

# Preliminary Results of the 2015 Reconnaissance Phase of Bureau of Ocean Energy Management's Atlantic Sand Assessment Project

29<sup>th</sup> Annual National Conference on Beach Preservation Technology Florida Shore and Beach Preservation Association Thursday, February 4, 2016 8:55 am

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# **CB&I** Introduction



AK Stee



Liberty Mutual. INSUBANCE

Our Green Cross for Safety® Honorees

2009

First 7

Exelon Generation.

A World of Solutions

# identified billions of cubic yards of sand resources on the Inner and OCS. *CB&I* is the most complete energy infrastructure focused company in the

2015

CRI

ExonMobil.

world. With 125 years of experience and the expertise of approximately 54,000 employees, CB&I provides reliable solutions while maintaining a relentless focus on safety and an uncompromising standard of quality.

#### NATIONAL SAFETY COUNCIL "GREEN CROSS FOR SAFETY" 2015 RECIPIENT

*CB&I* (NYSE: CBI) has designed, permitted, implemented, and monitored over

75 coastal restoration projects, more than any other firm in the US, having

















Outline

- 1) **Project Description**
- **Project Schedule and Milestones** 2)
- 2015 Reconnaissance Survey Equipment 3)
- 2015 Reconnaissance Survey Preliminary Results 4)
- 5) 2016 Design Level Survey Plan















- \$342 Million Allocated to DOI for Hurricane Sandy Recovery
- \$13.6 Million to BOEM
  - \$5 million for Atlantic Sand Assessment Project (ASAP)
  - \$3 million for initial round of State Cooperative Agreements
  - \$1.5 million for second round of State Cooperative Agreements (in 2016)
  - \$3.1 million to Division of Environmental Assessment
    - Environmental Assessment and monitoring













# **Project Description**



#### **Project Scope:**

- Collection of a minimum of 5,600 km of geophysical data on the OCS
  - Between 3-8 nm (4.8-12.9 km) from the shoreline
  - To a depth of approximately 90 ft (27.5 m)
  - Geophysical data will not be processed and interpreted (except for QA/QC subset)
- Collection of 350 geotechnical samples
  - 250 vibracores
    - Cores will be split, logged, sampled/analyzed, and photographed
  - 100 grab samples
  - Division of vibracore vs. grab samples to be determined upon geophysical survey results













- The geophysical and geotechnical survey will be conducted under two (2) phases totaling 5,600 km of data and 350 geotechnical samples
  - Reconnaissance level (2015): Approximately 4,200 km of geophysical data and 260 geotechnical samples (160 vibracores, 100 surface grab samples)
  - Design level (2016): Approximately 1,400 km of geophysical data and 90 geotechnical vibracore samples













#### Breakdown of Reconnaissance Geophysical and Geotechnical Data

Chata	Geopł	nysical	Geote	chnical
State	km	%	Number	%
MA	210	5%	14	5%
RI	50	1%	10	4%
NY	700	17%	49	18%
NJ	950	23%	52	20%
DE	200	5%	8	3%
MD	100	2%	8	3%
VA	200	5%	10	4%
NC	575	14%	37	14%
SC	475	11%	30	12%
GA	200	5%	12	5%
FL	490	12%	30	12%

Design-Level Data Acquisition will be allocated to:

- Develop potential borrow areas offshore New York and New Jersey to maintain 40% effort contract requirement
- Potentially develop one additional potential borrow area offshore a different state based on reconnaissance geophysical data analysis and BOEM direction













### **Project Timeline**





### What's Been Done?



	Geopł	nysical
State	Planned (km)	As-run (km)
MA	210	216
RI	50	54
NY	736	768
NJ	950	969
DE	200	203
MD	100	100
VA	200	201
NC	586	587
SC	475	511
GA	200	203
FL	505	527
Totals	4262	4338







		Geologic	
State	Vibracores	Surface Samples	Total Samples
MA	7	7	14
RI	6	4	10
NY	31	18	49
NJ	32	20	52
DE	5	3	8
MD	5	3	8
VA	6	4	10
NC	23	14	37
SC	19	11	30
GA	7	5	12
FL	19	11	30
Totals	160	100	260









- Project Kickoff: *November 19, 2014*
- State/Stakeholder Meetings: *January/February 2015*
- Final Data Acquisition Plan: *March 24, 2015*
- 2015 Reconnaissance Geophysical Survey (Complete)
  - Complete Geophysical Mobilization: April 16, 2015
  - Equipment Calibrations: April 17-18, 2015
  - Data Collection Begins Offshore FL: April 19, 2015
  - Complete Geophysical Survey Offshore MA: July 26, 2015
  - Complete Demobilization: July 30, 2015
- 2015 Reconnaissance Geologic Sampling Cruise (Complete)
  - Complete Geologic Sampling Cruise Mobilization: July 27-28, 2015
  - First Sample Collected Offshore FL: July 29, 2015
  - Complete Geophysical Survey Offshore MA: December 13, 2015
  - Complete Demobilization: *December 14, 2015*













