COASTAL SCIENCE & ENGINEERING
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March 10, 2017

Mr. Warren May
USACE-Charleston
69A Hagood Avenue
Charleston SC 29403

Mr. Matt Slagel
SCDHEC-OCRM
1362 McMillan Avenue (400)
Charleston SC 29405

RE: Response to Comments [CSE 2453]

Dear Warren and Matt:

This letter is written on behalf of the City of Isle of Palms (Applicant) in response to comments issued following the public notice for permit application 2016-00803. The comments generally fell into a few categories, including comments of support from local homeowners, comments from federal and state agencies regarding potential environmental impacts of the project, and comments from advocacy groups which were mostly focused on sediment quality (including impacts to benthic organisms) and timing of the proposed project. The comments of the advocacy groups (Coastal Conservation League and Audubon Society) deal with similar concerns as USFWS, SCDNR, and NOAA–NMFS.

The USACE requested information to confirm that there are no practicable alternatives to discharging dredged material in the aquatic ecosystem. CSE evaluated other sand sources in a feasibility report prepared prior to the 2008 project (CSE 2007 – Excerpt Attached). The analysis included inland sand sources, using sand from attached shoal or accreted areas, and offshore sand sources.

For a large project, using inland sand requires an extensive construction window and prolonged impacts to local traffic and infrastructure, and unit costs for sand are generally higher than other methods of construction. For a 1,000,000 cubic yard (cy) project, it would take ~65,000 truckloads of sand. This is considered prohibitive and would result in significant impacts to the inland borrow site as well.

The Applicant presently has a permit to use accreted portions of the beach; however, there is presently insufficient available quantity to meet the needs of the present project. This alternative is sufficient for smaller scale projects or emergency restoration provided sufficient quantity is available.

Another alternative is using structures such as seawalls or groins. Shore-parallel structures are presently not allowed by South Carolina regulations. They also do not promote preservation of a dry-sand beach, which is an essential component of the Applicant's beach management strategy. Groins can maintain a dry-sand beach, but would also require addition of sand, and would involve the same potential impacts as the other alternatives.

Finally, the do-nothing alternative is also an option for the Applicant. This alternative would allow the beach to adjust naturally to the coastal processes influencing the shoreline. Under this scenario, there would likely be continued conditions of critically eroded portions of the beach with individual homeowners seeking remedies for their affected properties. This may include additions of upland sand or installation and continued use of emergency measures, such as sandbags and wave dissipation systems. This condition would limit recreational use of the beach, reduce habitat for sea turtles, and leave properties threatened by storm events. Each of these results is contrary to the long-term beach management goals of the Applicant.

The other significant issue provided in the comments was dealt with by the selection of the borrow area and the potential impacts of the borrow sand on the benthic community on the beach and offshore zone. The Applicant understands the need to place the most beach-compatible material on the beach as possible for both environmental considerations, performance of the nourishment fill, and overall aesthetics of the beach. The 2008 project utilized borrow areas placed on offshore ridges to attempt to reduce the potential for the dredged areas to infill with mud following the project.

The average grain size of the areas ranged from 0.397 millimeter (mm) to 0.436 mm with shell content between 23.8 and 32.4 percent. The grain size and shell content for the borrow areas proposed for the present project both trend lower than for the 2008 project. The average grain size for borings in Area E is 0.443 mm; however this number is skewed by one boring in the area that represents a small corner of the permitted area. It averages 26.9 percent shell (11.3 percent >2 mm). Area F averages 0.383 mm and 27.5 percent shell (11.9 percent >2 mm).

The borrow areas as shown in the permit application contain over 4 million cubic yards of sand, which is substantially more than needed to complete the project. The Applicant will direct the dredge to the portions of the borrow areas containing the most compatible material, leaving over half of the permitted areas undredged. Areas of higher shell or mud content within the permitted boundary will be avoided.

The Applicant has completed extensive geotechnical investigations in an attempt to find borrow areas containing suitable sand for nourishment. Areas were initially identified further offshore than the permit areas; however, these areas were abandoned for this project at the request of SC SHPO due to the presence of historic cultural resources. The Applicant is obtaining additional borings within the requested areas to further refine the sediment characteristics and define priority dredge areas for this project.

The Applicant has made every effort to minimize impacts to the benthic community at both the beach and borrow area through these investigations. There are certain unavoidable impacts to benthic organisms that exist for any dredging project, and the Applicant has provided a sediment monitoring plan to document changes to the beach and borrow area following the project. The monitoring plan includes pre-project samples, daily monitoring of the material being placed, and post-project monitoring for up to five years after the project. This monitoring will provide insight as to the type and rate of material infilling the borrow area.

NMFS stated concerns of repeated impacts to the benthic community on the beach. To date, the Applicant has completed three projects over the last decade. The 2008 project was a large-scale offshore nourishment project. The 2012 (~80,000 cy) and 2014–2015 (~240,000 cy) were sand transfer projects, which likely had less impact to the beach due to the limited daily volume transferred and the placement of sand only on the uppermost part of the beach (leaving the low intertidal area unimpacted). While no data are available for those projects, the compatibility of the borrow material (existing intertidal beach), limited fill area and unimpacted adjacent areas likely led to rapid recovery of the benthic community. Regardless, there are few, if any, alternatives to the proposed project that would significantly reduce the impacts to the beach benthic community. The Applicant has proposed to increase the volume of the present project to increase the longevity of the fill. This would reduce the potential for future cumulative impacts. Also, an unnourished area in the center of Reaches 1 and 2 is likely to be left due to the present health of that area. This would leave a seeding source for the beach community to recover.

The above responses are provided to assist the USACE and OCRM in making a determination for the proposed nourishment project at Isle of Palms. The Applicant is committed to preserving the environmental and cultural resources of the beach system while also maintaining the environmental and recreational aspects of the dry beach. Please contact me if you have any questions on the above response.

Sincerely,

Coastal Science & Engineering (CSE)

Steven Traynum
Project Manager

Attachment

2.4 Sand Search and Borrow Area Alternatives

As part of the present feasibility study, CSE conducted a sand search and evaluated borrow area alternatives for this section of the beach. Four basic sources were considered:

- Inland (upland) deposits which may be trucked to the site.
- Onshore (beach) deposits in accretion zones where natural processes are likely to renew the source.
- Inlet shoals of Dewees Inlet that could be pumped to shore.
- Offshore deposits relatively close to the erosion zone but well seaward of the littoral zone.

2.4.1 Inland Deposits

Upland sand pits in the Mount Pleasant area have been used for small-scale nourishment in the past (D. Kynoski, WDCA, July 2007, pers comm). Permit number SAC 2006-3448-21G-P was issued 5 October 2007, allowing up to 180,000 cy to be hauled from inland sources and placed along Reach 3 and Reach 4. The permit was not signed by the applicant (Isle of Palms North Beach Owners LLC) because it contained a provision requiring removal of all sand bags before it could be implemented.

