

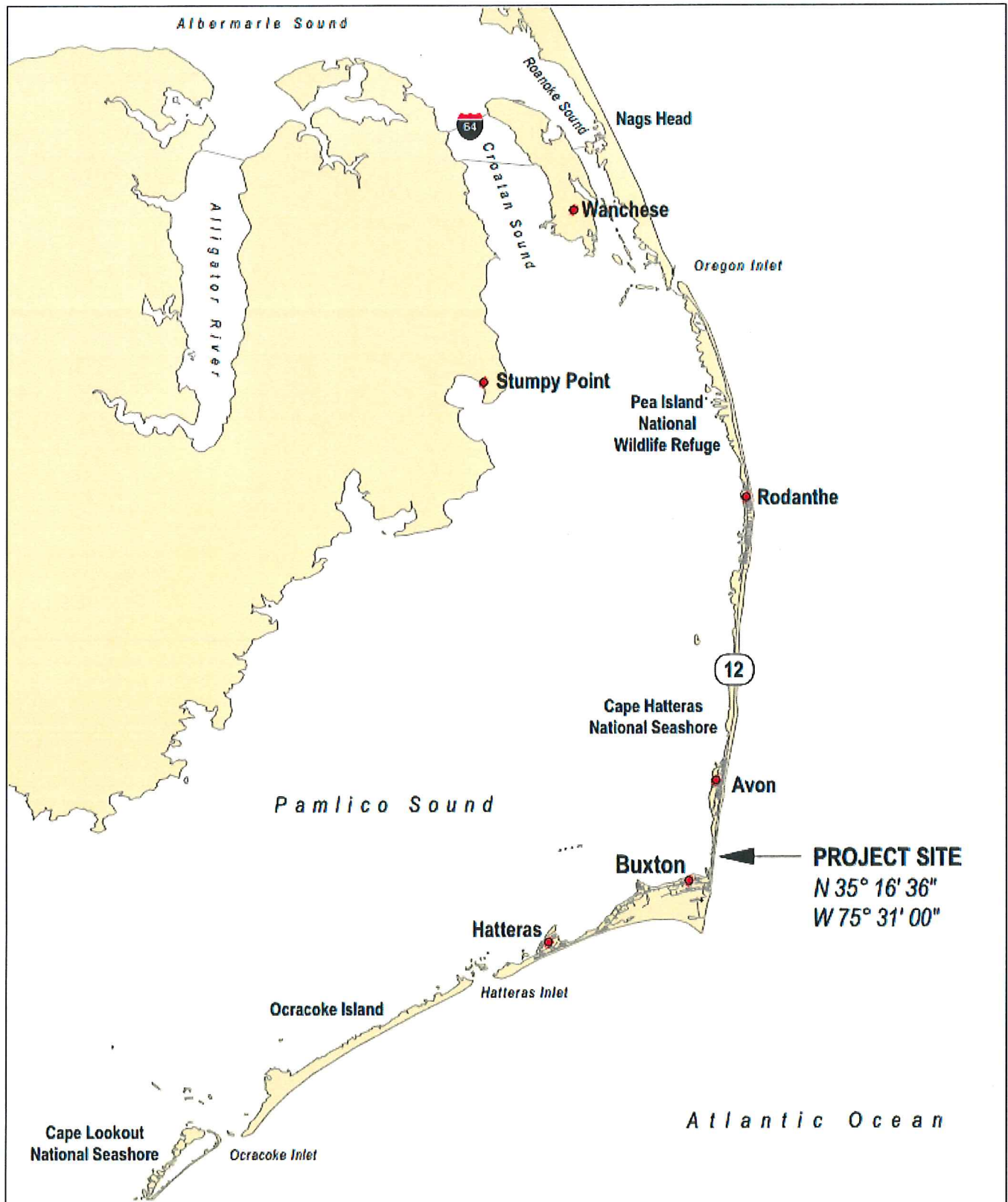


Figure 1. Location of Buxton and Cape Hatteras National Seashore, Dare County, North Carolina.

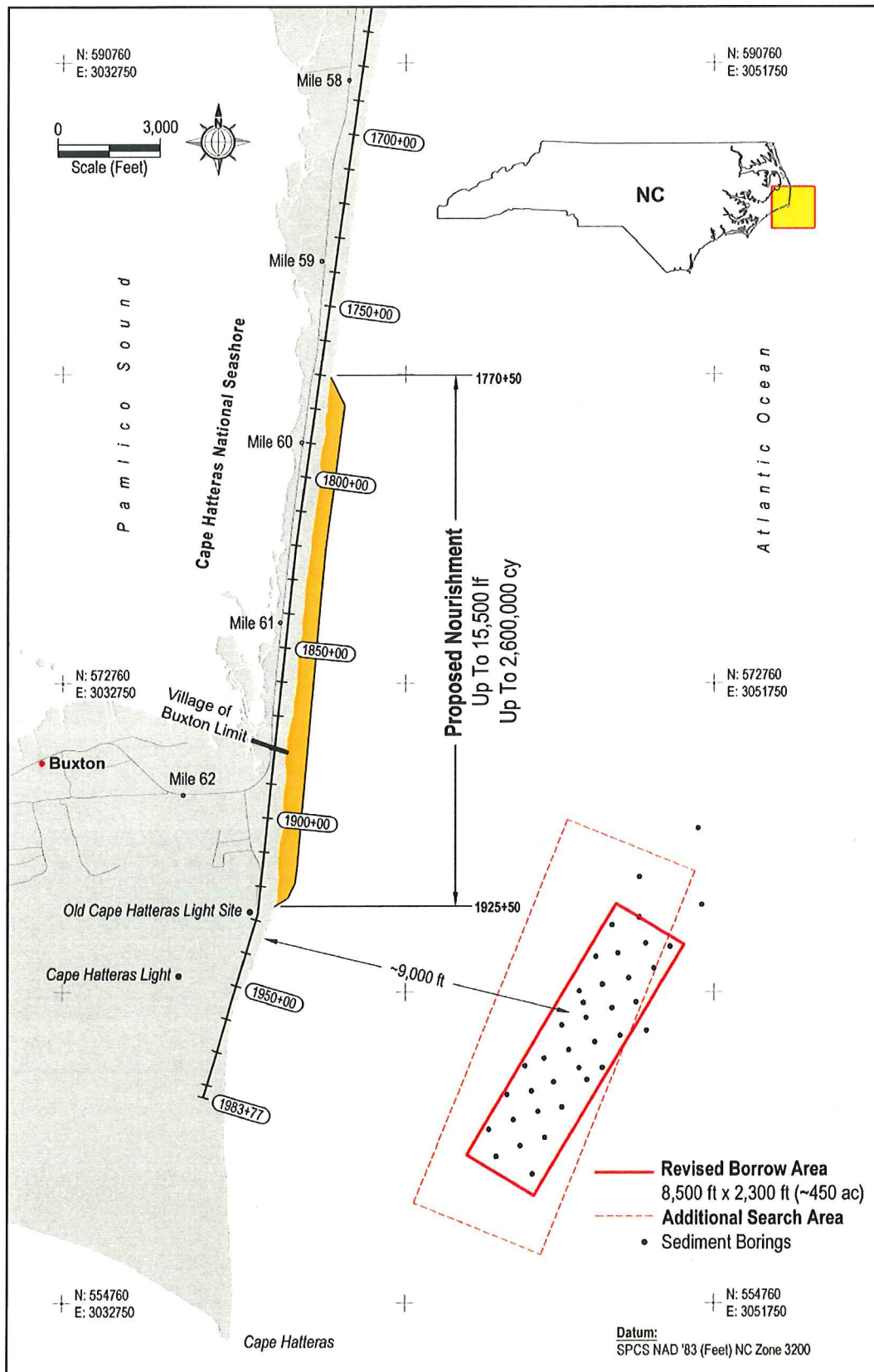


Figure 2. Proposed beach restoration for NC 12 at Buxton showing anticipated maximum project limits and offshore borrow area (after CSE/CZR 2013).