# C-Nav 3050 DGNSS



- Augmented differential global navigation satellite system (DGNSS)
- Dual frequency satellite corrections
- Integrated into Hypack Navigation station
- Data is logged for post processing with Continually Operating Reference Stations (CORS)















# Applanix POS MV 320 GPS



Horizontal

Pitch and Roll

Vertical

Heave

- Motion reference unit mounted to the survey vessel
- Attitude, heading, heave, position and velocity
- Combining GPS with inertial measurements























- Pole mounted bathymetry and backscatter acquisition
- Chirp pulse modulation
- Integrate different data sources
  - Sound velocity
  - Altimeter
  - Motion reference unit
- .jsf backscatter
- X/Y/Z processed bathymetry













# BOEM EdgeTech 3200 Sub-Bottom Profiler with 512i Towfish



- High-resolution sub-bottom profile data
- Frequency Modulated pulse
- Full spectrum of frequency range
- Resolution: 0.06 to 0.10 m
- .jsf file format













EdgeTech 3200 data examples from the Atlantic Outer Continental Shelf offshore NC (top) and VA (bottom)



# EdgeTech 4200-HFL Sidescan Sonar

600kHz

0.45 m at 100 m

1.5 cm













- Dual acquisition system
- 300/600 kHz
- Controlled by a topside box running Discover software
- .jsf file format





300kHz

1.3 m at 150 m

3 cm

Image of the EdgeTech 4200 Sidescan Sonar towfish (left) and data example depicting a shipwreck and adjacent seafloor from the northern Gulf of Mexico, offshore Louisiana in approximately 35 ft of water depth (right).

Resolution

**Along Track** 

Across Track



- Used to identify magnetic anomalies within the study area
  - Potential hazards and cultural resources
- Necessary for geotechnical sample collection site clearance by a qualified archaeologist
- Hypack .raw file format







Geometrics G882 magnetometer (top) and magnetometer data examples (bottom) from the Maryland Outer Continental Shelf in approximately 20 m of water depth. Examples show a small magnitude multicomponent target (left) and a small magnitude dipolar target (right)















# 271B Pneumatic Vibracore System

- Air-driven vibratory hammer, aluminum H-beam and drilling bit with a cutting edge
- Core sample: 6.09 m (20 ft) in length, 10.16 cm (4 inches) in diameter
- gINT file format







