

**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

Application No. _____
Date Received _____
Project Manager _____
Watershed # _____

Authorities: 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).

Drawings and Supplemental Information Requirements: 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: Fragoso	11. Agent Last Name (agent is not required): Traynum
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2. Applicant First Name: Desirée	12. Agent First Name: Steven
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3. Applicant Company Name: City of Isle of Palms	13. Agent Company Name: Coastal Science & Engineering
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4. Applicant Mailing Address: 1207 Palm Blvd	14. Agent Mailing Address: 160 Gills Creek Pkwy
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5. Applicant City: Isle of Palms	15. Agent City: Columbia
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6. Applicant State: SC	7. Applicant Zip: 29451	16. Agent State: SC	17. Agent Zip: 29209
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8. Applicant Area Code and Phone No.: 803-886-6428	18. Agent Area Code and Phone No.: 803-799-8949
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9. Applicant Fax No.:	19. Agent Fax No.:
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10. Applicant E-mail: desireef@iop.net	20. Agent E-mail: straynum@coastalscience.com
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21. Project Name: Isle of Palms Sand Management Project	22. Project Street Address: 41st Ave - 9510 Palmetto Dr, Isle of Palms SC
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23. Project City: Isle of Palms	24. Project County: Charleston	25. Project Zip Code: 29451	26. Nearest Waterbody: Atlantic Ocean
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27. Tax Parcel ID:	28. Property Size (acres):
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29. Latitude: 32.81260345945965	30. Longitude: -79.72044569421267
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31. Directions to Project Site (Include Street Numbers, Street Names, and Landmarks and attach additional sheet if necessary):
From the Isle of Palms Connector, Turn Left on Palm Blvd. Continue At the end of 14th Ave, turn right on Palm Blvd.

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 Attached

33. Overall Project Purpose and the Basic Purpose of Each Activity In or Affecting U.S. Waters (attach additional sheets if needed):
See Attached

34. Type and quantity of Materials to Be Discharged

Dirt or Topsoil:	_____	<input type="checkbox"/> cubic yards
Clean Sand:	400,000	<input checked="" type="checkbox"/> cubic yards
Mud:	_____	<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:	400,000	cubic yards

35. Type and Quantity of Impacts to U.S. Waters (including wetlands).

Filling: ¹⁰	_____	<input type="checkbox"/> acres	<input type="checkbox"/> sq.ft.	_____	<input 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: ²⁰	_____	<input checked="" type="checkbox"/> acres	<input type="checkbox"/> sq.ft.	400,000	<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: ³⁰	_____	acres	_____	sq.ft. ^{400,000}	cubic yards

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	Intertidal Beach	100 ft	sand harvesting and placement	30
Total Wetland Impacts (acres)				

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)
N/A				
Total Stream Impacts (Linear Feet)				

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:

See Attached

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).

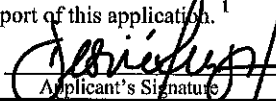
See Attached

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


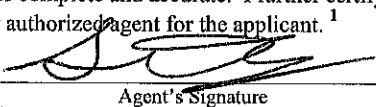
42. List all Corps Permit Authorizations and other Federal , State, or Local Certifications, Approvals, Denials received for work described in this application.

Similar work was performed under permit 2010-1041-2IG

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

 4/4/2024
 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

 4/4/2024  4/4/24
 Applicant's Signature Date Agent's Signature Date

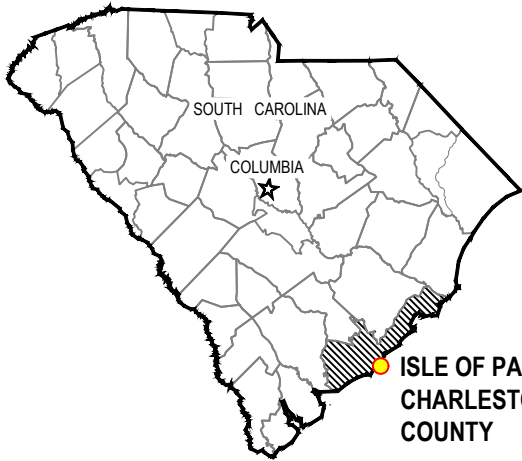
¹The application must be signed by the person who desires to undertake the proposed activity or it may be signed by a duly authorized agent if the authorization statement in blocks 11 and 43 have been completed and signed. 18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction 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.

#41- Adjacent Property Owner Mailing List
(Attach additional sheets if necessary)

Applicant Name: City of Isle of Palms

Project Name: Isle of Palms Sand Mangement Project

Property Owner Name	Mailing Address
	See Attached Sheets

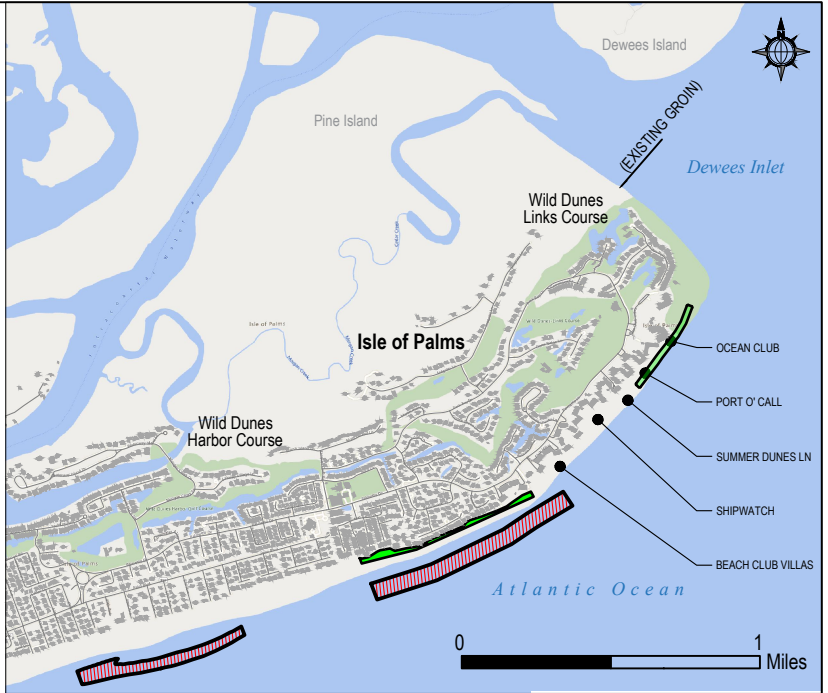


**ISLE OF PALMS,
CHARLESTON
COUNTY**

PROJECT LOCATION:

Latitude: 32° 48' 21" N

Longitude: W79° 43' 40"



DIRECTIONS:

FROM CHARLESTON, TAKE US-17 NORTH. TURN RIGHT ONTO SC 517 (ISLE OF PALMS CONNECTOR). TURN LEFT ONTO PALM BLVD. SITE IS NORTHEAST OF 47TH AVE EXTENDING ALONG TO DEWEES INLET ON THE NORTHEAST END OF ISLE OF PALMS.