The cost of sand hauling is a function of transportation distance. Typical costs are in the range $12–$18/cy. CSE did **not** investigate upland sources in detail because:

1) Costs are considered much higher than alternative sources.
2) Construction tends to take much longer than projects utilizing large ocean-certified dredges.
3) Access for trucks through Isle of Palms and the Wild Dunes community is problematic given the density of development.
4) There is usually extra wear and tear on roads and community infrastructure associated with trucked beach fills.

Nourishment by truck is cost effective for very small projects because of low mobilization costs. However, for projects of the scale needed to restore the sand deficit along Reach 3 and keep pace with continuing erosion, high efficiencies and large numbers of trucks

would be required. For example, a large cutterhead dredge typically delivers upward of 30,000 cy in a 24-hour period. To accomplish the equivalent via trucks would mean nearly 2,000 truck runs per day. At approximately one hour per round trip, it would take at least 200 trucks each working ten hours per day to accomplish the same amount of work. Numbers such as these are not realistic for Isle of Palms given the existing traffic and numbers of trucks available in the Charleston area.

2.4.2 Onshore Deposits

Accretion areas associated with shoal-bypass events have been used as a borrow source a number of times since the early 1980s (Kana and Williams 1986, ATM 2006). Where sand bars are attached to the beach and accessible at low tide, off-road trucks can excavate, load, and transfer sand to nearby eroding areas. Such operations are much more efficient than hauling sand from inland pits because transportation distances are so short. In a recent project at Kiawah (CSE 2007), the contractor used 15–18 off-road trucks to move over 550,000 cy in about 1.5 months. The average haul distance was about 1 mile. Unit cost of that project was (~)$6.75/cy, which included a premium because a major part of the work involved closing and opening a tidal inlet. A similar type project was accomplished at Seabrook Island in 2006 at a unit cost of (~)$1.75/cy. Costs in 1982–1983 for sand scraping off the accreting shoal and placement in the adjacent erosional areas of Wild Dunes was well under $0.75/cy.

CSE evaluated two onshore deposits considered previously for use as emeregency beach fill along Reaches 3 and 4 – accreted shoals at Beach Club Villas and Cedar Creek Spit. Figures 18 and 19 show these two potential onshore borrow areas.

Cedar Creek Spit is situated west of the groin along Dewees Inlet. The July 2007 survey showed the spit is a mostly unvegetated, washover terrace over 1,700 ft long that has built up gradually since the 1980s. The former shoreline (edge of marsh) was situated 500 ft landward of the present shoreline at the center of the spit. As the spit grew westward, it left an exposed sand flat between the spit and the marsh. This low-energy area is accumulating mud, but some portions remain too low for marsh to grow.*

[*Spartina alterniflora, the primary marsh grass species in South Carolina, propagates in sheltered tidal areas close to the mean high water elevation. Optimal flooding duration is around 10 percent of the tidal cycle. Longer flooding will drown the species. Shorter flooding favors other salt marsh species (Kana et al 1986).]

FIGURE 18. Reach 2 accretion zone in July 2007, showing the low water boundaries around attaching bars. CSE estimates there are up to 200,000 cy of surplus volume within the limits shown for potential emergency (interim) use as borrow material.

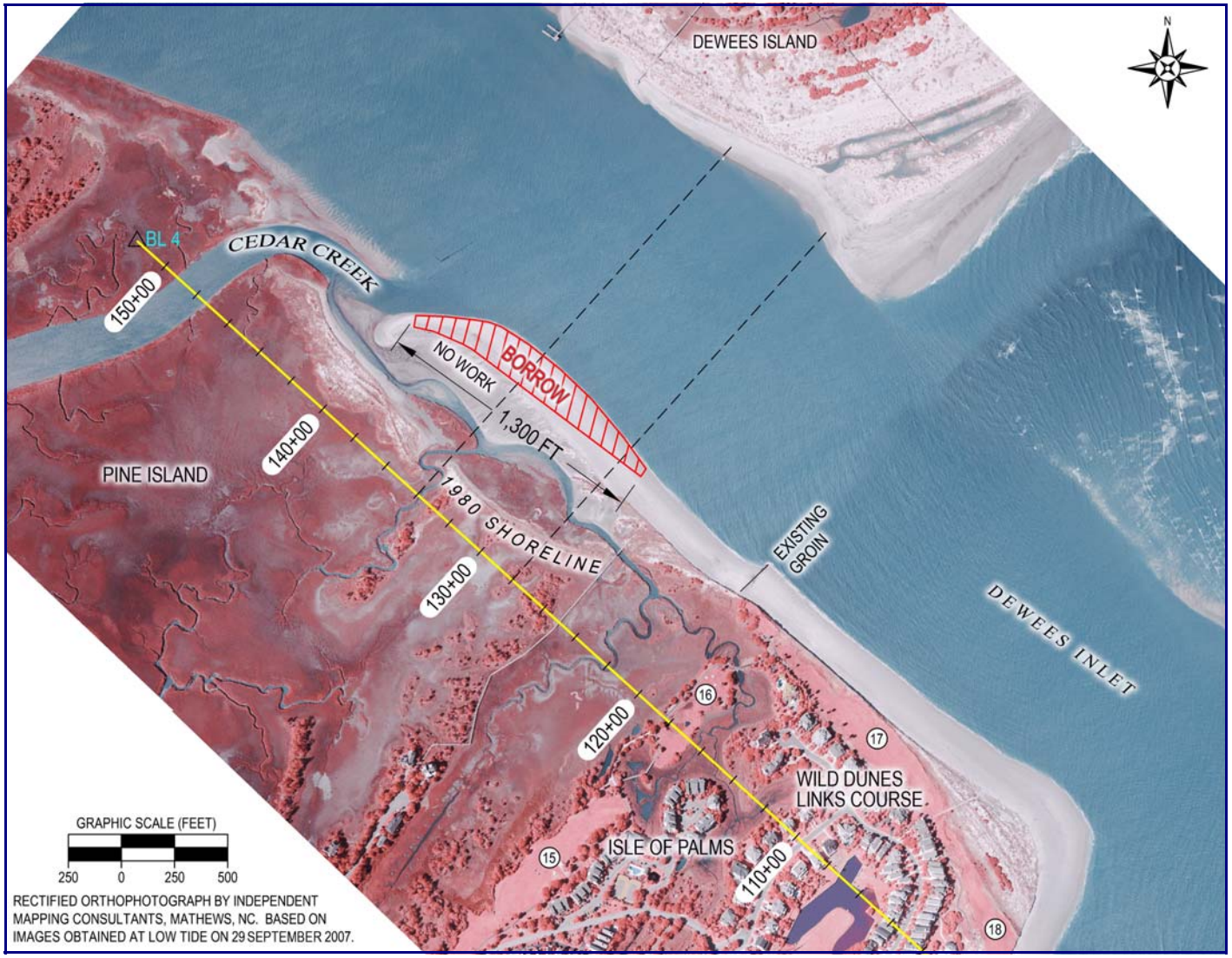


FIGURE 19. Cedar Creek spit at west end of Reach 4 along Dewees Inlet, showing a portion that CSE finds will provide up to 75,000 cy for potential emergency (interim) use as borrow material without adverse impact to the adjacent marsh.