# Northeast Regional As-Collected Data





# Mid-Atlantic/Southeast Regional As-Collected Data





# Florida Regional As-Collected Data





### **Florida Regional As-Collected Data**

































DRI	LLING L	.0G	DIVISIO	N		INS	TAL	ATION				SHEET 1 OF 1 SHEETS
PRO.	JECT					9.	SIZE	AND TYPE	OF BIT	3.0 In.		
Inver	ntory of Pote	ntial Bea	ch Nouri	shment and Co	astal CRI	10.	CO	ORDINATE	SYSTEM/DAT	UM HORIZONT	AL	VERTICAL
Rest	oration Sand	Source	s on the	Atlantic OCS	CD.		U	ЛМ		NAD 19	83	
BORI	ING DESIGNA	TION	. 1'	LOCATION COO	RDINATES	11.	MA	NUFACTUR	ER'S DESIGN	ATION OF DRILL		UTO HAMMER
F	L-BOEM-20	15-VC26		x = 470,058	Y = 3,396,823	-	Α	Ipine Pneu	imatic Vibrac	ore		ANUAL HAMMER
	merican Vibr	* acore S	ervices I	nc.	TRACTOR FILE NO.	12.	TOT	TAL SAMPL	ES	DISTORBED		IDISTORBED (OD)
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В	rian McCord											
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ļ		::-	SAND. f	ne grained, gue	artz, trace shell hash				Sample #1	. Depth = 2.9'		
	•	t	race silt,	(1.5" x 1.0") w	ole shell @ 4.0', gra	y		1	Mean (mm	): 0.17, Phi Sortir	ig: 0.67	,
ł	· [.	••••		(2.5Y-5/1	l, (SP).				Fines (230	): 1.52% (SP)		
ŀ	.  ·											
	5.0	·:-										
		· · ·	Shelly S	AND, fine grain	ed, quartz, trace silt,			2	Sample #2 Mean (mm	, Depth = 5.5' ); 0.28, Phi Sortir	a: 1.17	,
	6.0	÷. l	and she	iponents are sh Il fragments un	to 0.5", (1.0" x 0.5")	• л		-	Fines (230	): 1.53% (SW)		
ļ		·\	shell fra	gment @ 5.8',	gray (5Y-5/1), (SW).							
	ŀ		SAND 6	ne grained, gw	att trace shall back							
ŀ		·:::	tra	ace silt, gray (2.	5Y-5/1), (SP).			1				
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	10.0	·::										
			SAND	), fine grained,	quartz, trace shell	7			Sample #3	. Depth = 11.0		
ŀ	· ·	··· 4	tragmer ragments	nts, trace shell 1 s up to 0.5", 0.5	nash, trace silt, shell " whole shell ത 11 9			3	Mean (mm	): 0.16, Phi Sortir	ıg: 0.76	5
	12.1			dark gray (5Y	4/1), (SP).	'			Fines (230	): 3.33% (SP)		
		···	SANE	), fine grained,	quartz, trace shell			4	Sample #4 Mean (mm	), Deptn = 12.6 i): 0.17, Phi Sortir	g: 1.11	
	13.2	÷th,	whole sh	ell, shell fragm	ents and whole shells	Ч			Fines (230	): 3.87% (SW)		
-	14.2	<u>.</u> ]/	up to	0.75", olive gra	y (5Y-4/2), (SW).			5	Sample #5 Mean (mm	), Deptn = 13.6" i): 0.45, Phi Sortir	g: 2.03	1
		111	shell	components an	e shell hash, shell	1			Fines (230	): 3.06% (SW)		
[	:	1111	fragmen	ts and whole sl	nells up to 1.0", shell			6	Sample #6 Mean (mm	i, Depth = 15.5 0: 0.14. Phi Sortir	or: 0.83	
ŀ	·  .	비비니	SAND	), fine grained,	quartz, trace shell	-		~	Fines (230	): 7.10% (SP-SM	)	-
	17.0	JH.	fragmen	ts, trace shell h	ash, trace silt, trace							
			up to 0.7	5", 1.0" whole shells	shell @ 15.3', (1.5" x	11						
ŀ	·		0.5") who	ble shell @ 15.7	", dark gray (5Y-4/1)	11						
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#### DRAFT