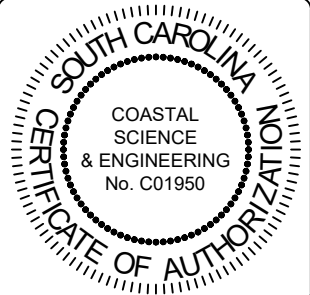
APPLICANT:
CITY OF ISLE OF PALMS
1207 PALM BLVD
ISLE OF PALMS SC 29451

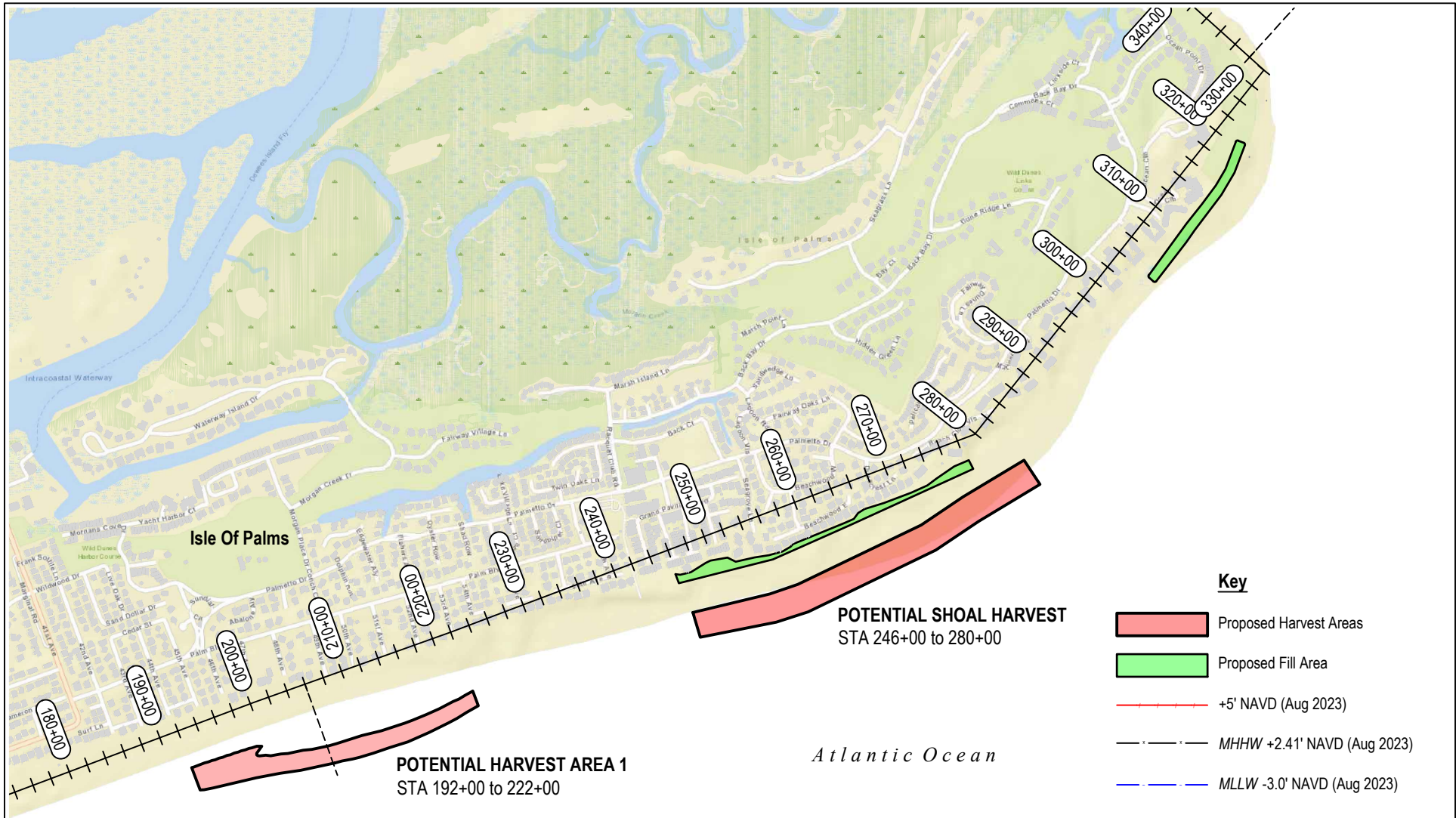
DRAWING TITLE:
City of Isle of Palms
Shoal Management
VICINITY MAP

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

SCALE: AS SHOWN
DATE: 28 Mar 2024
REVISED:
PROJECT #: 2589

SHEET:
01





Key

- Proposed Harvest Areas
- Proposed Fill Area
- +5' NAVD (Aug 2023)
- MHHW +2.41' NAVD (Aug 2023)
- MLLW -3.0' NAVD (Aug 2023)

POTENTIAL SHOAL HARVEST
STA 246+00 to 280+00

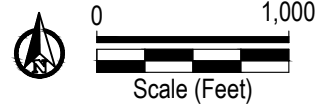
POTENTIAL HARVEST AREA 1
STA 192+00 to 222+00

Atlantic Ocean

DATUM:
Horizontal: SPCS NAD '83 (Feet) SC Zone 3900
Vertical: NAVD '88 (Feet)

Contours shown based on data collected by
Coastal Science & Engineering, Inc via RTK GPS Aug 2023.

NOTE:
Excavation and fill limits and volumes may
change based on conditions at the time of
construction, but will remain within permitted
boundaries and abide by all special conditions
of the permit.



APPLICANT:
City of Isle of Palms
1207 Palm Blvd
Isle of Palms, SC 29451

AGENT:
Coastal Science & Engineering
PO Box 8056
Columbia, SC 29202

DRAWING TITLE:
EXISTING CONDITION (August 2023)
PROPOSED SCRAPING & FILL PLAN

Scale:	As Shown	Sheet #:
Date:	5 April 2024	02
Revised:		
Project #:	2589	









NOTE:
Excavation and fill limits and volumes may change based on conditions at the time of construction, but will remain within permitted boundaries and abide by all special conditions of the permit.

DATUM:
Horizontal: SPCS NAD '83 (Feet) SC Zone 3900
Vertical: NAVD '88 (Feet)

Contours shown based on data collected by Coastal Science & Engineering, Inc via RTK GPS Aug 2023.

Key

-  Proposed Harvest Area
-  +5' NAVD (Aug 2023)
-  MHHW +2.41' NAVD (Aug 2023)
-  MLLW -3.0' NAVD (Aug 2023)

NOTE: No excavation will be done within 400' of the building line.