Figure 3 (1 of 2). Aerial image taken by the project team on 11 September 2014 – looking southwest. The maximum project area is shown on the photo.



Figure 3 (2 of 2). Aerial image taken by the project team on 11 September 2014 – looking north. The Village of Buxton north limit is located approximately at the end of the northernmost building showing in the photo.

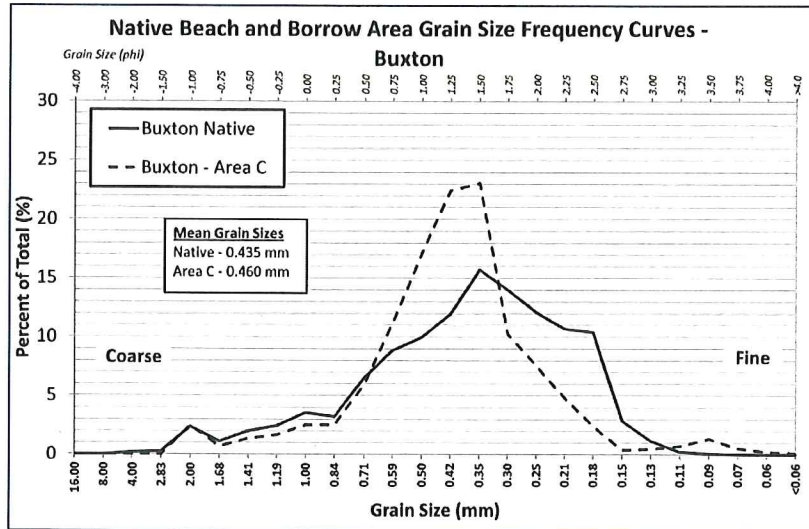


Figure 4.

Sediment grain-size distribution along the proposed project area (composited beach samples) and sediment quality for the proposed offshore borrow area showing similar mean grain size and sorting (composited from available cores).

[Note: Area "C" (dashed line in the graph) refers to the solid red-line box in Figure 2.]