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Project Name: Inventory	of Potential Bea	ch Nourishmen	t and Coastal	Restoratio	n					21		
Sand Sources on the Atla	intic OCS						Coast	al Plan	CB&I ning & E	nginee	ring, Ind	b.
Sampio Name: FL-BOEN	4-2015-VC26 #1						24	481 NV	V Boca F	Raton E	Blvd.	
Analyzed By: SMT								ph (	561) 391	1 8102		
Easting (ft):		Northing (ft):			Coo	rdinate System:			-	Elevation	(11):	
470,058	8	3	3,396,823	3			UTM					
USCS:	Munse	II: Wet - 2 Dry - 2 Washed - 2	.5Y-5/1 .5Y-7/1 .5Y-7/1	Comments								
Dry Weight (g):	Wash Weight	(g): Pa	n Retained (g)	): 	Sieve Los	s (%):	Fines (%): #200 - 1 6	Orga	nics (%):	Carbon	ates (%):	Shell Hash (%):
96.76	95.4	0	0.01		(	0.10	#230 - 1.5	52				
Sieve Number	Sieve S (Phi	Size i) (	Sieve Si (Millimete	ize ers)	G Re	rams tained	% Wei Retain	ght ed	Cum. Ret	Gram ained	is C	. % Weight Retained
3/4"	-4.2	5	19.03	<b>k</b>	(	00.0	0.00	)	0	.00		0.00
5/8"	-4.0	0	16.00	)	(	00.0	0.00	)	0	.00		0.00
7/16"	-3.5	0	11.31		(	0.00	0.00	)	0	.00		0.00
5/16"	-3.0	0	8.00		(	0.00	0.00		0	.00		0.00
3.5	-2.5	0	5.66		(	0.14	0.14		0	.14		0.14
4	-2.2	5	4.76		(	0.03	0.03		0	.17		0.17
5	-2.0	0	4.00		(	0.12	0.12		0	.29		0.29
7	-1.5	0	2.83		(	).12	0.12		0	.41		0.41
10	-1.0	0	2.00		(	).33	0.34		0	.74		0.75
14	-0.5	0	1.41		(	).48	0.50	)	1	.22		1.25
18	0.00	)	1.00		(	).46	0.48		1	.68		1.73
25	0.50	)	0.71		(	0.50	0.52		2	.18		2.25
35	1.00	)	0.50		(	).52	0.54		2	.70		2.79
45	1.50	)	0.35		1	1.15	1.19		3	.85		3.98
60	2.00	0	0.25		1	3.89	4.02		7	.74		8.00
80	2.50	)	0.18		2	3.13	23.9	D	30	).87		31.90
120	3.00	)	0.13		5	2.74	54.5	1	83	3.61		86.41
170	3.50	)	0.09		1	0.87	11.23	3	94	4.48		97.64
200	3.75	5	0.07		(	).65	0.67		95	5.13		98.31
230	4.00	0	0.06		(	0.16	0.17		95	5.29		98.48
Phi 5	Phi 1	6	Phi 25	5	P	hi 50	Phi 7	5	Ph	ni 84		Phi 95
3.38	2.98	В	2.90		2	2.67	2.36		2	.17		1.63
Moment	Mea	n Phi	Me	ean mn	n	Sor	ting	S	kewnes	s	ŀ	Kurtosis
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PRO	JECT					9. 8	SIZE A	ND TYPE	OF BIT	3.0 In.		
Inve	ntory of Pote	ntial Bea	ch Nouri	ishment and Coa	istal CBI	10.	COO	RDINATE	SYSTEM/DATU	M HORIZON	AL	VERTICAL
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A	American Vibr	acore S	ervices, li	nc.		12.	тоти	L SAMPL	ES			
4. NAM	E OF DRILLE	R				13.	тот/		R CORE BOXE	5		
S. DIRE	ECTION OF BO	RING		DEG. FROM	BEARING	14.	ELEV	ATION GI	ROUND WATER	1		
	VERTICAL			VERTICAL		15.	DATE	BORING	1	STARTED	CO	MPLETED
	INCLINED			!	!					08-15-15 13:	20	08-15-15 13:23
6. THIC	CKNESS OF O	VERBUR	DEN	0.0 Ft.		16.	ELEV	ATION TO	OP OF BORING	Not Deterr	nined	
7. DEP	TH DRILLED I	NTO RO	ск ()	).0 Ft.		17.	TOT	L RECOV	ERY FOR BOR	NG 19.9 Ft		
в. тот	AL DEPTH OF	BORING	20.	.0 Ft.		18.	SIGN	ATURE A	ND TITLE OF I	NSPECTOR		
		9				<u> </u>		<b>K</b> <sup>m</sup>				
ELEV.	DEPTH	0 D	CL opths and	ASSIFICATION O elevations base	F MATERIALS	R	ĚC.	X		REMAR	KS	
	0.0	3						<b>8</b> 2				
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			SAND. fi	ine grained, guar	tz, trace shell hash							
		···	trace silt,	, silt distributed i	n silty pockets up to	.		1	Sample #1, Mean (mm);	Depth = 3.0' 0.20. Phi Sorti	or: 0.56	
	ŀ		).25" and fragm	i throughout laye	r, (0.5" x 0.25") shel ( (5Y-5/1), (SP).	'			Fines (230):	1.97% (SP)		
		·:::	nagn	indine (gg 2:00 ; gr 0)	(or or i), (or ).							
	⊢ ŀ											
	6.0											
	ŀ	·::										
	r i	••••	SAND, fi	ne grained, quar	tz, trace shell hash,				Sample #2,	Depth = 7.7	- 0.00	
	-		trace si	(5Y-5/1), (	ment (g) 8.0°, gray (SP).			Z	Fines (230):	2.49% (SP)	ig: 0.60	
		···							Sample #2	Depth = 0.61		
	9.8	ni, s	AND, fin	e grained, quart	z, little silt, trace she	_ ا		3	Mean (mm):	0.17, Phi Sorti	ng: 0.64	
	10.2	···)	nash, 1.0'	" silt pocket @ 9 7', dark grav (5)	.5', clayey lamina @ (-4/1), (SM)	H		4	Fines (230): Sample #4	15.92% (SM)		
	-	:::\ <b>`</b> -	SAND, f	fine grained, qua	rtz, little shell hash,	-11			Mean (mm):	0.35, Phi Sorti	ig: 1.41	
	- 1		trace she shell, she	ell fragments, tra ell fragments up i	to 0.5", whole shells				Fines (230): Sample #5.	2.72% (SW) Depth = 12.4		
			up to 0.75	5", 3 whole shells	@ 10.1' (2 = 2.0" x			5	Mean (mm)	0.19, Phi Sorti	ng: 0.90	1
	[ ]	·::	fragment	= 1.5" x 0.5"), ( t @ 10.1', dark g	ray (5Y-4/1), (SW).				Fines (230):	4.52% (5₩)		
	14.6		SAND, fi	ne grained, quar	tz, trace shell hash,				Convolution	Death - 4E C		
	15.4	11fl\_	a due alli,	(2.5Y-4/1),	(SW).	Л	F	6	Sample #6, Mean (mm):	0.17, Phi Sorti	ng: 0.80	
			SAND, fil trace s	ne grained, quar silt, dark grav (5)	tz, trace shell hash, Y-4/1), (SP-SM)	Л	F	7	Fines (230): Sample #7	7.97% (SP-SM	)	
	16.5	- Wh	Shelly S	AND, fine graine	d, quartz, trace silt,	7	⊢	'	Mean (mm):	0.56, Phi Sorti	ig: 1.47	,
	17.3	-	snell co fragment	its up to 0.75", d	ark gray (2.5Y-4/1).	ŀ	F	8	Fines (230): Sample #8	5.60% (SW-SM Depth = 16.8	()	
	- 1	AL	CANID 6	(SW-SM	A).	1			Mean (mm)	0.20, Phi Sorti	g: 1.15	i
	LE		shell hash	ne grained, qua h, trace silt, 1.0*	whole shell @ 17.2,				Fines (230):	7.56% (SW-S0	9	
	19.9		da CLAV 5	ark gray (2.5Y-4/	1), (SW-SC).							
	20.0/	<u></u>	dark	greenish gray (	5GY-4/1), (CL).	1						
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	LI			End of Br	ring							
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#### DRAFT