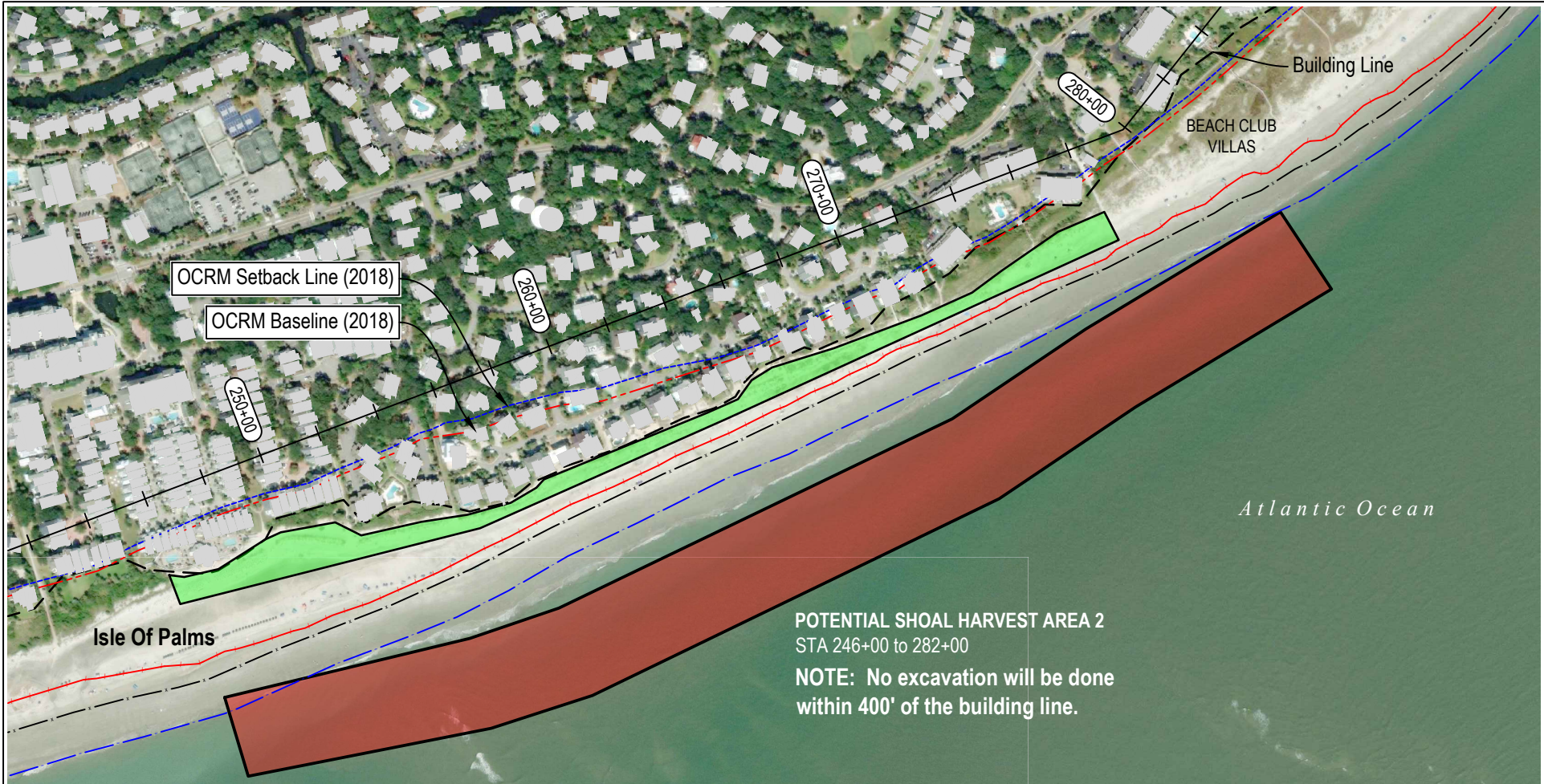
APPLICANT:
City of Isle of Palms
1207 Palm Blvd
Isle of Palms, SC 29451

AGENT:
Coastal Science & Engineering
PO Box 8056
Columbia, SC 29202

DRAWING TITLE:
PROPOSED HARVEST AREA 1



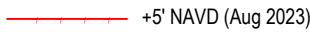
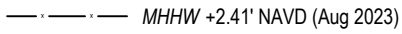
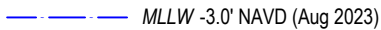
Scale:	As Shown	Sheet #:	03
Date:	5 April 2024		
Permit #			
Project #:	2589		



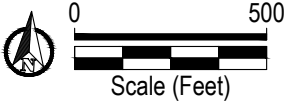


POTENTIAL SHOAL HARVEST AREA 2
 STA 246+00 to 282+00
NOTE: No excavation will be done within 400' of the building line.

Key

-  Proposed Harvest Area
-  Proposed Fill Area
-  +5' NAVD (Aug 2023)
-  MHHW +2.41' NAVD (Aug 2023)
-  MLLW -3.0' NAVD (Aug 2023)

NOTE:
 Excavation and fill limits and volumes may change based on conditions at the time of construction, but will remain within permitted boundaries and abide by all special conditions of the permit.



Harvest Area 2 anticipates future attachment of a shoal. (See sheet 07 for photo)

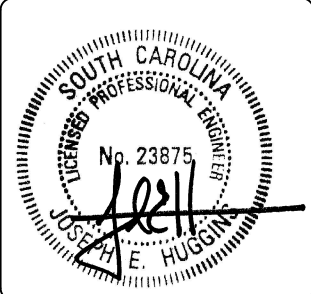
DATUM:
 Horizontal: SPCS NAD '83 (Feet) SC Zone 3900
 Vertical: NAVD '88 (Feet)
 Contours shown based on data collected by Coastal Science & Engineering, Inc via RTK GPS Aug 2023.

APPLICANT:
 City of Isle of Palms
 1207 Palm Blvd
 Isle of Palms, SC 29451

AGENT:
 Coastal Science & Engineering
 PO Box 8056
 Columbia, SC 29202

DRAWING TITLE:
PROPOSED HARVEST AREA 2
PROPOSED FILL AREA

Scale:	As Shown	Sheet #:	04
Date:	5 April 2024		
Revised:			
Project #:	2589		





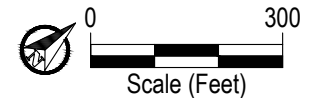
Key

- Proposed Fill Area
- +5' NAVD (Aug 2023)
- MHHW +2.41' NAVD (Aug 2023)
- MLLW -3.0' NAVD (Aug 2023)

DATUM:
 Horizontal: SPCS NAD '83 (Feet) SC Zone 3900
 Vertical: NAVD '88 (Feet)

Contours shown based on data collected by
 Coastal Science & Engineering, Inc via RTK GPS Aug 2023.

NOTE:
 Excavation and fill limits and volumes may
 change based on conditions at the time of
 construction, but will remain within permitted
 boundaries and abide by all special conditions
 of the permit.



