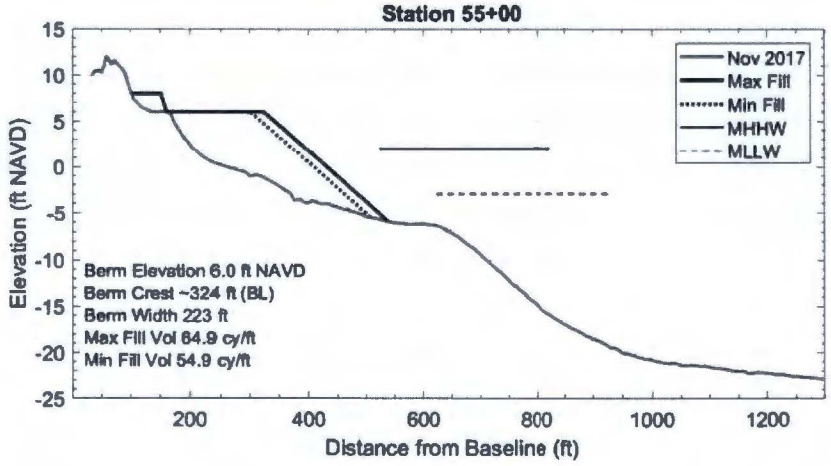
DRAWING TITLE:
Nourishment Fill Sections

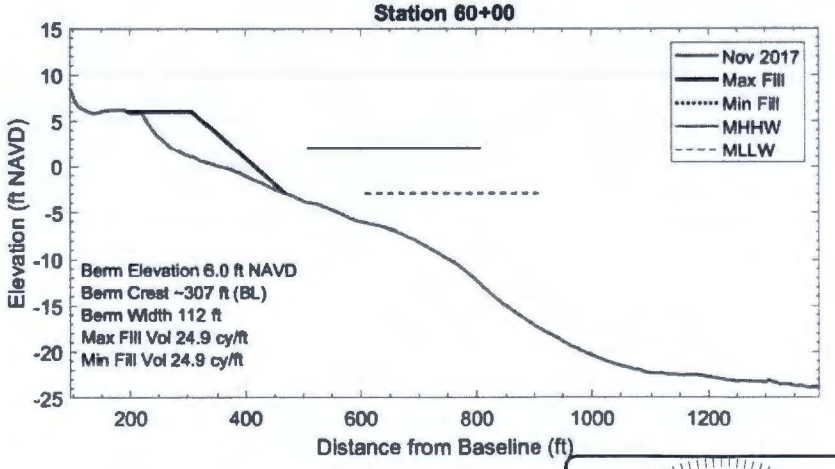
SCA
DAT
TMS
PRO

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
Sheet 8 of 12









APPLICANT:
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HORRY COUNTY I & R DIVISION
4401 PRIVETTS RD CONWAY, SC 29526