Gra Depths and	elevations b	etric Re ased on mea	port asured valu	Jes					R			
Project Name: Inventory	of Potential Bea	ch Nourishmen	t and Coasta	i Restorati	ion							
Sand Sources on the Atla	ntic OCS						Coast	al Plan	CB&I	nainee	ina Ina	
Sample Name: FL-BOEN	-2015-VC16 #1						2	481 NV	V Boca F	Raton E	Blvd.	~
Analysis Date: 10-12-15								Boca	Raton, F 561) 391	L 3343 1 8102	1	
Easting (ft):		Northing (ft):			Coo	dinate System:		pint	100.000	Elevation (	ft):	
480,634	4	3	3,323,43	3			UTM					
USCS: SP	Munse	Wet - Dry - Washed -	5Y-5/1 5Y-7/1 5Y-8/1	Comment	ts:							
Dry Weight (g):	Wash Weight	(g): Pa	n Retained (	9):	Sieve Los	s (%):	#200 - 2.1	3 Organ	nics (%):	Carbon	atos (%):	Shell Hash (%):
Stars Number	Sieve	Size	Sieve S	Size	G	rams	% Weight		Cum, Gra		s C	. % Weight
Sieve Number	(Ph	i)	(Millime	ters)	Re	tained	Retain	ed	Ret	ained		Retained
3/4"	-4.2	5	19.0	3	(	0.00	0.00	)	0	.00		0.00
5/8"	-4.0	0	16.0	0	(	0.00	0.00	)	0	.00		0.00
7/16"	-3.5	0	11.3	1	(	0.00	0.00	)	0	.00	_	0.00
5/16"	-3.0	0	8.00	)	(	0.00	0.00		0	.00	_	0.00
3.5	-2.5	0	5.66	5	(	0.00	0.00	)	0	.00	_	0.00
4	-2.2	5	4.76	5	(	0.00	0.00		0	.00	_	0.00
5	-2.0	0	4.00	)	(	0.00	0.00		0	.00	_	0.00
7	-1.5	0	2.83	3	(	0.03	0.03		0	.03	_	0.03
10	-1.0	0	2.00	,	(	0.04	0.04		0	.07	_	0.07
14	-0.5	0	1.41		(	0.08	80.0		0	.15	_	0.15
18	0.0	0	1.00	,	(	0.14	0.15		0	.29	_	0.30
25	0.5	0	0.71		(	0.34	0.36		0	.63	_	0.66
35	1.0	0	0.50	,	1	1.30	1.44		1	.99	_	2.10
45	1.5	0	0.35		4	F. 40	4.78		0	.51	_	00.07
80	2.0		0.25	,	2	0.49	10.3	9		2.00	_	23.27
120	2.0	0	0.10	,	3	4.00	30.0	2	00	7.40		02.49
170	3.5	0	0.00	,	5	1 44	4.70	, ,	01	1.84	+	97.18
200	3.7	5	0.08	,	(	).65	0.69		92	2.49	+	97.87
230	4.0	0	0.06	5	(	).15	0.16		92	2.64		98.03
		-	0.00									
Phi 5	Phi 1	16	Phi 2	5	P	hi 50	Phi 7	5	Pt	ni 84		Phi 95
3.27	3.27 2.87 2.73					2.36	2.02		1	.78		1.30
Moment	Mea	n Phi	м	ean m	m	Sor	ting	S	kewnes	s	ĸ	Kurtosis
Statistics	2.	31		0.20		0.	56		-0.99			6.25







