CSE evaluated transects across the spit (Fig 20) and found that there is some excess sand on the inlet side of the spit that could be used for nourishment without adverse impact to the existing marsh. The volume is limited however. Figure 20 shows typical sections that could be removed in CSE's opinion and still leave the spit intact. This equates to ~75,000 cy. The rate of spit growth is unknown but of the order 10,000 cy/yr (Kana and Dinnel 1980). Therefore, if 75,000 cy are removed from Cedar Creek Spit, it will take 5–10 years for the material to be replaced by natural processes.

Reach 2 (Beach Club Villas area) is the main accretion zone associated with the present shoal-bypassing event. It receives sand from offshore as well as Reach 3. CSE's July 2007 survey documented the extent of visible shoals and determined there is a sizable surplus of the order 200,000 cy in the reach compared with a normal healthy profile. With additional sand moving onshore, this reach could be used as an emergency borrow source with the expectation that new sand will replace the excavations. Permit number OCRM-00-715-E was issued to WDCA on 8 February 2001 (expires 8 February 2009) to allow use of the accreted shoals as a borrow source at a rate not to exceed ~25,000 cy per month. The permit was appealed by interested parties and as of this date (November 2007) has not been cleared for use.

Assuming up to 200,000 cy could be obtained from Reach 2 working at least 600 ft seaward of existing property, this volume is not considered sufficient to fully restore Reach 3. Therefore, CSE recommends that the Reach 2 accretion zone only be considered for emergency use until such time as a larger offshore source can be permitted. Further, the condition limiting borrowing to ~25,000 cy per month will have to be amended, allowing much larger volumes per month. Conditions along Reach 3 have deteriorated to the point where a rapid, large infusion of sand is required to make a measurable impact. Volumes around 25,000 cy would only add ~6 cy/ft to the profile. Such small quantities would erode out of the area by the time the next round of shoal borrowing occurred. Such small quantities would neither be noticed by the average person nor add measurable protection to structures.

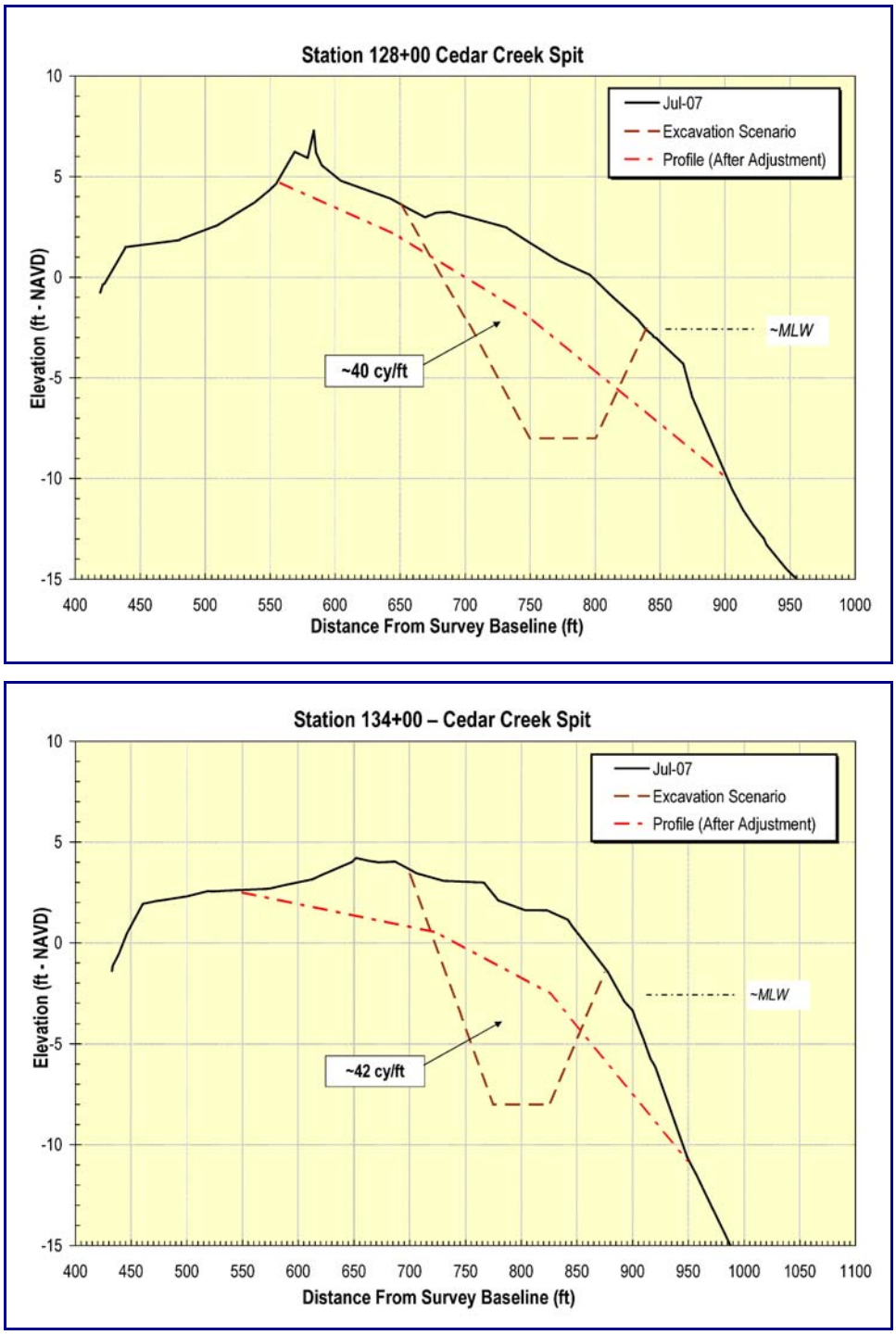


FIGURE 20. Representative sections across Cedar Creek spit (see Fig 19), showing a feasible excavation plan that would leave the spit intact and continue to protect the adjacent marsh 500 ft landward of the spit.

CSE recommends a minimum of 200,000 cy (~40-50 cy/ft) be transferred from Reach 2 to Reach 3 under one mobilization in the shortest time practicable so as to provide an erosion buffer that will last for at least six months. Work of this magnitude could be accomplished in one month during the coming winter with minimal environmental impact (cf, Jutte et al 2002). This is considered the only feasible emergency solution for Reach 3 that could serve as interim protection while a nourishment permit application is in review.

Obviously, sand accreting along Reach 2 is an integral part of the littoral system, and so moving some of it from Reach 2 to Reach 3 neither adds nor subtracts from Isle of Palms' overall sand budget. CSE recommends use of the sand bars off Beach Club Villas as the best source for emergency (interim) beach restoration, until such time as a permit can be received for a large-scale long-term nourishment using an external (offshore) sand source. Sediment quality for the Beach Club Villas accreting shoal is excellent because its sand bars are in the active littoral zone. Based on recent experience, sand could be excavated and transferred between Reach 2 and Reach 3 for $3–4/cy in today's market.