APPLICANT:
 City of Isle of Palms
 1207 Palm Blvd
 Isle of Palms, SC 29451

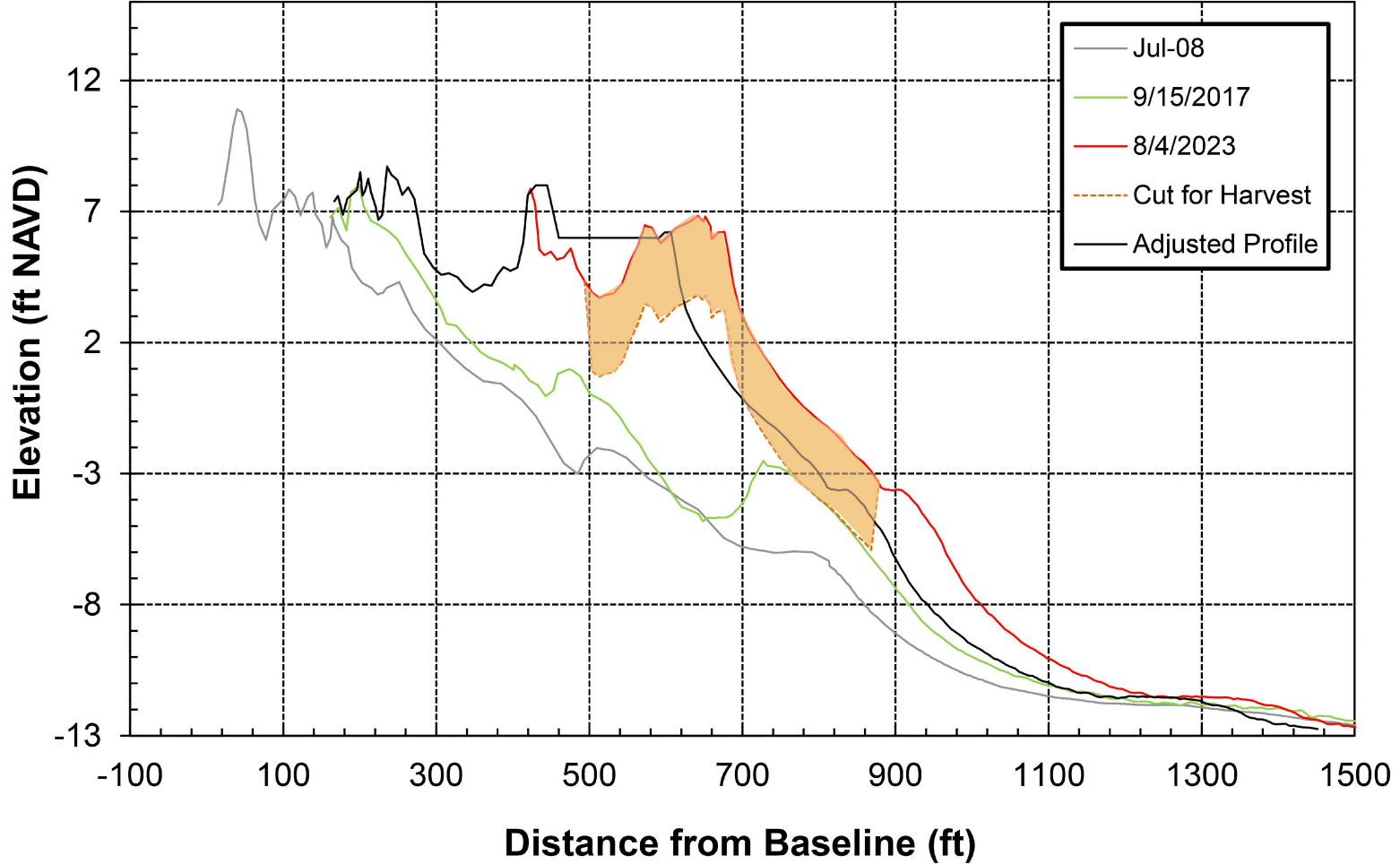
AGENT:
 Coastal Science & Engineering
 PO Box 8056
 Columbia, SC 29202

DRAWING TITLE:
PROPOSED FILL AREA 2

Scale:	As Shown	Sheet #:
Date:	5 April 2024	05
Revised:		
Project #:	2589	



Station: 206+00



DATUM:
 Horizontal: SPCS NAD '83 (Feet) SC Zone 3900
 Vertical: NAVD '88 (Feet)

Contours shown based on data collected by
 Coastal Science & Engineering, Inc via RTK GPS Aug 2023.

NOTE:
 Excavation and fill limits and volumes may
 change based on conditions at the time of
 construction, but will remain within permitted
 boundaries and abide by all special conditions
 of the permit.

APPLICANT:

City of Isle of Palms
 1207 Palm Blvd
 Isle of Palms, SC 29451

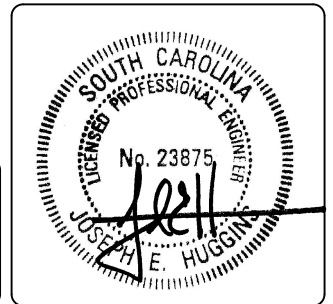
AGENT:

Coastal Science & Engineering
 PO Box 8056
 Columbia, SC 29202

DRAWING TITLE:

**TYPICAL HARVEST AREA SECTION
 2008-2023**

Scale:	As Shown	Sheet #:
Date:	5 April 2024	06
Revised:		
Project #:	2589	





Note:

Photo taken looking Northeast on January 16th 2024. Shoal anticipated to continue migrating toward the beach and attach creating harvest area 2 shown on sheet 04.

APPLICANT:

City of Isle of Palms
1207 Palm Blvd
Isle of Palms, SC 29451

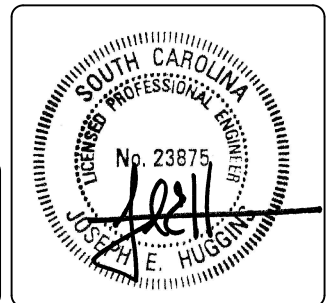
AGENT:

Coastal Science & Engineering
PO Box 8056
Columbia, SC 29202

DRAWING TITLE:

OBLIQUE AERIAL PHOTO
16 January 2024

Scale:	As Shown	Sheet #:
Date:	5 April 2024	07
Revised:		
Project #:	2589	



32. Description of the overall project and each activity in or affecting US waters or state critical areas

The proposed activity is a sand scraping and transfer project on Isle of Palms, SC. The project is intended to restore a dry sand beach along critically eroded areas of the beach. The project is intended to provide temporary erosion relief until a large-scale shoal bypass event attaches to the beach. CSE expects the shoal to attach in the next 12-18 months based on current migration rates. More details of the current beach and shoal condition are provided later. The project is similar in design and scope as prior projects completed in 2012 and 2014 under permit (2010-1041-2IG). The 2012 project moved ~80,000 cy of sand from the shoal attachment site while the 2014 project moved ~80,000 cy from the area near 53rd Ave and ~200,000 cy from the shoal attachment site (Figure 1). Sand was placed along erosional arcs at Beachwood East and near Seascape and Ocean Club condo units.

The applicant proposes to harvest sand from the intertidal beach along an accretional portion of the beach, including the area between 44th and 53rd Avenues (Harvest Area 1) and the site of shoal attachment (Harvest Area 2). The harvest areas are shown in Sheets 2 and 3 of the permit drawings. Area 1 has accreted over the past several years and is sufficiently distant from any upland property to protect developed areas. The applicant has included a buffer of 600 ft between properties and excavation areas along the area spanning Harvest Area 1.

The applicant proposes to recycle up to 100,000 cy of sand from Harvest Area 1, and up to 200,000 cy from Harvest Area 2. Available quantities at Harvest Area 2 will depend on the configuration of the shoal as it attaches. The applicant has provided a 400 ft buffer between properties and any excavation area at Harvest Area 2. Based on the shoal configuration and proximity to the shoreline, the applicant anticipates that only one transfer event will be required; however, the applicant requests that the permit allow for up to two events to occur over the 5 year life of the permit should the erosion pressure continue into the future. Shoal attachments are dynamic and do not always result in predictable changes to the beach, especially when considering post-attachment accretion trends.

Up to 30 acres of exposed intertidal beach will be utilized to harvest up to a cumulative total of 400,000 cubic yards (cy) of sand in up to two discrete events over the course of five years. Any single event will be limited to a total of 250,000 cy, with only up to 100,000 cy of sand harvested from Area 1 during a single event.

All work under this alternative will be performed by land-based equipment working between low water and high water along the intertidal beach to minimize impacts to dry-beach habitat. Sand will be used to construct a dune and dry sand berm along the placement areas. The dune elevation will be +14 ft NAVD, and the berm at +6ft NAVD. The berm will be up to 50 ft wide along the fill areas.

The Applicant is in the initial stages of design and permitting of another large-scale nourishment effort. The previous project was constructed in 2018, and has protected the east end of the island since that time. The proposed project will be scaled to provide an interim solution to the episodic erosion along

portions of Isle of Palms affected by the shoal. It will offer sufficient restoration to allow for removal of emergency measures presently installed along the erosion area.