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DR	ILLING	LOG	DIVISION	INS	STAL	LATION				SHEET 1 OF 1 SHEETS
. PRO	JECT			9.	SIZ	AND TYPE	OF BIT	3.0 ln.		
Inve	entory of Pot	ential B	Beach Nourishment and Coastal	10.	CO	ORDINATE	SYSTEM/DAT	UM HORIZON	TAL	VERTICAL
Res	storation San	d Sour	ces on the Atlantic OCS		L.	ЛТМ		NAD 1	983	
2. BOR	RING DESIGN	ATION	LOCATION COORDINATES	11.	MA	NUFACTUR	ER'S DESIGN	ATION OF DRILL		AUTO HAMMER
ł	FL-BOEM-20	015-VC	C10 X = 505,911 Y = 3,247,612		1	Apine Pneu	matic Vibrac	ore		MANUAL HAMMER
3. DRI	LLING AGEN	CY	CONTRACTOR FILE NO.					DISTURBED		INDISTURBED (UD)
	American Vit	bracore	Services, Inc.	12.	. 10	TAL SAMPL	25			
4. NAN	ME OF DRILLI	ER		13.	то	TAL NUMBE	R CORE BOX	ES		
	Justin Rober	tson		14.	EL	EVATION G	ROUND WATE	R		
5. DIR	VERTICAL	ORING	VERTICAL					STARTED		OMPLETED
	INCLINED			15.	DA	TE BORING		08-14-15 13	:59	08-14-15 14:01
6. THE	CKNESS OF	OVERB	URDEN 0.0 Et	16.	EL	EVATION TO	OP OF BORIN	Not Deter	mined	
			0.011		-			107 Deter	*	
7. DEP	TH DRILLED	INTO R	ROCK 0.0 Ft.	17.		TAL RECOV	ENT FOR BO	19.7	L	
в. тот	AL DEPTH O	F BORI	NG 20.0 Ft.	18.	. 810	MATURE A	ND TITLE OF	INSPECTOR		
		0		-		6 <sup>11</sup>				
ELEV. (ft)	DEPTH	EGEN	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	105	RÊC.	AMPL		REMAI	RKS	
	0.0	-	SAND fine grained quartz some shall back	.			Sample #1	Depth = 0.3'		
	0.7	· · · ·	trace shell fragments, trace silt, shell fragment	its /		1	Mean (mm	): 0.31, Phi Sort	ing: 1.1	6
	Γ	$\cdot \cdot \cdot$	up to 0.5", dark gray (5Y-4/1), (SW).				Fines (230	): 1.30% (SW)	_	
	F	•••	SAND, tine grained, quartz, little shell hash	-			Sample #2	, Depth = 2.5'		
		•••••	up to (1.0" x 0.5"), (1.25" x 1.0") shell fragment	nt		2	Mean (mm	): 0.25, Phi Sort	ing: 0.8	88
	t	••••	@ 1.8', (1.5" x 1.0") shell fragment @ 3.2', gr	ау			Fines (230	j. 1.47% (SVV)		
	4.0	••••	(5Y-5/1), (SW).				Sample #3	Depth = 4.4'		
	4.9	••••	SAND, fine grained, quartz, trace shell hash trace silt gray (EV-5/4) (SP)	•		3	Mean (mm	): 0.20, Phi Sort	ing: 0.5	54
			SAND, fine grained, guartz, little shell hash	_			Fines (230	): 1.74% (SP)		
	L	•••••	trace shell fragments, trace silt, shell fragmer	nts		4	Mean (mm	; Depth = 5.7' ): 0.22. Phi Sort	ina: 0.f	51
	6.5		up to 0.75", 0.25" silty pocket @ 5.6', gray	_		$\vdash$	Fines (230	): 1.86% (SP)	- g. o.t	
	ŀ	<b>t-</b> ]	SAND, fine grained, quartz, little shell hash				Sample #5	, Depth = 7.3		×0
		[•][•]	trace shell fragments, trace silt, shell fragmer	ts		5	Fines (230	): 0.22, Phi Soft ): 4.95% (SW-S	ng: 1.2 M)	18
	8.6	÷	up to 0.75", (1.25" x 1.0") whole shell @ 7.2	, L		6	Sample #6	, Depth = 8.4'	,	
	-		(5Y-4/1). (SW-SM).	ſ			Mean (mm	): 0.46, Phi Sort	ing: 1.8	81
		11111	SHELL, trace silt, shell components are she	<b> </b>		7	FINes (230 Sample #7	Denth = 9.6'		
	10.5	1111	hash and shell fragments up to 0.75", (1.25"	X			Mean (mm	): 0.16, Phi Sort	ing: 1.0	0
	-		(SW).	<b>*</b>  [			Fines (230	): 11.23% (SM)		
			SAND, fine grained, quartz, little shell hash							
	12.4		little silt, (2.0" x 1.5") shell fragment @ 8.9', dort groopich group (10X 4(1) (200)							
	_		Clayey SHELL, shell components are shell ha	shГ						
	13.7	11	and shell fragments up to (1.5" x 1.0"), (3.0"	x						
	-		1.75") shell fragment @ 11.0', 1.5" whole sh	ell [[						
	L		CLAY, little shell hash, dark gray (N-4/0), (CL	5/						
	Γ		Clayey SHELL HASH, little sand, 1.5" whole							
	16.6	114	sneii @ 15.0', 3.0" clay pocket @ 16.4', darl gray (N-4/0) (GC)	¢						
	10.0	9/10	gray (n=no), (Go).	-						
	ſ		SHELL HASH, little clay. little sand, little she							
	ŀ		fragments, shell fragments up to 0.5", (2.5"	x						
			1.5") shell fragment @ 19.7', dark gray (N-4/	J),						
	10.7		(60).							
	20.0	•////	No Recovery.	~						
		ΓĽ		_						
	F		End of Boring							
	L		-							
	ŀ									
	L									
	[									