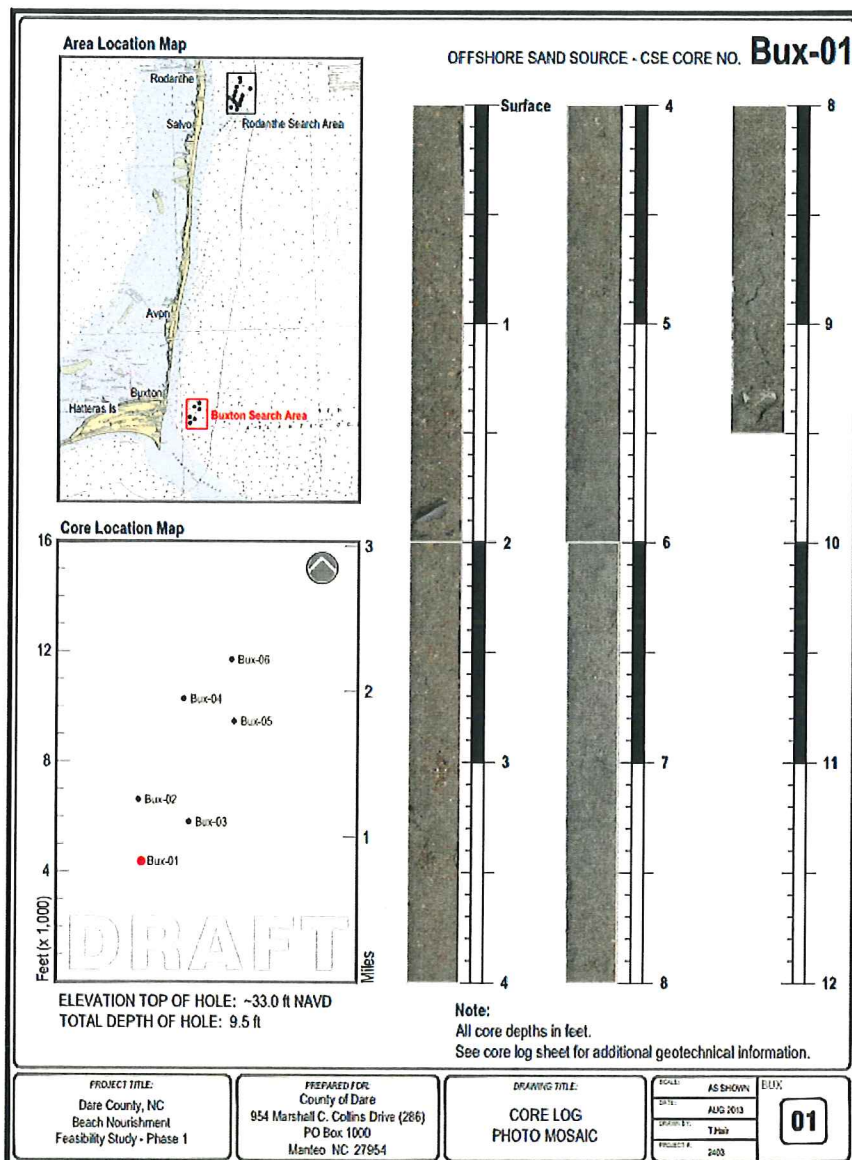
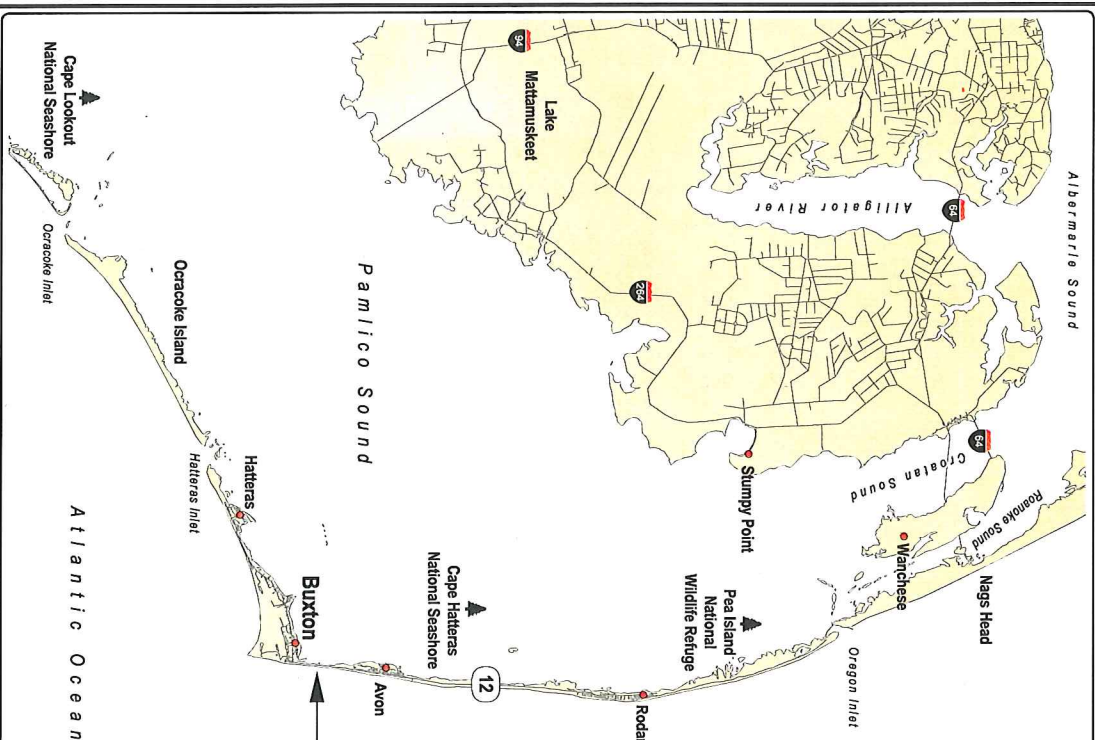
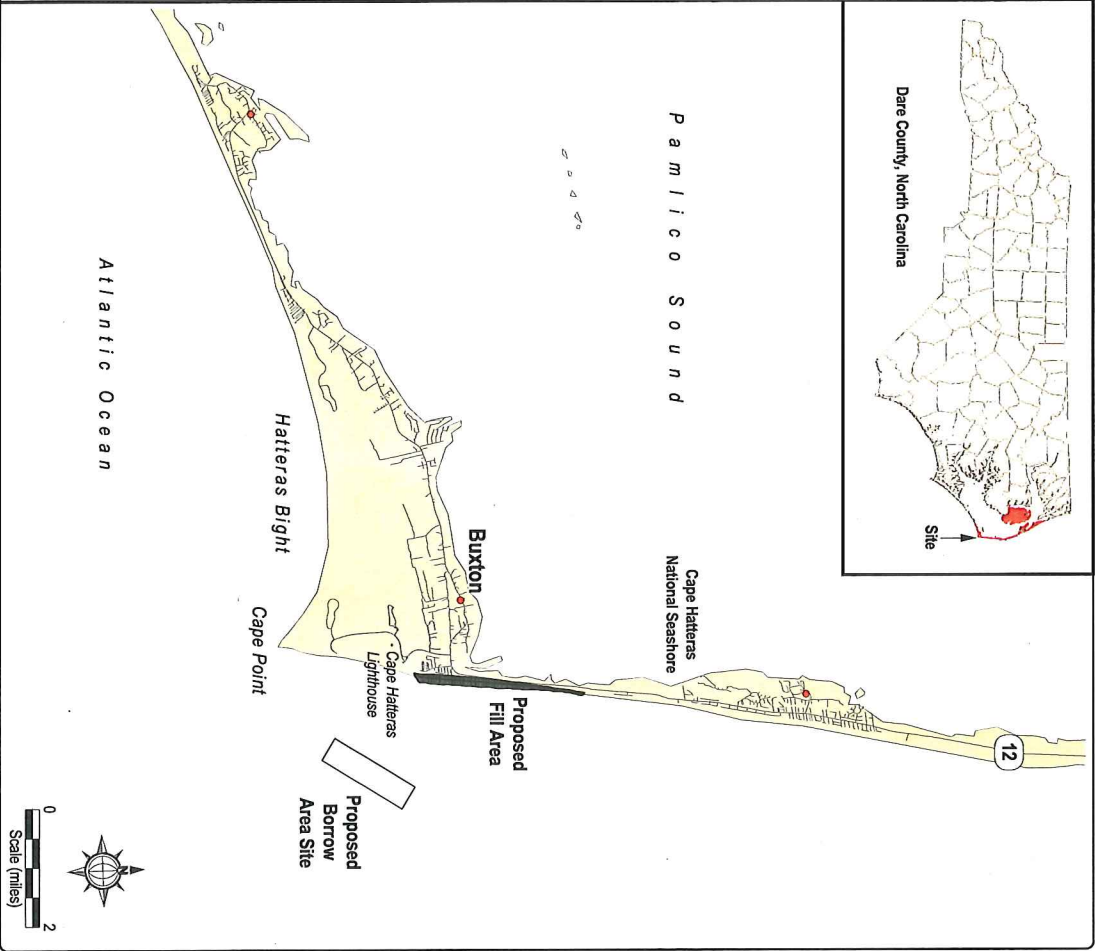
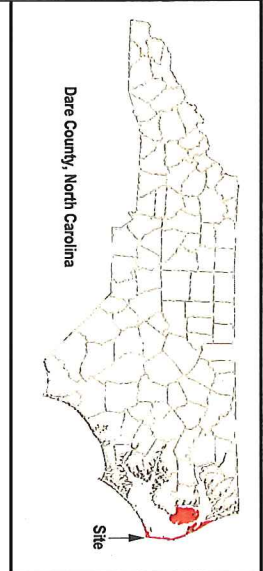


Figure 5.

Representative core photo log for the proposed offshore borrow area (from CSE/CZR 2013).



PROJECT SITE
 N 35° 16' 36"
 W 75° 31' 00"



Project site directions, from Nags Head, NC:
 Follow NC-12 S to Cape Hatteras National Park Hwy. South.
 Continue to follow NC-12 S for 4.3 miles to Haulover public beach access parking area.
 North project limit is on beach side of NC-12 (National Park Service Beach) and extends
 15,500 feet South toward Buxton, NC. South project limit is in the vicinity of the old Cape
 Hatteras Lighthouse location.