2.4.3 Offshore Sources

CSE initiated a search for an offshore borrow area based on the goal of locating a primary source of beach-quality sand that is not part of the active littoral system. Inlet shoals were considered by ATM (2006), but CSE received indications that certain parties would oppose use of the ebb-tidal delta. With time being of the essence, the sand search focussed on a large area south of the Wild Dunes community within the three-nautical-mile jurisdictional limit. This area contains ridge and swale topography in 20–25 ft water depths and is beyond the limits of the ebb-tidal delta of Dewees Inlet (Fig 21).

Detailed bathymetry was obtained in a three-square-mile area, then cores were obtained in a systematic grid within the search box (Fig 22). Twenty cores averaging 7 ft long were recovered in an initial coarse grid. Each core was split, logged, sampled, and analyzed for sediment quality. Based on favorable initial reconnaissance sampling, CSE selected the southernmost corner of the search grid for additional borings at about 750-ft spacing. Sediment data from the borings are available in a data appendix under separate cover. The second set of borings averaged about 8 ft in length.

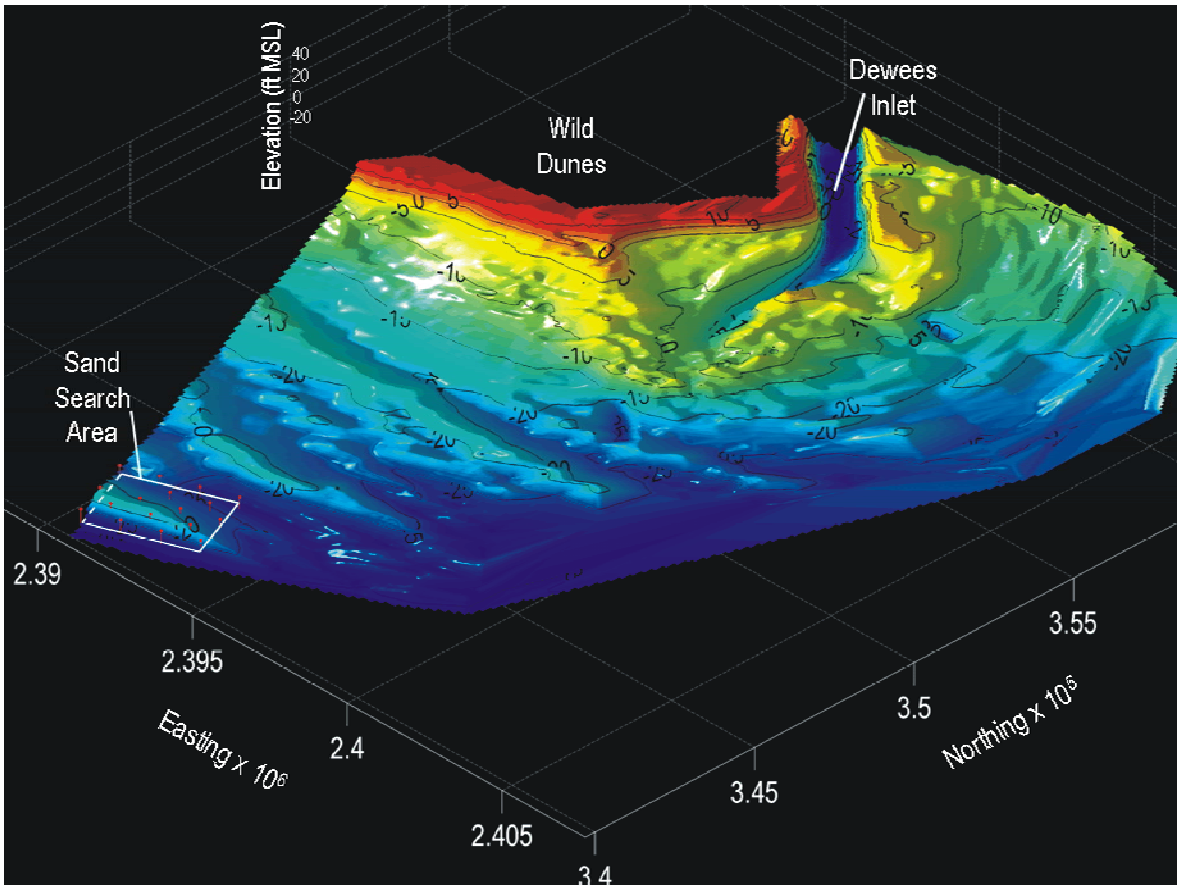


FIGURE 21. Topography and bathymetry of the present survey area presented in a three-dimensional DTM model. Aerial viewpoint is looking obliquely toward the northwest. Note the extensive shoals of Dewees Inlet attached to the beach off Beach Club Villas. CSE's detailed sand search area is in the lower left corner of the image ~3 miles offshore.

Based on experience with other nourishment projects, CSE established the following criteria for an offshore borrow area:

- Within a feasible distance for direct pumping to the beach using an ocean-certified hydraulic dredge (typically within 4 miles of the project beach).

- Contains a broader mixture of grain sizes than is typically found on the visible beach so as to improve longevity of the fill and provide a better base for the project with coarser sands settling in the berm and finer sands settling offshore. This mimics the natural sediment distribution on most beaches.

- Contains no more than 5 percent mud by volume and only trace amounts of stiff clay. Mud (silt and clay) generally disperses rapidly offshore, but it reduces the effective volume that remains in place on the beach. Higher percentages of mud have been allowed for some South Carolina projects (W. Eiser, SCDHEC-OCRM, pers comm, June 2007), but lower percentages are preferred. Stiff clay results in "clay rollers" washing up along the beach. Tiny amounts are common to nearly all projects using offshore sources, but the deposit should not have significant layers of clay that represent more than a fraction of 1 percent of the total deposit.

- Contains limited granular or gravel-sized sediment (order of 10–15 percent), but may contain higher percentages of shell if the majority of the $CaCO_3$ material consists of sand-sized fragments.

- Is generally free of organic detritus or black sediments indicative of anaerobic conditions.

- Has a color after washing and drying that is similar to the native beach.

- Will provide at least one million cubic yards meeting the above-listed criteria for use along Isle of Palms.