#### DRAFT

Gra Depths and	elevations b	etric Re ased on me	eport asured value	Jes					PR			
Project Name: Inventory	of Potential Bea	ch Nourishme	nt and Coasta	i Restorati	on							
Sand Sources on the Atla	ntic OCS						Coast	al Plan	CB&I	nainee	ring Inc	
Sample Name: FL-BOEN	-2015-VC10 #2	:					2	481 NV	V Boca I	Raton E	Blvd.	
Analysis Date: 10-28-15					-			Boca	Raton, F	L 3343	1	
Analyzed By: DA Easting (ft):		Northing (ft):			Coo	rdinate System:		pir(	301/33	Elevation (	π):	
505,91	1		3,247,61	2			UTM					
USCS: SW	Munse	Wet Dry Washed	- 5Y-5/1 - 5Y-6/1 - 5Y-7/1	Comment	ts:							
Dry Weight (g):	Wash Weight	(g): Pi	an Retained (	) 9):	Sieve Los	s (%):	Fines (%): #200 - 1.5 #230 - 1.4	58 <sup>Orga</sup>	nics (%):	Carbon	atos (%):	Shell Hash (%):
33.02	Ciouro I	Cinc.	Ciouro C	Nino	0		#230 - 1	abt	Cum	Crom		% Moight
Sieve Number	(Ph	512e i)	(Millime	ters)	Re	tained	Retain	ed	Ret	ained	s	Retained
3/4"	-4.2	5	19.0	3	(	0.00	0.00	)	0	.00		0.00
5/8"	-4.0	0	16.0	0	(	0.00	0.00	)	0	.00		0.00
7/16"	-3.5	0	11.3	1	(	0.00	0.00	)	0	.00		0.00
5/16"	-3.0	0	8.00	)	(	0.00	0.00	)	0	.00		0.00
3.5	-2.5	0	5.66	6	(	0.50	0.50	)	0	.50		0.50
4	-2.2	5	4.76	5	(	0.06	0.06	;	0	.56		0.56
5	-2.0	0	4.00	)	(	).16	0.16	;	0	.72		0.72
7	-1.5	0	2.83	3	(	).21	0.21		0	.93		0.93
10	-1.0	0	2.00	)	(	).85	0.85	i	1	.78		1.78
14	-0.5	0	1.41		(	).86	0.86	6	2	.64		2.64
18	0.0	0	1.00	)	1	1.54	1.54	ł	4	.18		4.18
25	0.5	0	0.71		1	1.73	1.73	•	5	.91		5.91
35	1.0	0	0.50	)	1	3.09	3.10	)	9	.00		9.01
45	1.5	0	0.35	5	6	6.06	6.07	,	15	5.06		15.08
60	2.0	0	0.25	5	1	8.54	18.5	7	33	3.60		33.65
80	2.5	0	0.18	3	4	3.13	43.2	1	76	6.73		76.86
120	3.0	0	0.13	3	1	8.01	18.0	4	94	4.74		94.90
170	3.5	0	0.09	)		3.01	3.02	2	97	7.75		97.92
200	3.7	5	0.07	7	0	0.50	0.50	)	98	3.25		98.42
230	4.0	0	0.06	6	(	0.11	0.11		98	3.36		98.53
Phi 5	Phi 1	16	Phi 2	5	P	hi 50	Phi 7	5	Pt	ni 84		Phi 95
3.02	2.7	0	2.48	3	2	2.19	1.77		1	.52		0.24
Moment	Mea	n Phi	м	ean m	m	Sor	ting	S	kewnes	s	ĸ	lurtosis
Statistics	:	2		0.25		0.	88		-2.24			10.29