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 27954
 PHONE 800.343.6800
 WWW.COASTALSCIENCE.COM

Applicant:
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 954 Marshall Collins Dr.
 Manteo, NC 27954

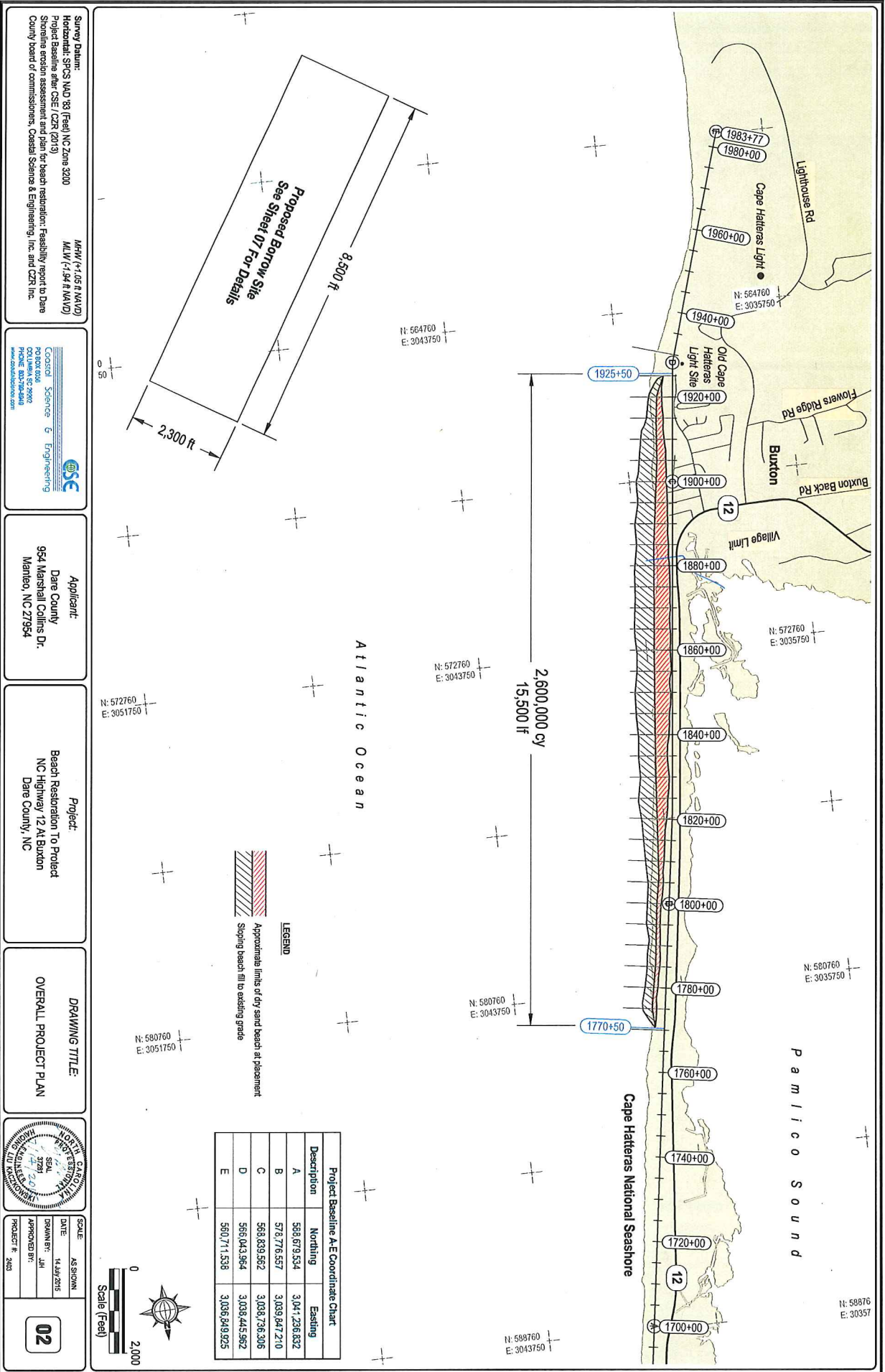
Project:
 Beach Restoration To Protect
 NC Highway 12 At Buxton
 Dare County, NC

DRAWING TITLE:
 Project Location
 & Vicinity Map



SCALE: AS SHOWN
DATE: 14 JUL 2015
DRAWN BY: LHM
APPROVED BY:
PROJECT #: 2423

01



Survey Data:
 Horizontal: SPCS MJD 83 (Feet) NC Zone 3200
 Vertical: CEN 83 (Feet) NC Zone 3200
 Project Baseline: CEN 83 (Feet) NC Zone 3200
 Stationing: 100 ft intervals
 County Board of Commissioners, Coastal Science & Engineering, Inc. and CEN Inc.

Coastal Science & Engineering
 954 Marshall Collins Dr.
 Manteo, NC 27954
 Phone: 252-292-2000
 Fax: 252-292-2001
 www.coastalscience.com