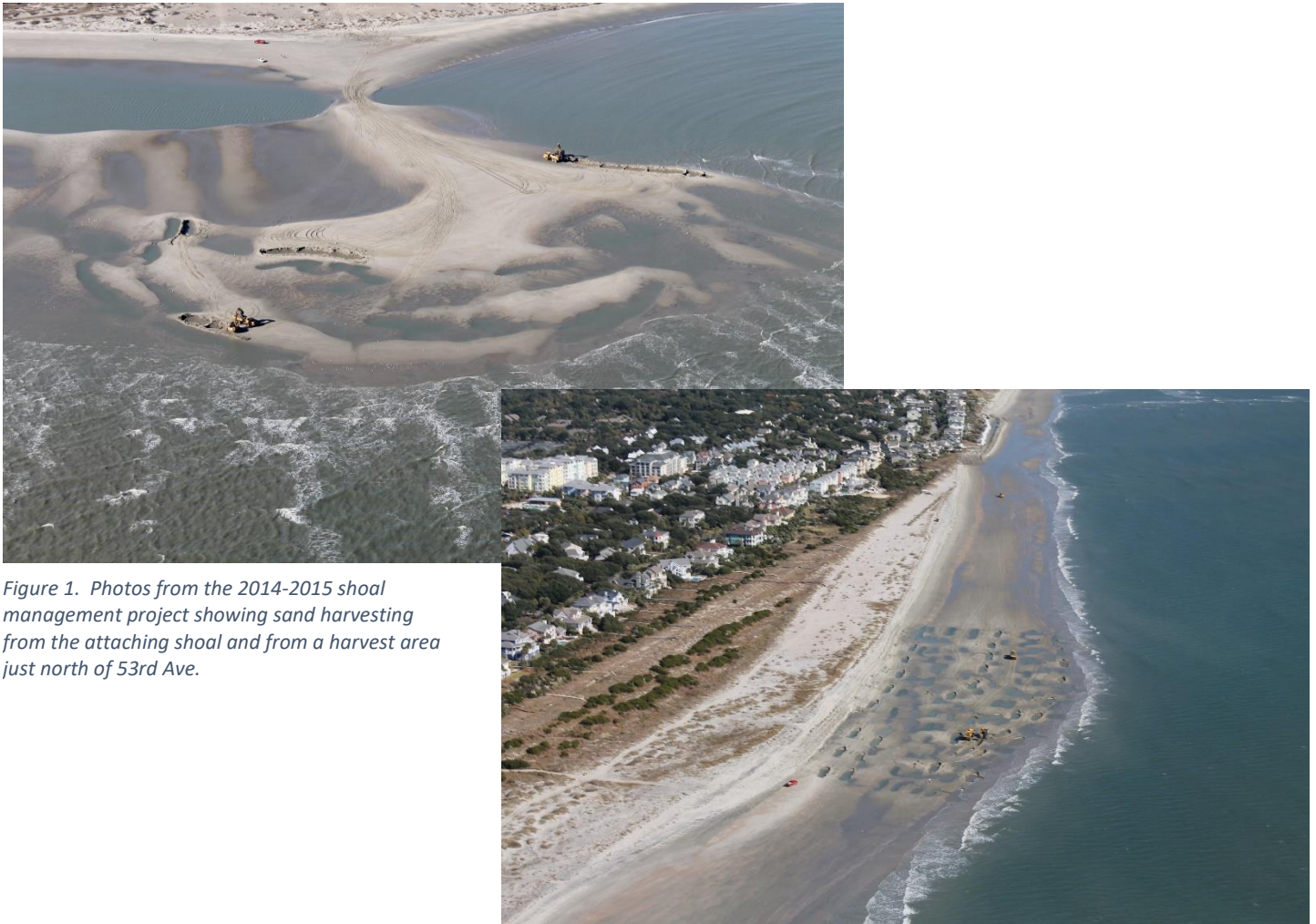


Figure 1. Photos from the 2014-2015 shoal management project showing sand harvesting from the attaching shoal and from a harvest area just north of 53rd Ave.

33. Overall project purpose and the basic purpose of each activity in or affecting US waters

The purpose of the project is for sand management along Isle of Palms, wherein excess sand in accreting sections of the island is shifted mechanically to eroding areas to provide storm protection to properties and maintain public use of the beach at all stages of the tide. The project seeks to augment the natural shoal bypass cycle and restore a viable profile along eroded sections of the shoreline until the shoal bypass cycle completes. Figure 2 shows the current condition of the beach along Beachwood East, within Wild Dunes. Persistent erosion has been occurring at the site for several years, but has accelerated recently. The area has lost ~300 ft of beach since 2019, resulting in a critically eroded condition at Beachwood East. Sandbags have been placed to protect structures along ~1,000 lf of beach. It is likely that erosion will spread north and south in the future, leaving additional properties threatened.

The effect of sediment bypassing at tidal inlets on receiving shorelines has been well documented (Williams and Kana 1987, Gaudio 1998, Kana et al 1999). Shoals migrating onshore bring new sand to a beach; however, they usually cause large, rapid changes to the shoreline during the process. Changes are generally temporary, but can cause significant problems when development is threatened. Large fluctuations in the shoreline position near inlets led to the SC DHEC-OCRM classification of Unstabilized Inlet Erosion Zones, which impose stricter setback criteria than standard zones away from inlets.

At Isle of Palms, aerial images dating to the 1940s confirm ongoing shoal-bypass events averaging one every 6.6 years (Gaudio 1998). The addition of sand as a result of these events accounts for the accretion observed along the downcoast portion of the island, which has been gaining 2.6 cubic yards per foot per year (cy/ft/yr) since 1998 (CSE 2010). A bypass event occurring in the early 1980s was used by Kana et al (1985) to model the “shoal-bypass cycle,” identifying three stages of evolution where the shoal:

- Stage 1) Emerges offshore, usually as a circular-shaped, sub-aerial sand mound.
- Stage 2) Migrates closer to shore, often as a horseshoe-shaped bar, causing accretion in its lee and erosion of adjacent areas.
- Stage 3) Fully attaches to the beach, allowing new sand to spread into previously eroded areas.

The shoal-bypass events act as natural nourishment to the Isle of Palms and contribute to the net accretion observed over the majority of the island over the past century. Two notable shoal-bypass events occurred in the 1980s, followed by another in the mid-late 1990s, and others between 2004 and 2007. After the nourishment project in 2008 (P/N 2007-02631-2IG-P), two smaller shoal-bypass events occurred, bringing more sand to the beach near Beach Club Villas and the Property Owners Beach House, but causing erosion near Seascape Villas, Ocean Club Villas, and the 18th hole of the Ocean Course (see Sheet 04 for property locations). These events necessitated the first shoal-management permit (2010-1041-2IG). A large shoal event attached to the beach in 2015, and there has been no significant shoal event since 2015.

The City of Isle of Palms sponsored a large-scale nourishment of the area in 2018. That project (P/N 2016-00803) placed ~1.7 million cy of sand on the beach between 57th Ave and the Links Course. CSE has monitored the beach annually since the project, noting that there has been extensive erosion along the center portion of the fill area (centered near Beach Club Villas). The area spanning the beach between stations 264 and 290 presently shows lower unit volumes than the pre-nourishment condition. The majority of the nourishment area still holds 50-100 cy more sand than before nourishment. Erosion is likely to continue along Beachwood East until the shoal attaches and sand shifts laterally from the attachment site. CSE expects that erosion along the eastern end of IOP may accelerate over the next 12 months, possibly affecting the area near Seascape and Ocean Club (as was the case in 2012 and 2014). The applicant has included the latter area in the permit application in anticipation of future erosion.