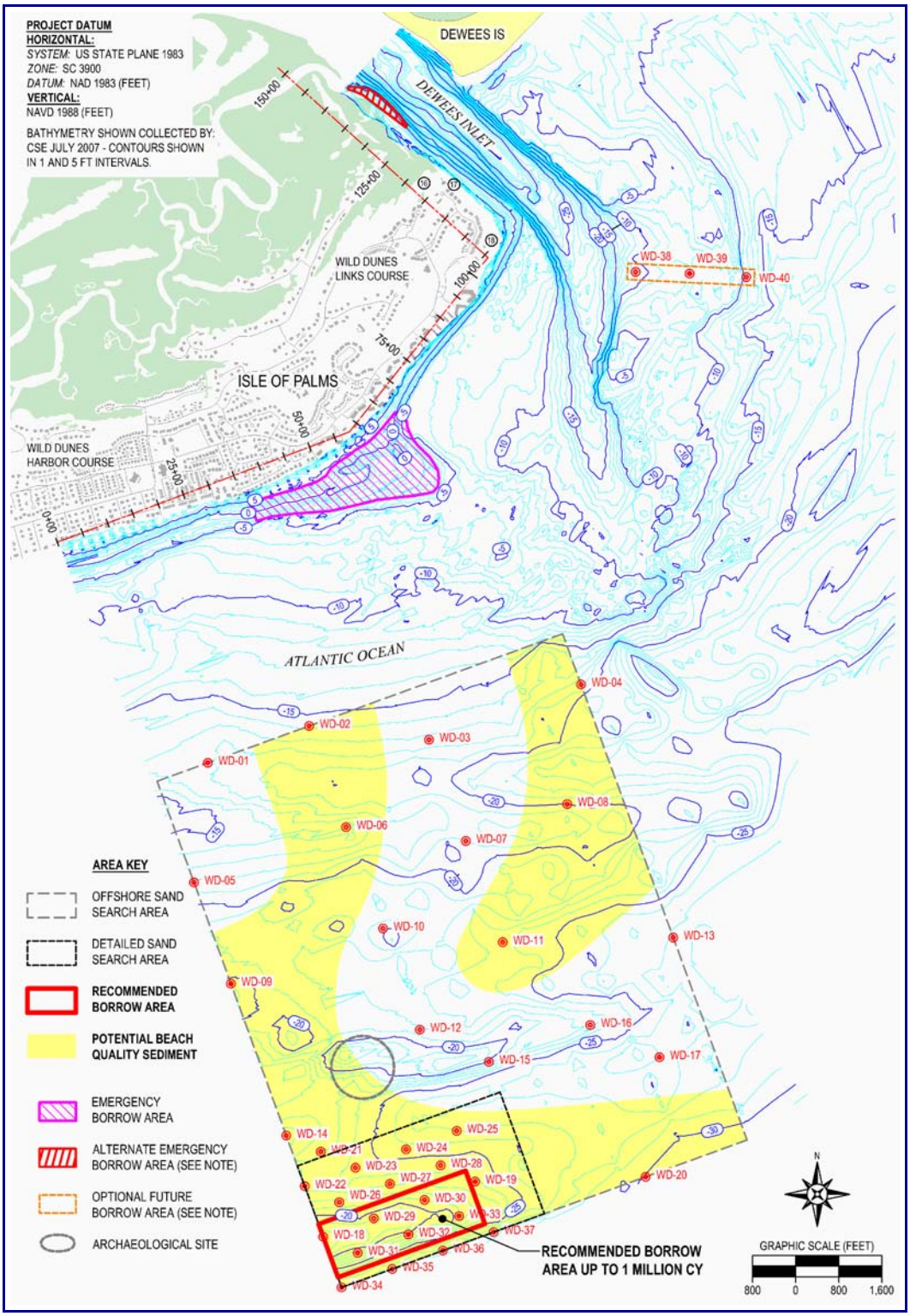


FIGURE 22. Offshore bathymetry and sand search area for the present project. After initial reconnaissance cores were obtained on a coarse search pattern, more detailed coring was performed in the southern corner of the grid. The highlighted subarea is considered to have favorable beach-quality sediments within the upper 8 ft of substrate.

CSE prepared isopach maps of the portion of the sand search area considered to closely meet the above-listed criteria. Figure 23(a–c) shows mean grain size, percent mud, and percent shell material for a 200-acre area (southern corner of the search grid). Using the results and detailed sediment texture data from laboratory analyses, CSE selected an ~75-acre area represented by six cores (WD-18, WD-29, WD-30, WD-31, WD-32, and WD-33) as the subarea most closely meeting the above-listed criteria. [Note: It is probable that several other areas within the large search area contain equally good sediments, but this area was chosen because of the density of coverage.] Each core represents about 12 acres. The documented thickness of the subarea (based on core recovery limits) is 8 ft. Excavations of a 75-acre area over an average sediment thickness of 8 ft would yield ~975,000 cy. Figure 23(a–c) includes the approximate boundaries of the initially recommended borrow area.

[NOTE: The isopach maps are based on a limited number of cores and should not be construed as an accurate representation of conditions. Additional borings are recommended in the sand search area so as to confirm sediment quality in more detail and optimize the borrow area boundaries.]