AGENT:
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COLUMBIA, SC 29202

DRAWING TITLE:
Nourishment Fill Sections

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
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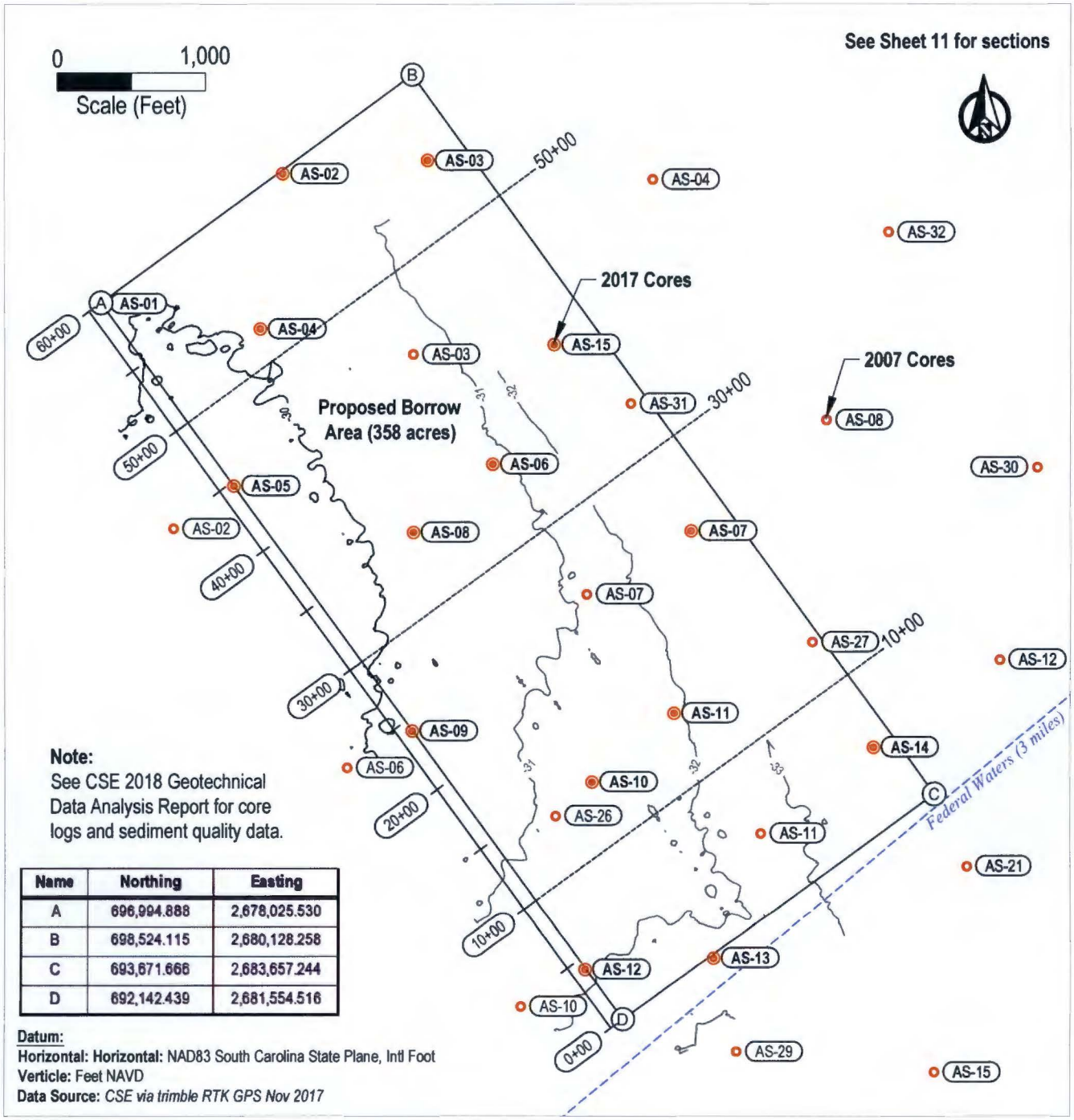

Note:
See CSE 2018 Geotechnical Data Analysis Report for core logs and sediment quality data.

Name	Northing	Easting
A	696,994.888	2,678,025.530
B	698,524.115	2,680,128.258
C	693,671.666	2,683,657.244
D	692,142.439	2,681,554.516

Datum:
Horizontal: Horizontal: NAD83 South Carolina State Plane, Intl Foot
Verticle: Feet NAVD
Data Source: *CSE via trimble RTK GPS Nov 2017*

APPLICANT:
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HORRY COUNTY I & R DIVISION
4401 PRIVETTS RD CONWAY, SC 29526