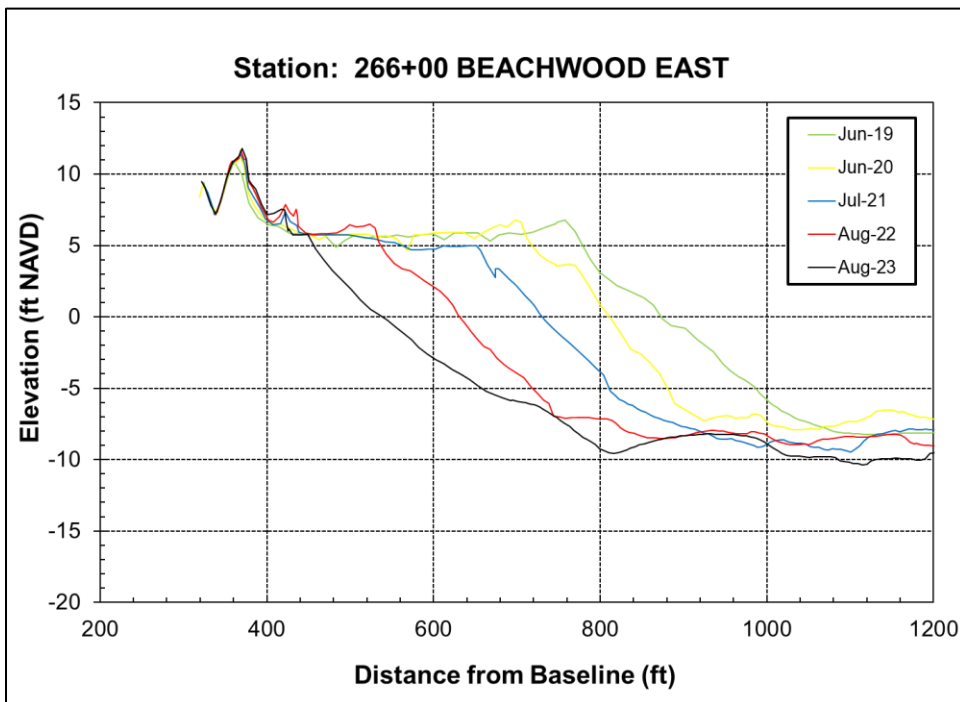


Figure 2. Photo and beach profile of the Beachwood East Area in February 2024.

Figure 3 shows the condition of the shoal as of August 2023. The shoal was positioned ~800 ft from the beach, with the center mass of the shoal extending from Beach Club Villas to Mariners Watch. The area of focused erosion is along the beach adjacent to the southern end of the shoal. The shoal has moved landward at a rate near 1,000 lf per year over the past three years (Figure 4). CSE expects the shoal to attach to the shoreline in the next 12-18 months. At that point, it will be accessible for sand harvesting, though the exact quantity of sand that will be available for harvesting is unknown. The applicant wishes to minimize sand quantities transferred under this permit to the minimal necessary to mitigate emergency erosion.

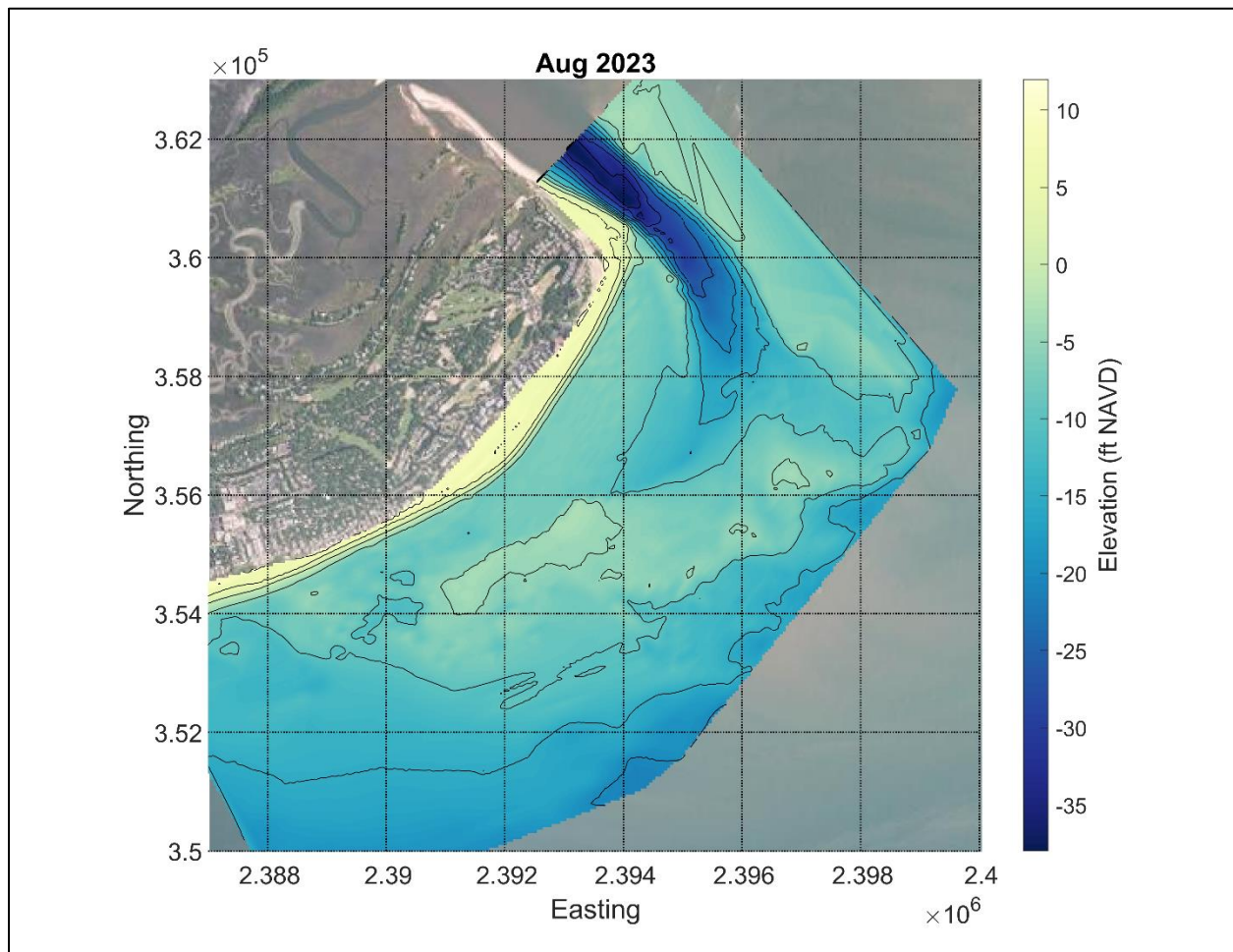


Figure 3. Elevation model of the east end of Isle of Palms inshore zone in August 2023. The approaching shoal is visible in the yellow shades ~800 ft off the beach at this time.