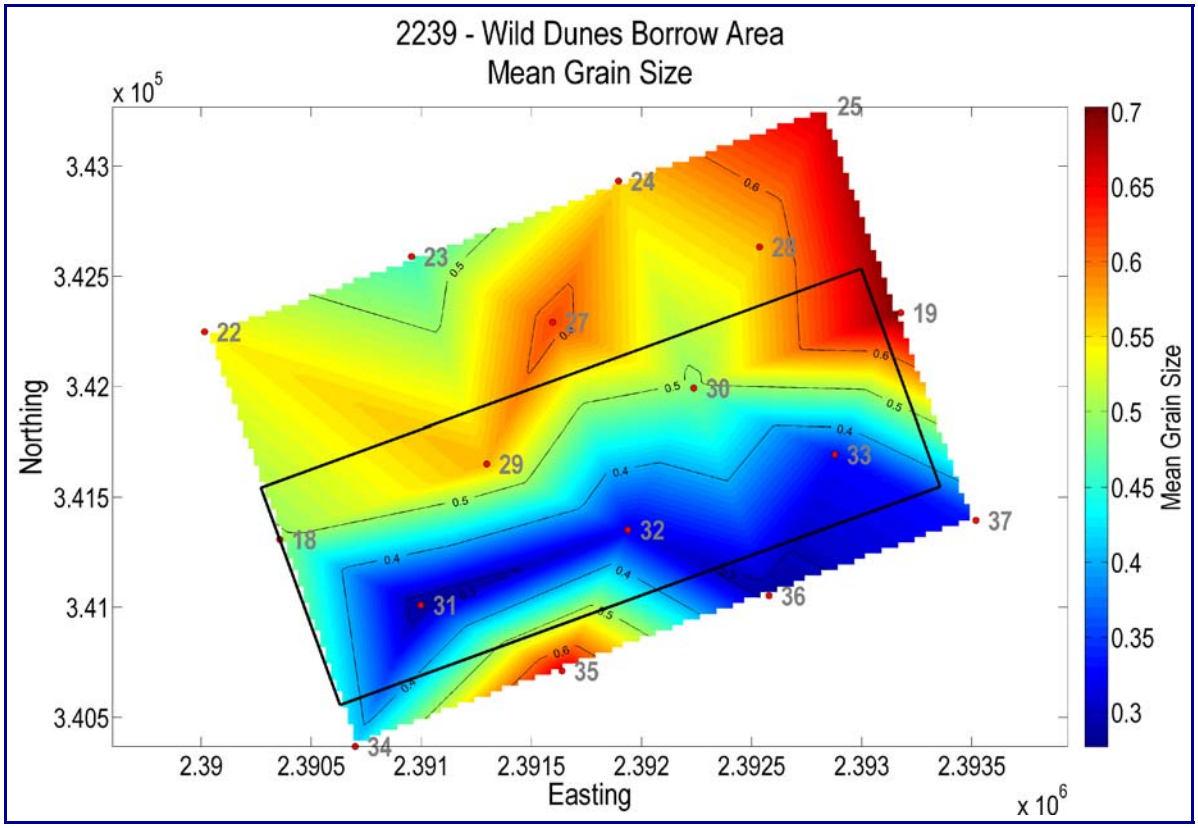
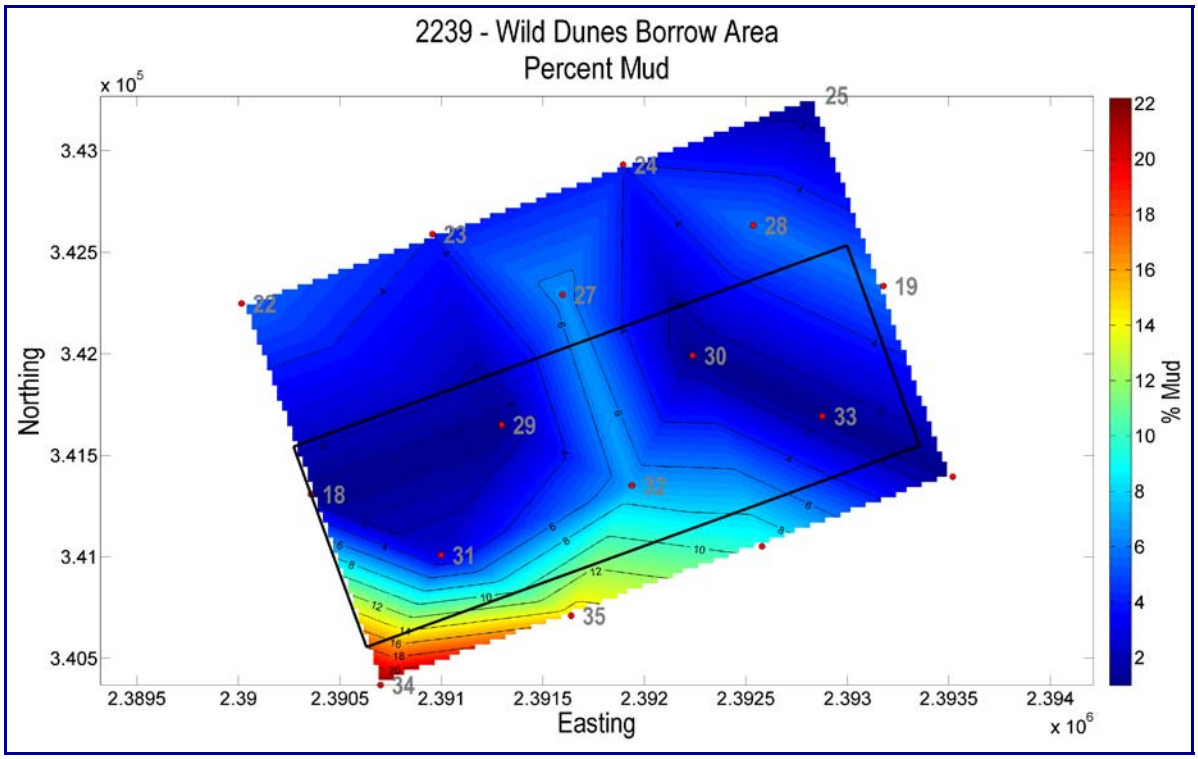


FIGURE 23(a). Rough isopach diagram of sediment parameters in the sand search area (south corner of the search area in Figure 22) showing mean grain size (mm).