AGENT:
COASTAL SCIENCE & ENGINEERING
PO BOX 8056
COLUMBIA, SC 29202

DRAWING TITLE:
Proposed Borrow Area

SCALE:	AS SHOWN
DATE:	2 Mar 2018
TMS#	-
PROJECT #:	2477

SHEET #: 10

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
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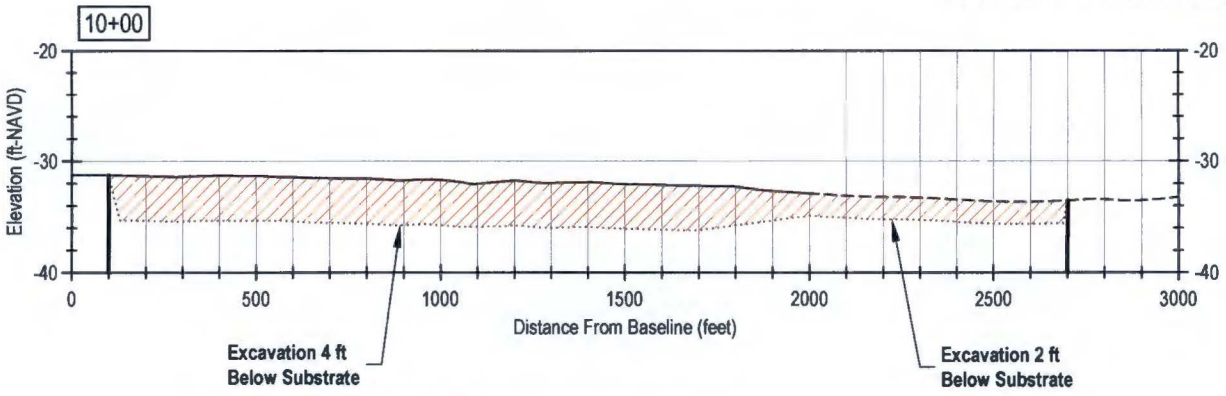
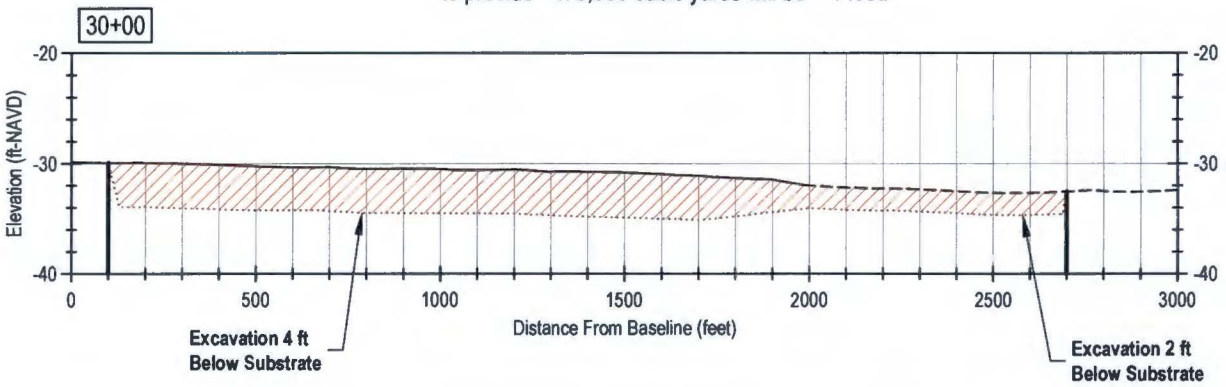
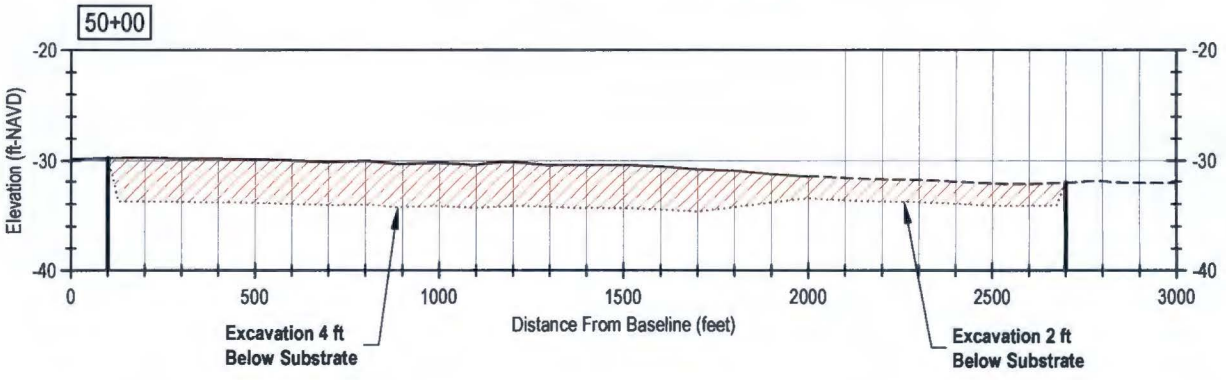
See Sheet 10 for section locations