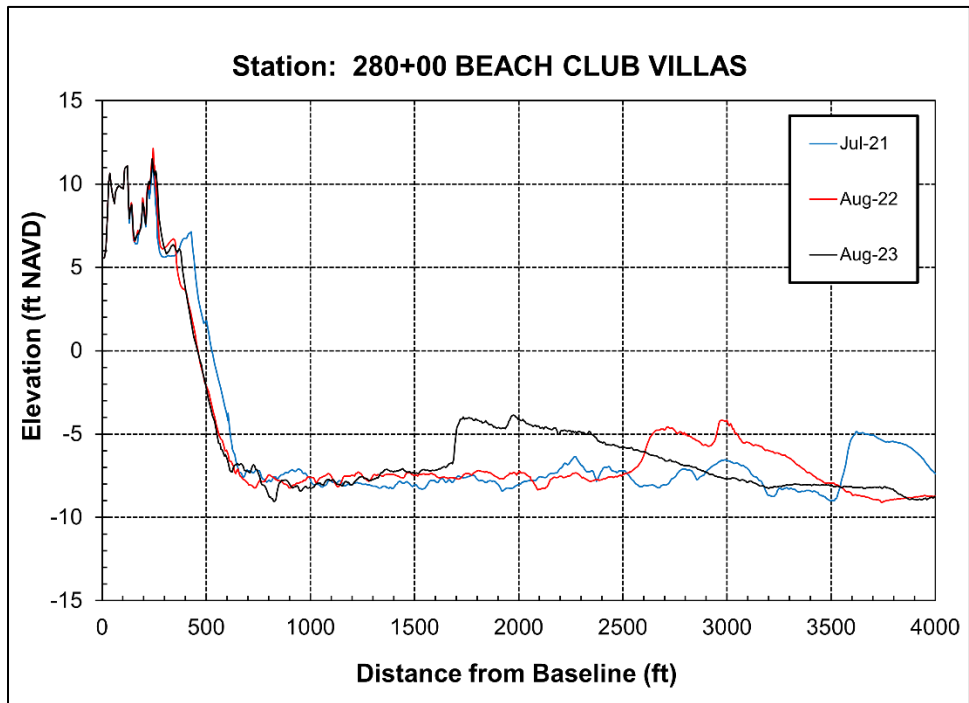
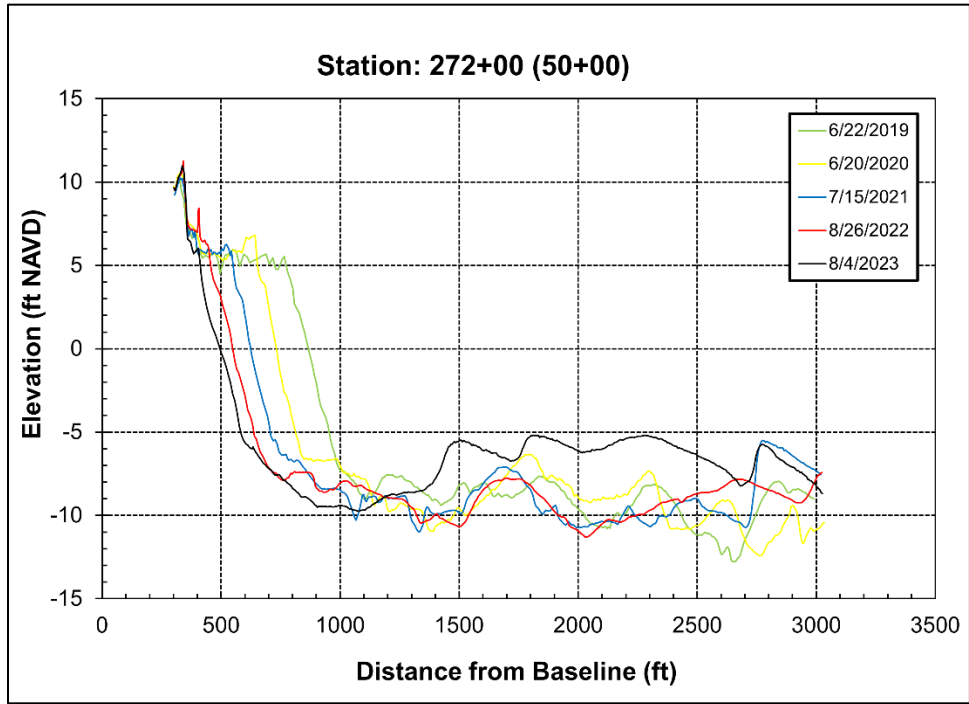


Figure 4. Elevation profiles showing the onshore shoal migration along the Beachwood East area (top) and seaward of Beach Club Villas (bottom). The shoal has migrated ~1,000 ft landward per year since 2021.

Harvest Area 1 is located immediately downdrift of the nourishment project fill areas (2008 and 2018). The area has consistently gained sand since the first nourishment project in 2008, and has been naturally accretional prior to any nourishment efforts. Since 2008, the beach along Harvest Area 1 has gained ~585,000 cy of sand and grew by nearly 500 ft in width (Figure 5). Multiple rows of dunes have accreted along the area, despite impacts from several major storms since 2015. Following the 2014 scraping event (which occurred slightly north of the presently proposed area), CSE noted that the beach immediately began accreting additional sand and there was no post-project impact to the dune. CSE expects a similar trend should this area be utilized for the proposed project. The applicant is limiting the excavation volume from Harvest Area 1 not to exceed 100,000 cy. This will eliminate the potential for adverse impacts to the upland area within the harvest area and maintain a sufficient sediment supply to downdrift beaches.

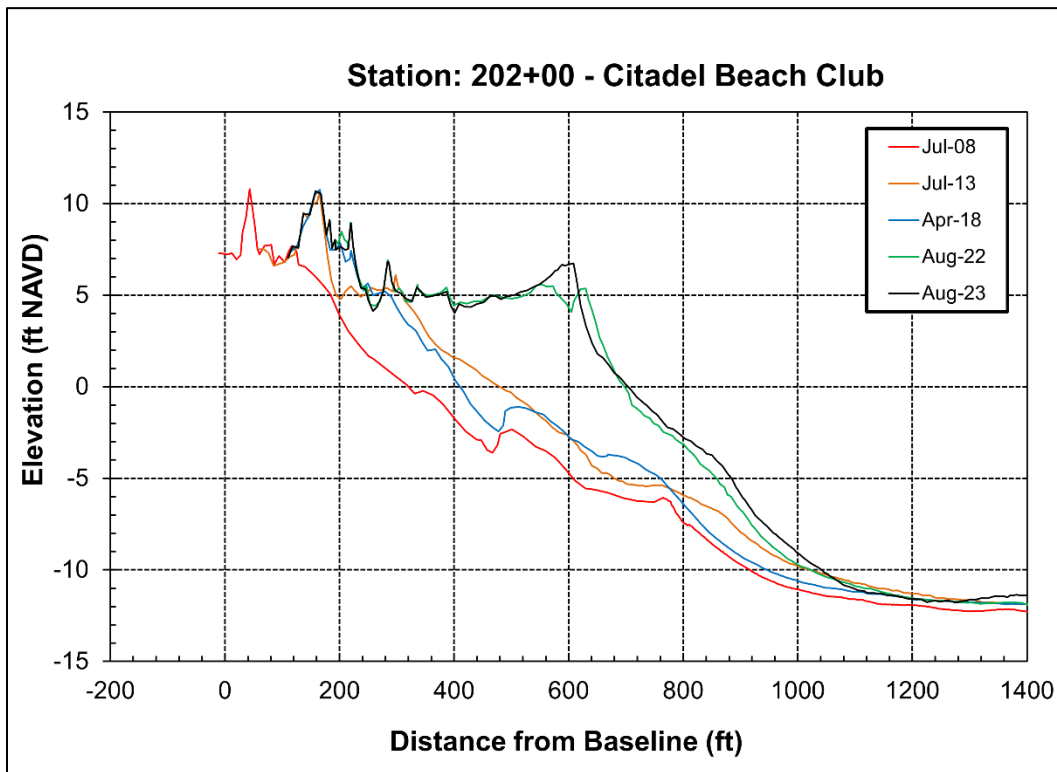


Figure 5. Beach profiles along Harvest Area 1 showing the significant accretion in this area since 2008. The beach has gained ~500 ft in width, including multiple rows of dunes.