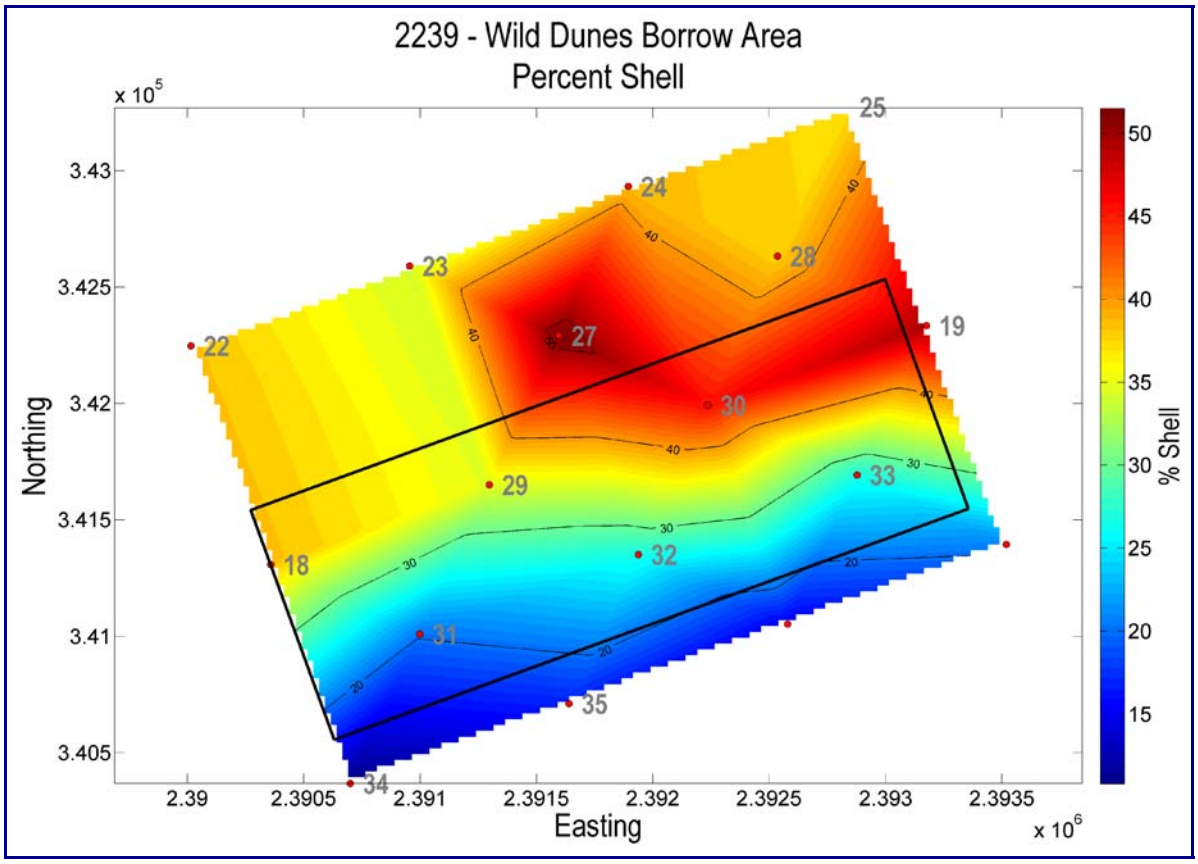


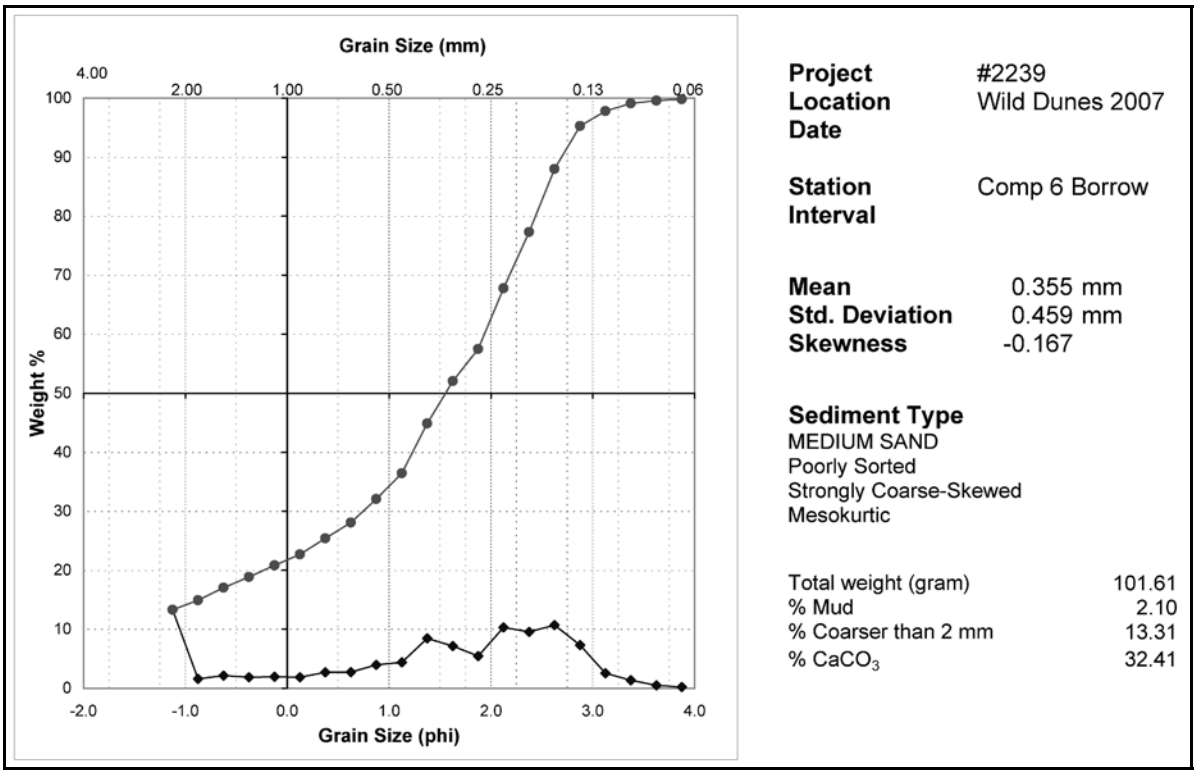
FIGURE 23(b–c). Rough isopach diagrams of sediment parameters in the sand search area (south corner of the search area in Figure 22) showing percent mud (upper) and percent shell – $CaCO_3$ (lower).

The recommended offshore borrow area has sediments averaging ~0.35 millimeter (mm) diameter (medium sand) (Fig 24 upper). Approximately 13 percent of the deposit is estimated to be coarser than 2 mm (shell fragments) and ~2 percent (by weight) is estimated to be mud. The total amount of shell material for 15 samples tested is 32 percent, which means two-thirds of it consisted of sand-sized fragments (<2 mm diameter). Figure 25 is a photograph of the proposed borrow material (composite of six cores and 15 samples) after routine washing and drying. Color of the sediment closely matches the tannish light gray color of native beach sand along the Wild Dunes shoreline.

CSE collected and analyzed representative beach samples and developed a composite size distribution for Wild Dunes. Figure 24 (lower) shows a typical grain-size distribution for berm, beach face, and low-tide terrace samples in Reaches 2 and 3. Mean grain size for the composite is 0.25 mm with 5 percent of the material coarser than 2 mm (shell fragments). The beach samples tested 11.1 percent $CaCO_3$, so at least half of the shell material is in the sand-sized range. A common term for crushed shell fragments is “shell hash.” Mud percentage was not measured because surf zone samples in this setting generally do not have any measurable mud. Fine-grained material (silts and clay) are found in suspension but disperse offshore under breaking waves.

CSE also evaluated sediment compatibility using the overfill factor R_A (James 1975, CERC 1984). R_A is a ratio of how much more borrow material is required to perform as the native beach. R_As under 1.2 are desirable. An R_A of 3.0, for example, would mean that it would take about 3 cy of borrow material to equal the performance of 1 cy of native sand. Deposits that are finer than the native beach tend to have high overfill factors and are therefore not favored. The R_A for the recommended offshore area (subarea composite) is <1.02 (Table 5). Based on this result, CSE concludes the proposed offshore borrow area (subarea shown in Fig 22) will likely yield sediments that perform similarly as the native beach sediments in this setting.

CSE is completing additional analyses on the offshore sediments so as to optimize the borrow area limits and sediment quality for the present project.