Note:
Excavation limits indicated are the maximum cut depth after multiple passes. Average cut depth to provide ~475,000 cubic yards will be ~ 1 foot.



Datum:
Horizontal: Horizontal: NAD83 South Carolina State Plane, Intl Foot
Verticle: Feet NAVD
Data Source: *CSE via trimble RTK GPS Nov 2017*



APPLICANT:
C/O ARCADIAN SHORES
HORRY COUNTY I & R DIVISION
4401 PRIVETTS RD CONWAY, SC 29526

DRAWING TITLE:
Borrow Area Sections
Proposed Excavations

AGENT:
COASTAL SCIENCE & ENGINEERING
PO BOX 8056
COLUMBIA, SC 29202

SCALE:	AS SHOWN
DATE:	2 Mar 2018
TMS#	-
PROJECT #:	2477

SHEET #: 11

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
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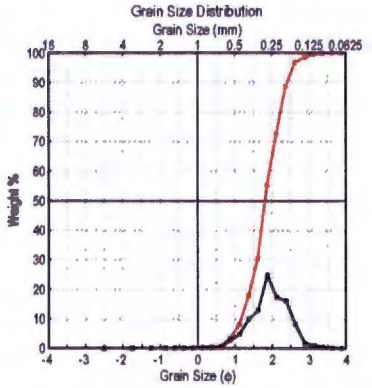
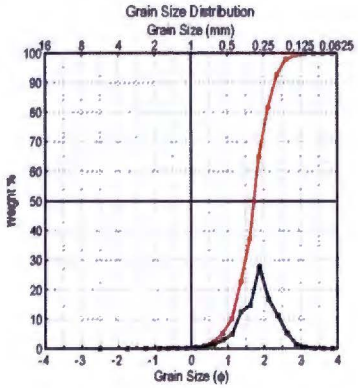
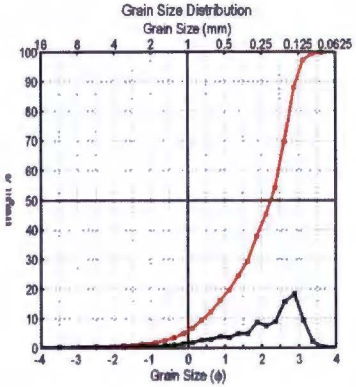


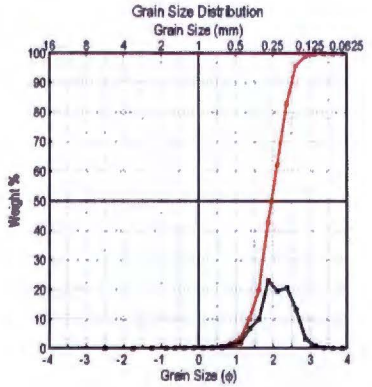
Project	2477
Location	Arcadian Shores SC
Date	Nov 2017
Station	ALL
Interval (ft)	Dune Toe
Mean	0.281 mm
STD	0.709 mm
Skewness	-0.385
USCS	Wentworth
SP	Medium Sand
Fine Sand	Well Sorted
Poorly Graded	Symmetrical Leptokurtic
Total weight (gram)	339.15
% finer than 0.0625 mm	0.00
% coarser than 2.00 mm	0.06
CaCO3	0.0