Harvest Area 2 includes the potential shoal attachment site. The area overlaps with potential placement areas to allow for uncertainty in the shoal attachment process and beach condition at the time of the project. Harvest Area 2 will be utilized if the shoal is accessible by land-based equipment. Area 2 is the preferred harvest area if conditions allow. As shown in Figure 1, once the shoal is accessible, there is ample room for land-based equipment to harvest sand along the seaward side of the shoal. This process accelerates onshore migration and recovery of the eroded sections of the beach, mimicking the natural sediment transport process of shoal attachment.

39. Describe measures taken to avoid and minimize impacts to waters of the US

The applicant has successfully completed two prior shoal management projects. Each of these projects provided improved beach health along the placement sites until another shoal-bypass cycle created additional erosion. The goal of the project is to provide localized erosion relief to areas under emergency conditions while allowing sufficient time for natural sediment transport process to provide longer-term relief. Presently, only a small area of the beach along the east end is critically eroded, and this condition does not justify a large-scale nourishment project. Mitigation of the limited area of erosion will extend the interval before another large-scale nourishment project is required.

A list of alternatives considered for beach management is provided below.

Alternative 1 – Do Nothing

The Do-Nothing alternative will allow for natural beach processes to continue, including continued erosion of the hotspot, onshore migration of the shoal, and eventually some level of accretion following attachment. Until the shoal attaches, erosion is expected to continue along Beachwood East, and is expected to accelerate at the east end of the island. Presently, there are sandbags along Beachwood preventing additional damage to properties. Should erosion continue along the eastern end of the project area, CSE expects that additional emergency measures will be required along Ocean Club and/or Seascape properties. While sandbags can protect upland property, they require regular maintenance, can impact the slope of the beach and impede public access, and can impact sea turtles nesting. Long-term exposure of sandbags results in high maintenance costs, debris on the beach, and poor storm protection. Rapid restoration of the beach will allow for removal of sandbags and improved beach health.

Benefits – Natural solution, no construction impacts

Negatives – Uncertain timing/scale of natural accretion, prolonged exposure of sandbags, property damage during storms, impacts of emergency measures/construction

Alternative 2 – Upland Sand Nourishment

This alternative would involve trucking beach compatible sand from an upland source to provide nourishment for eroded areas. While upland trucking of sand is feasible for small-scale projects, projects involving 100,000 cy of sand are generally too large to complete economically or efficiently via trucking. Trucked in sand is typically \$40-50 per cy, which is an order of magnitude higher than harvesting sand from the beach. It also involves significant impacts to the traffic flow, as a 100,000 cy project would require over 6,500 truckloads of sand. This alternative requires substantially more time to complete, as recent experiences shows that only up to ~1,500 cy of material is likely to be able to be trucked to the site each day. The applicant does not believe that trucking is a viable option for successful beach restoration.

Benefits – Does not require sand harvesting from the beach

Negatives – Cost, inefficiency, impacts to traffic and roads, sand compatibility

Alternative 3 – Shoal Management/Sand Recycling

This alternative is the project proposed herein. It involves focused restoration along an erosion hotspot at a modest cost (\$0.5-1 million). The project is anticipated to take 1-2 months to complete, and can be completed during the winter season to minimize impacts to public access and the environment. The project is considered to be an interim project to allow for the shoal process to complete, without having to do a large offshore nourishment project at a cost of ~\$15 million. The interim project will allow for an acceptable beach condition for several more years along the east end, extending the overall lifespan of the 2018 nourishment. Extending the lifespan of nourishment reduces cost and prevents construction impacts associated with offshore projects. The Applicant is proactively working towards a permit for the next large-scale nourishment effort, but will wait until the large project is warranted. Erosion affecting a larger section of the beach and an overall reduction in sand volume will trigger the next offshore project.

Benefits – Lower cost of sand (~25% of offshore sand cost, ~10% of upland sand cost), maintains steady sand supply to downcoast areas, delays large-scale project, limits impact areas to intertidal beach, can be constructed in winter

Negatives – Does not increase overall sand supply, may impact (but not eliminate) public use of beach along haul path, sand volume determined by site conditions at time of construction, use of shoal depends on attachment progress

Alternative 4 – Large-Scale Nourishment

The City of Isle of Palms has sponsored two large-scale nourishment projects (2008 and 2018) to mitigate erosion along the eastern end of the island. These projects were constructed in response to significant erosion occurring along ~6,000 lf of the east end, and added ~900,000 cy and 1.67 million cy, respectively. Large-scale nourishment is a common practice on developed shorelines, and impacts of the projects are typically well understood; however, they are large construction projects that involve substantial equipment and can interfere with the beach and borrow area. Impacts potentially include temporary increases in turbidity, lighting, and noise along the beach and borrow area, beach closures and limited access during construction, changes in sediment characteristics, beach compaction, and other impacts. The projects are also expensive, requiring mobilization costs of up to \$5 million and unit pumping costs of ~\$12 per cy.

As mentioned previously, the City of Isle of Palms is beginning work towards a permit for the next large-scale nourishment. This work involves extensive study of the offshore zone to find beach compatible sand while ensuring protection of known and unknown cultural resources. The applicant anticipates submission of the initial permit application in fall of 2024; however, no schedule has been determined

for implementation of the project. The City will continue to monitor the beach and determine when a large project is necessary based on the beach condition. The current condition will allow for restoration of the eroded area with the much smaller and more economical shoal-management project.

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

The proposed project is designed to mitigate beach erosion along a critically eroded areas of Isle of Palms and facilitate consistent sediment transport to downdrift areas of the island. The project will improve storm protection, restore the wet sand beach, restore dune habitat for sea turtle nesting, and allow for removal of emergency sandbags. The applicant believes that the restorative nature of the project offsets temporary impacts during construction and requests that no additional mitigation be required. To document the recovery of the system following construction, the applicant proposes the following monitoring plan:

- Annual orthophotography of the project area pre- and post-project and for three (3) years following the project. Photography will include coverage of the island north of 42nd Ave. Photo resolution will be greater than three (3) inches per pixel. The applicant will provide digital files of the orthophotography to regulatory and resource agencies upon request.
- Annual beach profiles of the island extending from a point landward of the primary dune to a minimum distance of 1,500 lf seaward of the dune for a three (3) years following the project. Profiles will be compared to pre and post construction profiles to document beach width, dune condition, and sand volume change. Profiles will extend south of the project area to the Sea Cabins Pier to document sand volume change downcoast of Harvest Area 1.

The project is proposed to be constructed outside of sea turtle nesting season (Nov 1 – Apr 30) to eliminate threats to nesting or hatching sea turtles. This will also keep construction to the period outside of peak biological recruitment permits for benthic infauna, and outside of peak tourist season. Construction equipment will be stored in areas devoid of vegetation and off the dune.