Applicant:
 Dare County
 954 Marshall Collins Dr.
 Manteo, NC 27954

Project:
 Beach Restoration To Protect
 NC Highway 12 At Buxton
 Dare County, NC

DRAWING TITLE:
 OVERALL PROJECT PLAN

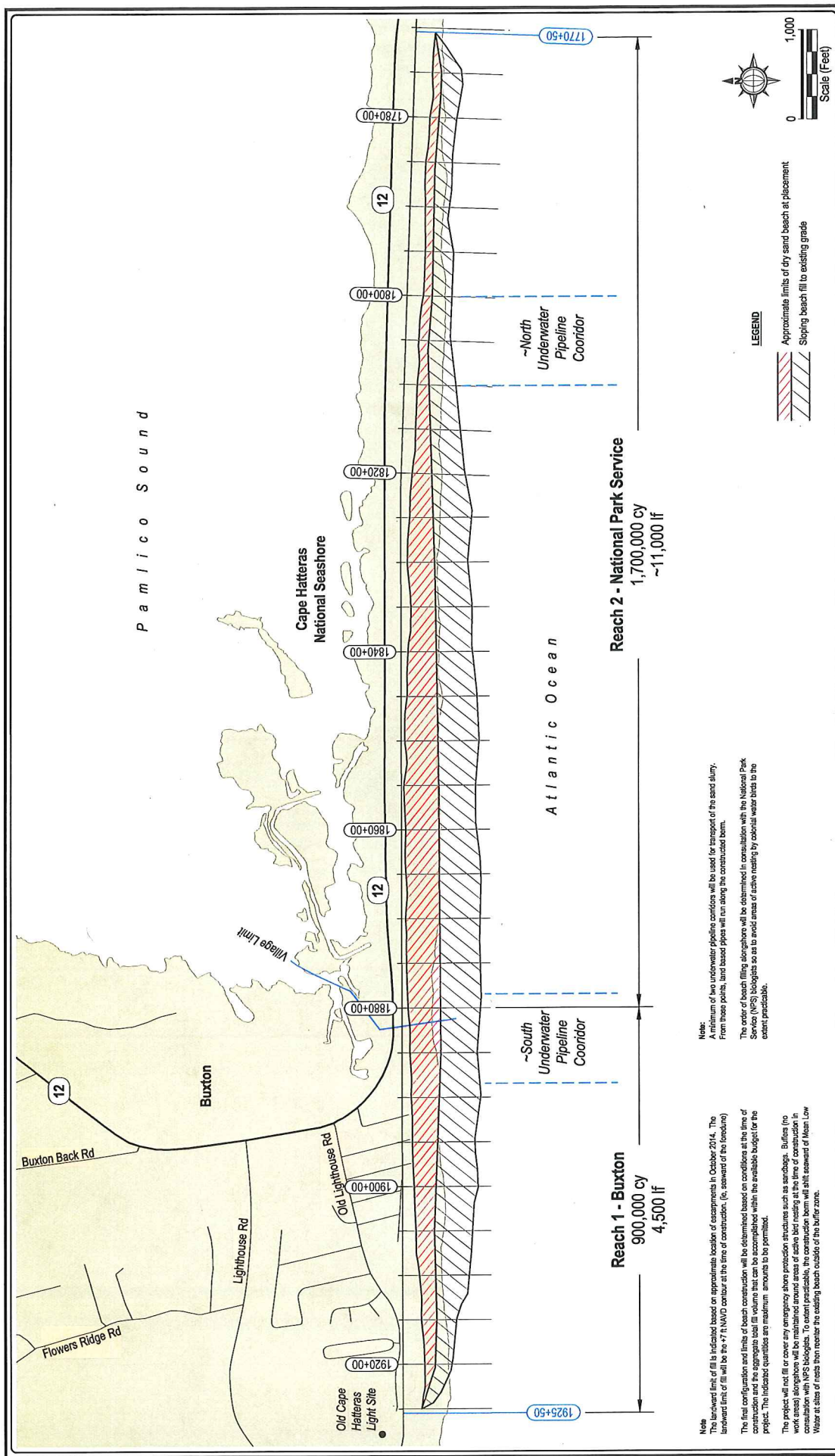


SCALE:
 AS SHOWN
 DATE: 11/17/2015
 DRAWN BY: JH
 APPROVED BY: JH
 PROJECT #: 280

02

Project Baseline A-E Coordinate Chart		
Description	Northing	Easting
A	588,679,534	3,041,236,632
B	578,776,557	3,039,847,210
C	568,839,562	3,038,736,306
D	566,043,964	3,038,445,962
E	560,711,538	3,036,849,925





Survey Datum: MHW (+1.05 ft NAVD)
Horizontal: SPCS NAD 83 (Feet) NC Zone 3200
Vertical: NAVD 88 (Feet)
Notes: Data collected by Coastal Science & Engineering, Inc via RTK GPS.
Data collected: October 2014

Project: Beach Restoration To Protect NC Highway 12 At Buxton Dare County, NC

Applicant: Dare County
 954 Marshall Collins Dr.
 Manteo, NC 27954

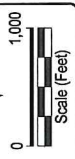
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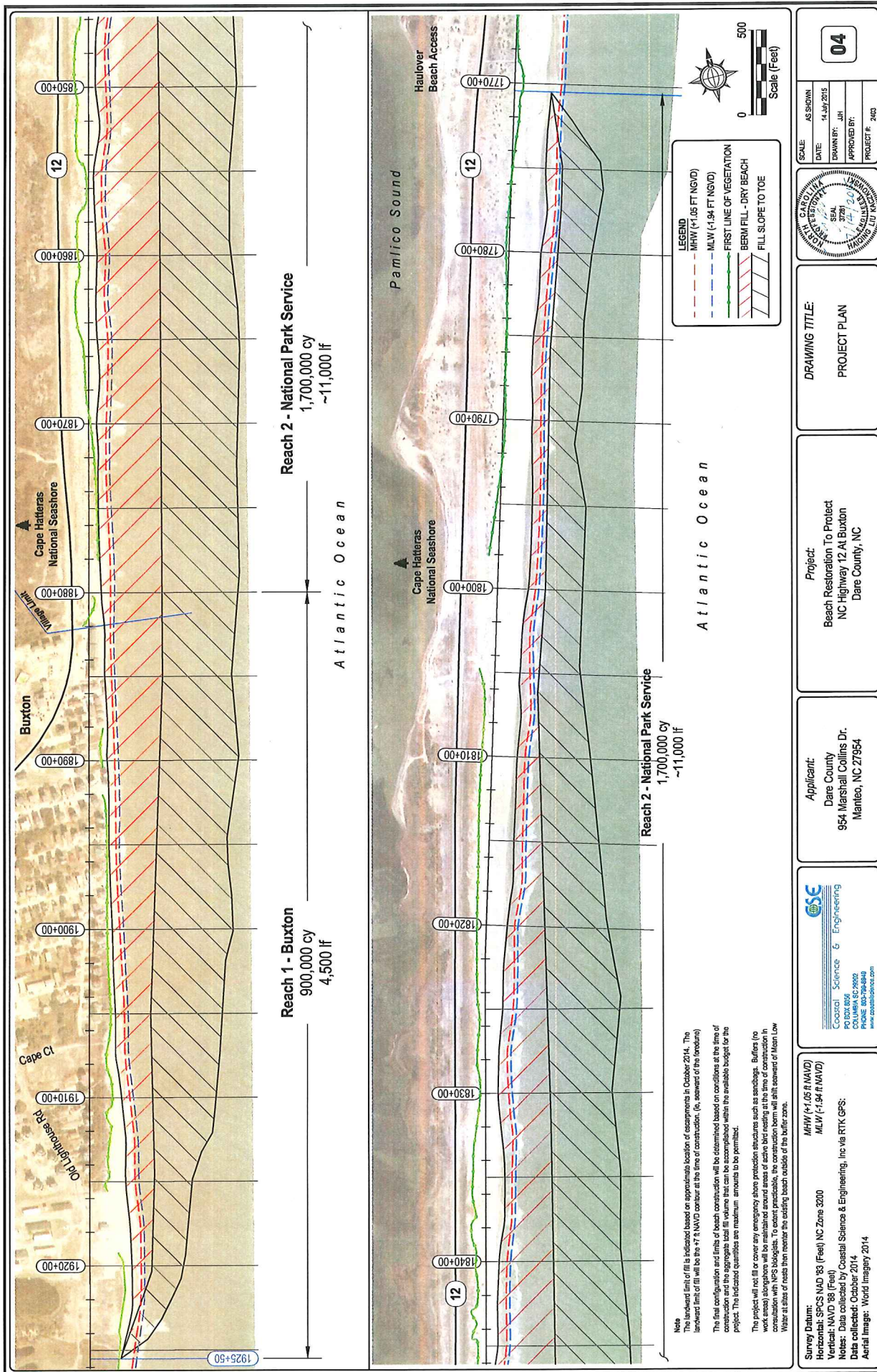