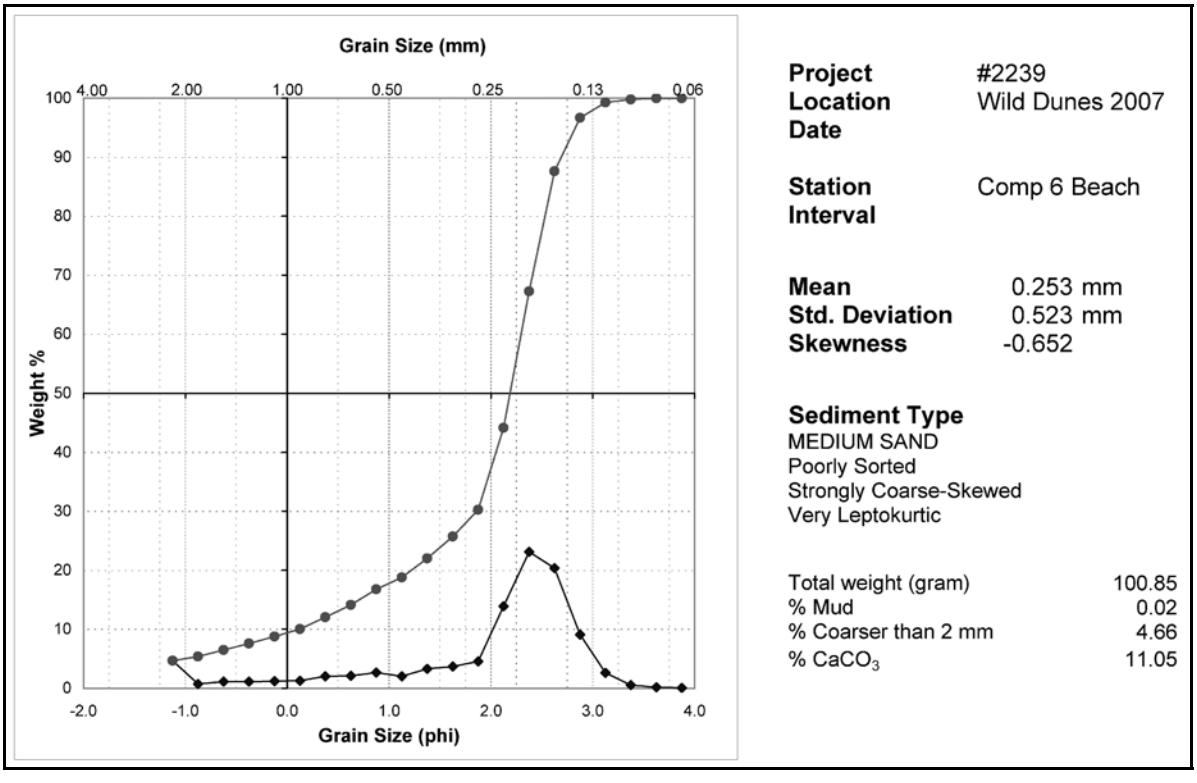


FIGURE 24. Sediment grain-size distribution for the preliminary offshore borrow area based on a composite size distribution from six cores to a target excavation thickness of ~8 ft. Lower graph shows a representative native beach composite for Reaches 2 and 3 at Wild Dunes. See text for further explanation.

FIGURE 25.

Photograph of a physical composite sample of offshore sediment from the subarea of the sand search grid proposed for use in a "ten-year" project. Sediments have been rinsed and dried by standard lab procedures. The majority of the shell material consists of sand-sized fragments (<2 mm diameter) and the dominant species is Donax sp, a common surf zone clam (~1 cm diameter with thin-walled shell).

TABLE 5. Summary sediment quality measures for the native beach and recommended offshore borrow subarea.

Parameter	Native Beach Samples (Composite)	Borrow Area (Composites to 8 ft)
Mean Grain Size mm	0.253 mm	0.355 mm
Sorting mm	0.523 mm	0.459 mm
Percent >2 mm	5.0	13.5
Percent Shell >2 mm	~4.7	~13.5
Percent Shell <2 mm	~6.4	~18.4
Dominant Shell Species	Donax sp	Donax sp
Sediment Description	medium sand	medium sand

CSE also obtained three borings in the incipient main channel of Dewees Inlet (see Figs 22 and 23). These borings all contained clean coarse sediments. While not optimal for beach nourishment because of their coarseness, they could be used as a base under better quality sediments. The motivation to collect cores WD-38, WD-39, and WD-40 is the possibility that additional studies (beyond the present scope of this report) may demonstrate certain advantages of realigning the main channel of Dewees Inlet. The incipient channel is already carrying a significant flow. Morphology of the bars suggests the "east channel" will continue to enlarge by natural processes because it offers more efficient discharge out the inlet. **At this time, CSE is not recommending excavations in the incipient channel of Dewees Inlet because it would likely delay permitting of the project.**

2.4.4 Key Findings – Borrow Sources

Four types of borrow sources were evaluated for the present project:

- Inland deposits.
- Onshore deposits.
- Inlet deposits.
- Offshore deposits.

Inland deposits were rejected because of the unit cost and inefficiency of construction. Truck hauling of inland sand is appropriate for building up backshore areas, maintaining cover over shore-protection structures, replacing sand lost under buildings, or accomplishing small-scale projects by individual home owners. Costs are typically in the range $12–$18/cy for this location.

Onshore deposits where accretion is occurring [such as the attached shoal off Beach Club Villas (Reach 2)] are recommended for emergency (interim) use until such time as a permit can be obtained for an offshore dredging project.

CSE finds that Cedar Creek spit could provide up to 75,000 cy without adverse impact to the adjacent marsh. Further, this is a renewable source that would likely be replenished naturally within 5–10 years. However, a new permit would be required to utilize the spit. The accreting bars off Beach Club Villas (Reach 2) could provide up to 200,000 cy without adverse impact to adjacent property based on the large volume just offshore (>1 million cubic yards). A permit exists for use of the Reach 2 accreting area but remains under appeal. If the appeal were settled, some modification of the permit's special conditions would be required to allow excavation of 150,000 cy (minimum) to 200,000 cy (maximum) under a single mobilization (as discussed in Section 2.4.2). The Beach Club Villas shoal is the only feasible borrow source for emergency beach restoration within the next 3–4 months, assuming the permit issues can be resolved by all parties concerned.

Inlet deposits were considered by ATM (2006) and suggested as potential borrow sources. CSE found (in discussions with community representatives) that any proposals to borrow sand from the ebb-tidal delta would likely result in considerable delay in obtaining permits. One obvious area to use would be the underwater shoal platform off Beach Club Villas (>1,000 ft offshore). By large-scale dredging of this mound (cf, Fig 21), the proximal cause of erosion along Reach 3 could be eliminated. However, this would not provide as

much net benefit as an offshore borrow source because the shoal in its present configuration is part of the Isle of Palms littoral system. Dredging it and placing the sand along Reach 3 simply accelerates the shoal-bypass cycle without introducing an entirely new source. Another section of the inlet was considered for use – the incipient east-west channel. A significant part of the inlet flow goes through this developing channel. CSE recommends further monitoring of the east-west channel before considering it for an alternate borrow source area. CSE's limited coring showed the area contains much coarser sediments than the native beach. If the deposit were used, it would have to be mixed with a finer grained deposit to maintain the quality and character of the Wild Dunes beach. Based on likely controversies regarding use of the inlet shoals and lack of comparative bathymetry to evaluate shoal and channel development, CSE does not recommend use of inlet delta shoals for the present project.

CSE completed a sand search in a three-square-mile area south of Beach Club Villas. Based on 40 borings, a 75-acre subarea was identified that contains sediment closely matching the native beach. Incremental differences in grain size and the coarse fraction of the deposit mean the sediments are likely to perform the same as native beach sand and be "stable." That is, they will not erode faster due to an excessive amount of fine-grained sediment in the deposit. The subarea is ~2.5–3 miles from Reach 3, within a feasible distance for an ocean-certified pipeline dredge. Water depths are 20–25 ft and sediments have been confirmed to an average thickness of 8 ft. Preliminary borings indicate the offshore borrow area is likely to meet CSE's recommended criteria for sediment quality as well as state standards for borrow sources established by South Carolina, North Carolina, and Florida.