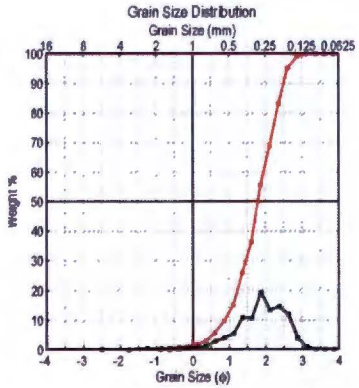
Project	2477
Location	Arcadian Shores SC
Date	Nov 2017
Station	ALL
Interval (ft)	Berm Crest
Mean	0.281 mm
STD	0.706 mm
Skewness	-0.544
USCS	Wentworth
SP	Medium Sand
Fine Sand	Well Sorted
Poorly Graded	Coarse Skewed Leptokurtic
Total weight (gram)	345.48
% finer than 0.0625 mm	0.01
% coarser than 2.00 mm	0.12
CaCO3	0.0



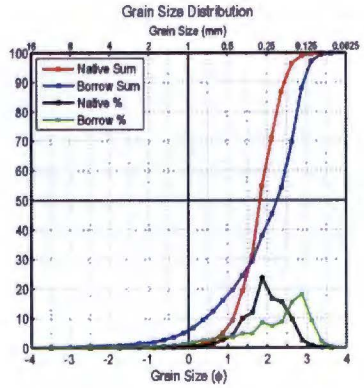
Project	2477
Location	Arcadian Shores
Date	Nov 17
Station	BA
Interval (ft)	COMP
Mean	0.242 mm
STD	0.474 mm
Skewness	-1.605
USCS	Wentworth
SP	Fine Sand
Fine Sand	Poorly Sorted
Poorly Graded	Strongly Coarse Skewed Leptokurtic
Total weight (gram)	3066.05
% finer than 0.0625 mm	0.14
% coarser than 2.00 mm	1.54
CaCO3	0.0



Project	2477
Location	Arcadian Shores SC
Date	Nov 2017
Station	ALL
Interval (ft)	Beach Face
Mean	0.237 mm
STD	0.730 mm
Skewness	-0.659
USCS	Wentworth
SP	Fine Sand
Fine Sand	Well Sorted
Poorly Graded	Coarse Skewed Leptokurtic
Total weight (gram)	339.98
% finer than 0.0625 mm	0.00
% coarser than 2.00 mm	0.04
CaCO3	0.0



Project	2477
Location	Arcadian Shores SC
Date	Nov 2017
Station	ALL
Interval (ft)	LTT
Mean	0.275 mm
STD	0.632 mm
Skewness	-0.980
USCS	Wentworth
SP	Medium Sand
Fine Sand	Moderately Well Sorted
Poorly Graded	Coarse Skewed Leptokurtic
Total weight (gram)	355.21
% finer than 0.0625 mm	0.00
% coarser than 2.00 mm	0.50
CaCO3	0.0



Project	2477
Location	Arcadian Shores
Date	Nov 2017
Native	Beach
Borrow	BA
Native Mean	0.263 mm
Native STD	0.686 mm
Native Skew	-0.831
Borrow Mean	0.242 mm
Borrow STD	0.474 mm
Borrow Skew	-1.605

APPLICANT:
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AGENT:
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COLUMBIA, SC 29202

DRAWING TITLE:
Geotechnical Data
Grain Size Distributions

SCA
DAT
TMS
PRO

Arcadian Shores Beach Renourishment
SAC-2018-00319
Horry County, South Carolina
Date: March 2, 2018
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