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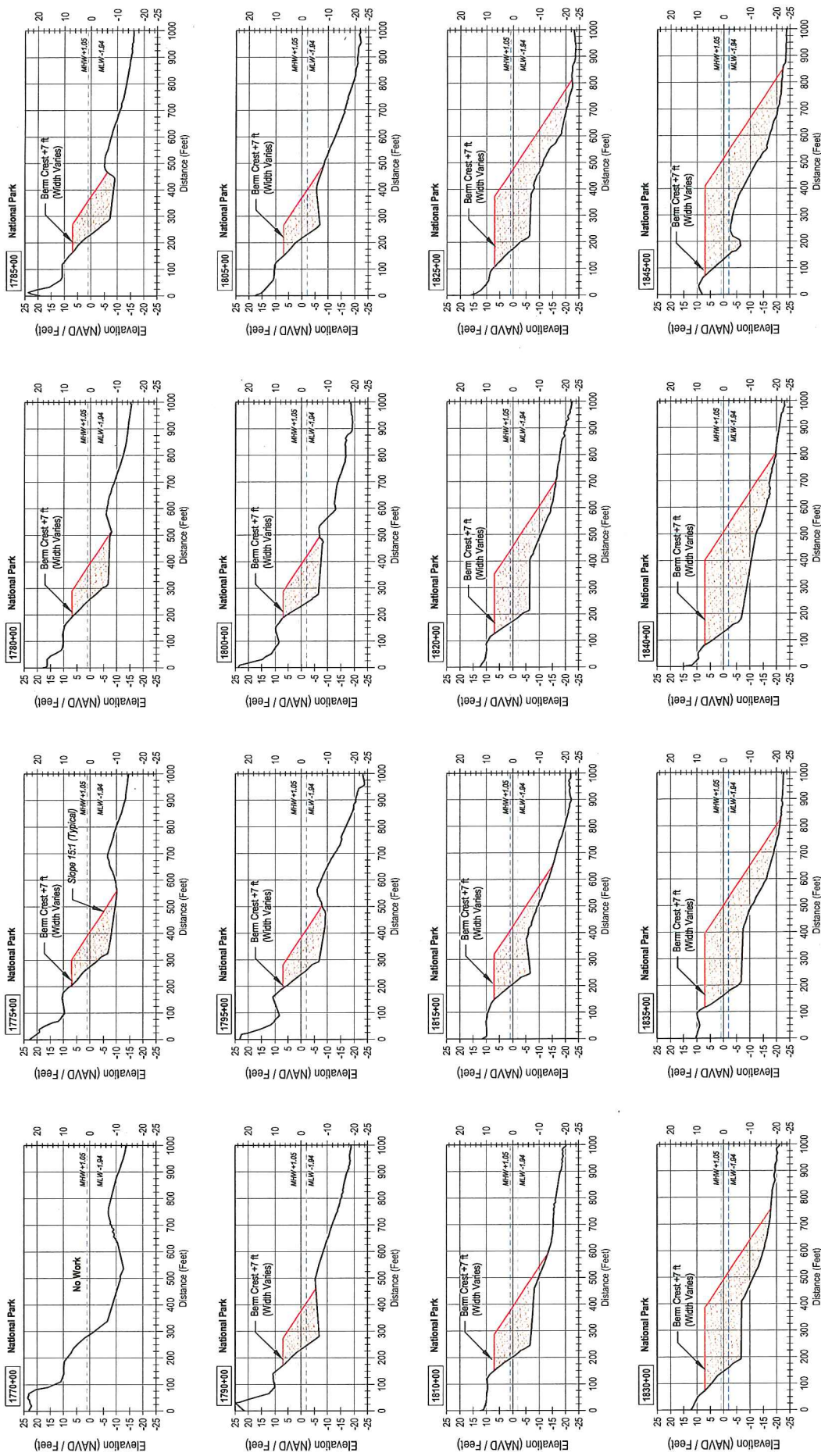
Note:
 The placement limits of fill is indicated based on approximate location of easements in October 2014. The placement limits of fill will be the 7' N NAVD contour at the time of construction. (i.e. seaward of the structure)
 The final configuration and limits of beach construction will be determined based on conditions at the time of construction and the aggregate total fill volume that can be accomplished within the available budget for the project. The indicated quantities are maximum amounts to be permitted.
 The project will not fill or cover any existing shore protection structures such as sandbags. Buffers (no work areas) alongshore will be maintained around areas of active bird nesting at the time of construction in consultation with NPS biologists. To extent practicable, the construction berm will shift seaward of Mean Low Water at sites of nests then reenter the existing beach outside of the buffer zone.

Note:
 A maximum of two underwater pipeline corridors will be used for transport of the sand slurry. From these points, sand based pipes will run along the constructed berm.
 The order of beach filling alongshore will be determined in consultation with the National Park Service (NPS) biologists so as to avoid areas of active nesting by colonial water birds to the extent practicable.

LEGEND
 Approximate limits of dry sand beach placement
 Sloping beach fill to existing grade







Survey Datum: MHW (+1.05 ft)
 Horizontal: SPCS NAD 83 (Feet) NC Zone 3200
 Vertical: NAVD 88 (Feet)
 Notes: Data collected by Coastal Science & Engineering, Inc via RTK GPS;
 Data collected: October 2014

Coastal Science & Engineering
 10101 E. 9th Ave. Suite 200
 Fort Lauderdale, FL 33315
 PHONE: 954-784-8400
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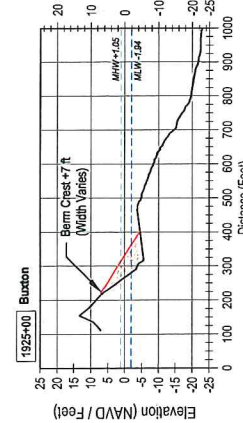
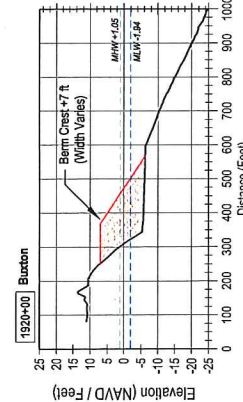
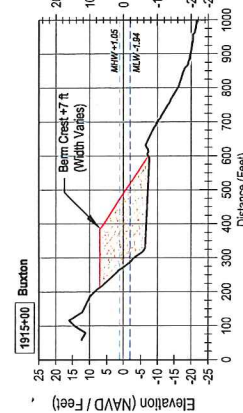
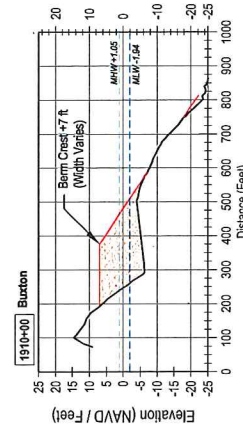
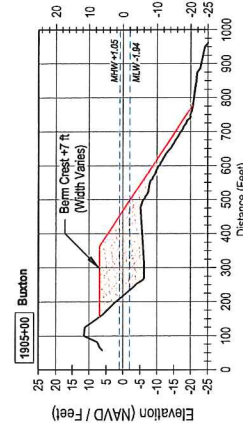
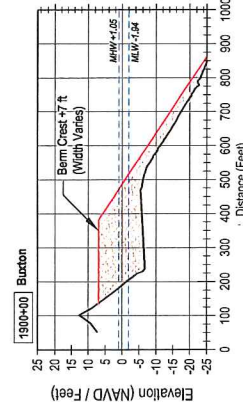
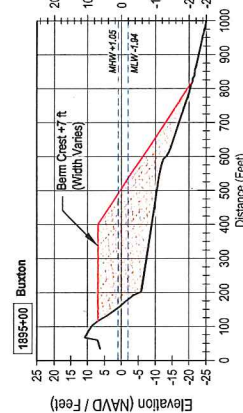
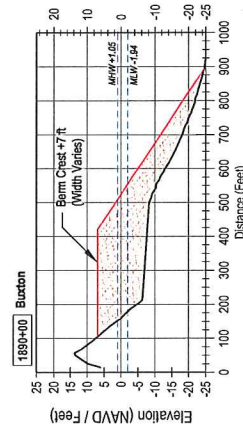
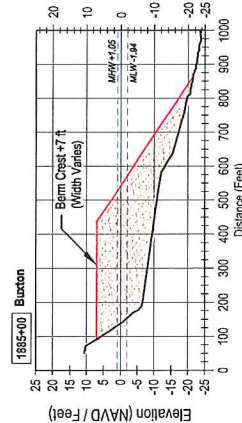
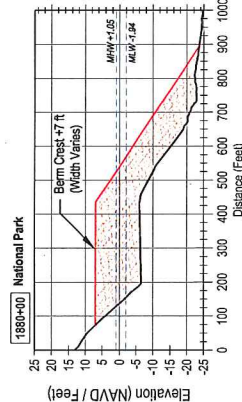
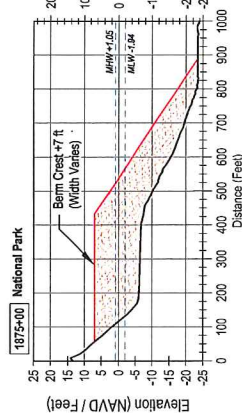
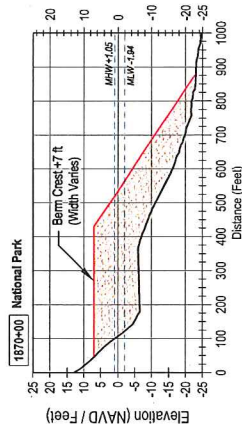
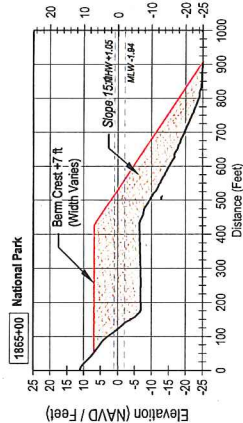
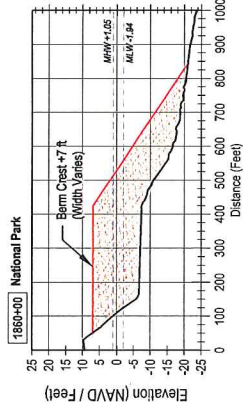
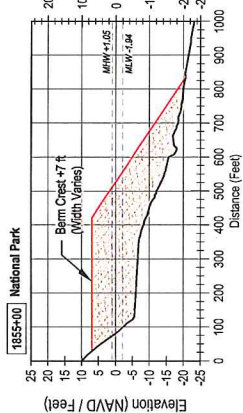
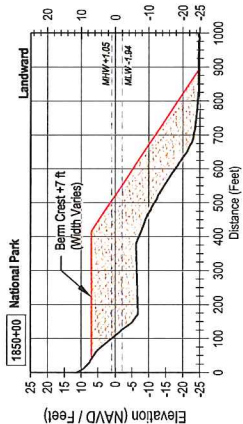
Applicant:
 Dare County
 954 Marshall Collins Dr.
 Manteo, NC 27954

Project:
 Beach Restoration To Protect
 NC Highway 12 At Budton
 Dare County, NC

DRAWING TITLE:
 PLAN FILL SECTIONS
 STA 1770+00 to 1845+00

SCALE: AS SHOWN
 DATE: 14 JULY 2015
 DRAWN BY: JAH
 APPROVED BY:
 PROJECT # 2603

05



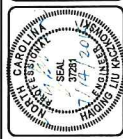
Survey Datum:
Horizontal: SPCS NAD 83 (Feet) NC Zone 3200
Vertical: NAVD 88 (Feet)
Vertical Exaggeration: 10:1
Notes: Data collected by Coastal Science & Engineering, Inc via RTK GPS:
Data collected: October 2014

CSE
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Manteo, NC 27954

Project:
Beach Restoration To Protect
NC Highway 12 At Buxton
Dare County, NC

DRAWING TITLE:
PLAN FILL SECTIONS
STA 1850+00 to 1925+00

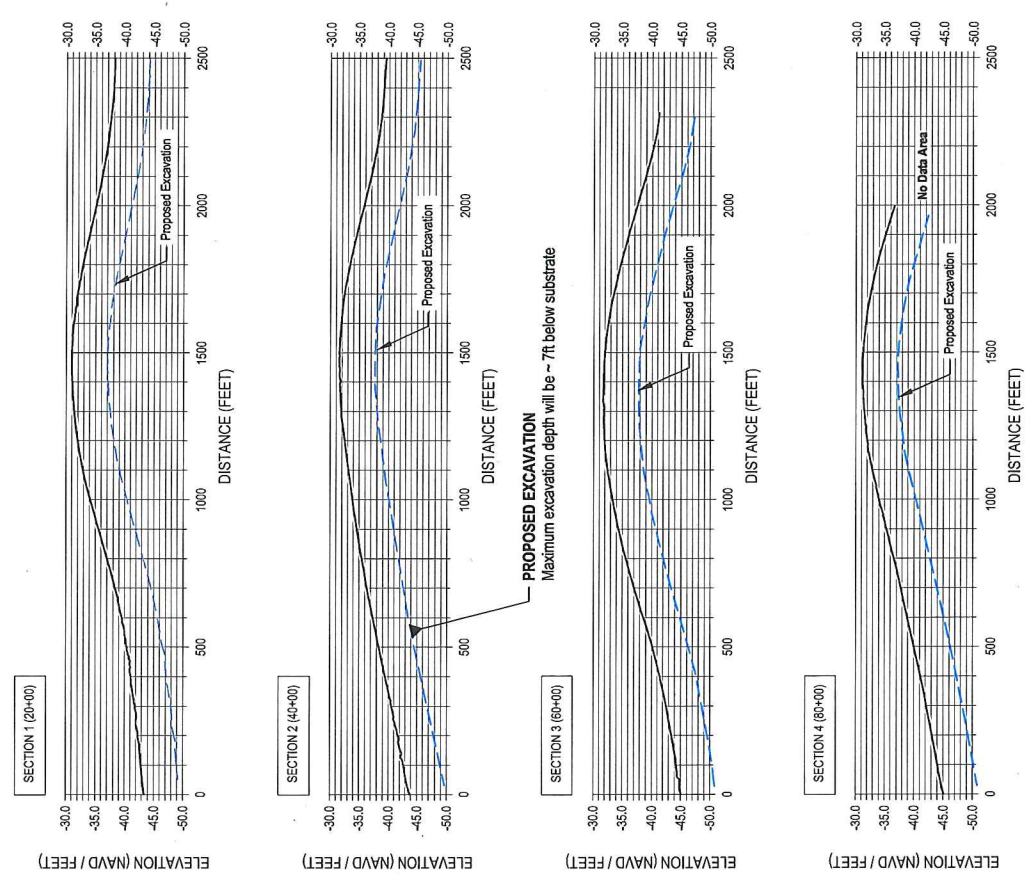
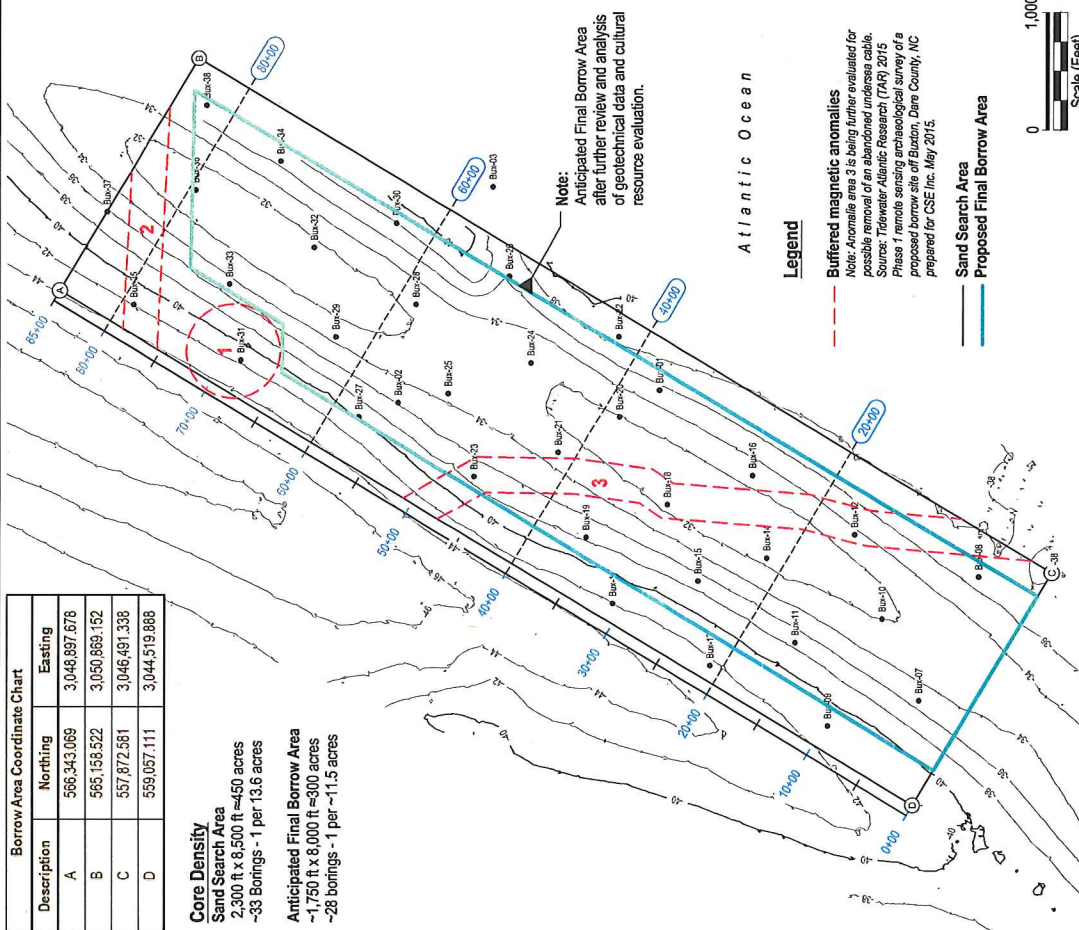


SCALE: AS SHOWN
DATE: 14 JUL 2015
DRAWN BY: J.H.
APPROVED BY:
PROJECT #: 2403

Borrow Area Coordinate Chart		
Description	Northing	Easting
A	566,343.069	3,048,897.678
B	565,158.522	3,050,869.152
C	557,872.581	3,046,491.338
D	559,057.111	3,044,519.888

Core Density
Sand Search Area
2,300 ft x 8,500 ft ~450 acres
~33 Borings - 1 per 13.6 acres

Anticipated Final Borrow Area
~1,750 ft x 8,000 ft ~300 acres
~28 borings - 1 per ~11.5 acres



Survey Datum:
Horizontal: SPCS NAD 83 (Feet) NC Zone 3200
Vertical: NAVD 88 (Feet)
Notes: Data collected by Coastal Science & Engineering, Inc. via RTK GPS;
Data collected: October 2014

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Manteo, NC 27954

Project:
Beach Restoration To Protect
NC Highway 12 At Buxton
Dare County, NC

DRAWING TITLE:
BORROW AREA PLAN
& SECTIONS

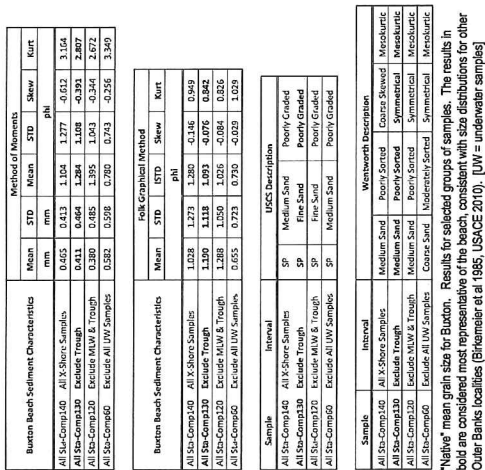


SCALE: AS SHOWN
DATE: 14 JULY 2015
DRAWN BY: JH
APPROVED BY:
PROJECT #: 2403

BEACH SEDIMENT SAMPLES

Station Average - All Samples - October 2014									
	Mean		STD		Shell		Gravel		
	mm	mm	mm	mm	%	%	%	%	
1760+00	0.524	0.589	5.3	4.8					
1790+00	0.600	0.608	5.4	5.1					
1820+00	0.704	0.623	6.9	8.1					
1840+00	0.749	0.621	7.4	8.5					
1870+00	0.709	0.610	6.6	9.6					
1890+00	0.586	0.638	5.7	5.3					
1900+00	0.626	0.608	6.0	7.1					
1920+00	0.674	0.637	6.7	6.5					
1940+00	0.583	0.617	6.3	5.4					
1980+00	0.548	0.619	5.5	5.5					
Average	0.630	0.617	6.2	6.6					

Station Average Excluding Trough					
	Mean		Shell (w/o Trough)		Gravel (w/o Trough)
	mm	mm	mm	%	
	1760+00	0.519	0.612	4.9	4.1
	1790+00	0.515	0.597	5.6	2.9
	1820+00	0.569	0.631	5.7	4.2
	1840+00	0.627	0.630	6.2	5.4
	1870+00	0.552	0.617	5.1	5.4
	1890+00	0.461	0.645	4.7	1.6
	1900+00	0.459	0.618	4.5	2.8
	1920+00	0.502	0.648	5.7	1.9
	1940+00	0.459	0.623	4.7	1.2
	1980+00	0.399	0.626	4.3	1.3
	Average	0.504	0.625	5.1	5.4



Project:
Beach Restoration To Protect
NC Highway 12 At Buxton
Dare County, NC

DRAWING TITLE:
BORROW AREA
GEOTECHNICAL DATA

SCALE:	AS SHOWN
DATE:	14 July 2015
DRAWN BY:	JJH
APPROVED BY:	
PROJECT #:	2403