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			DIVISIO	IN I			194	STA	ATION				SHEET 1
DR	ILLING	LOG	DIVISIO					ISTAL	LATION				OF 1 SHEETS
1. PRO	JECT						9.	SIZ	AND TYPE	OF BIT	3.0 In.		
Inve	entory of Pote	ential E	leach Nour	ishment an	d Coas	stal CR	10	). CO	ORDINATE	SYSTEM/DAT	UM HORIZONT	AL	VERTICAL
Res	storation San	d Sour	ces on the	Atlantic OC	s				ЛТМ		NAD 19	83	
2. BOR	RING DESIGN	ATION		LOCATION	COORD	NATES	11	1. MA	NUFACTUR	ER'S DESIGN	ATION OF DRILL		UTO HAMMER
3. DRI	LUNG AGEN	015-VC	15	X = 518,	CONTR	Y = 3,224,812	_		vpine Pneu	imatic vibrac	DISTURBED		IDISTURBED (UD)
	American Vit	oracore	Services.	Inc.	CONTR		12	2. ТО	TAL SAMPL	ES	DIGTORDED		
4. NAM	E OF DRILL	ER					13	з. то		ER CORE BOX	ES		
ł	Brian McCor	d					14	4. EL	EVATION G	ROUND WATE	R		
5. DIR IX	ECTION OF B	ORING		DEG. FRO	M	BEARING	-				STARTED	co	MPLETED
	INCLINED						15	5. DA	TE BORING		08-14-15 12:3	32	08-14-15 12:36
6. THI	CKNESS OF	OVERB	JRDEN	0.0 Ft.			16	5. EL	EVATION TO	OP OF BORIN	Not Determ	nined	
7. DEP	TH DRILLED		оск (	0.0 Et			17	7. то	TAL RECOV	ERY FOR BOI	ting 17.5 Ft		
				0.011.			18	B. SIG	SNATURE A	ND TITLE OF	INSPECTOR		
в. тот	AL DEPTH O	F BORI	NG 20	.0 Ft.				E	BF				
ELEV. (ft)	DEPTH	COEND	CL Depths and	ASSIFICAT	10N OF	MATERIALS	lues	RÊC.	OX OR		REMARI	KS	
	0.0		CUEL I		a and	fine grained	out -	-	<b>6</b> 0	Sample #1	Denth = 0.3'		
	0.7	i::h	trace sh	ell fragmer	nts, trac	ce silt, trace who	le r	-	1	Mean (mm	): 0.59, Phi Sortin	g: 1.67	
	1.7	$\cdots$	shell, wh	ole shells u	up to 1.	0", shell fragme	nts /		2	Fines (230 Sample #2	): 1.30% (SW) Depth = 1.1'		
	2.0	÷÷	SAND,	fine grained	ay (2.5 d, quart	tz, little shell has	h, /			Mean (mm	): 0.34, Phi Sortin	g: 1.15	1
	L		Choller C	e silt, dark	gray (5	Y-4/1), (SW).			4	Fines (230 Sample #3	): 1.60% (SW) Depth = 1.8'		
	3.7		shell co	omponents	are sh	ell hash and she	",  ,	1		Mean (mm	): 0.48, Phi Sortin	g: 1.41	
			fragments	up to 0.5"	dark g	ray (5Y-4/1), (S	<b>W)</b> .]		5	Fines (230 Sample #4	): 1.18% (SW) Denth = 2.7		
	5.1		fragmer	o, ime grail nts, trace s	hell ha	ariz, trace snell sh, trace silt, she	al  -	4		Mean (mm	): 0.24, Phi Sortin	g: 0.77	
		•••	fragmen	ts up to 0.	25", 1.5	5" shelly pocket	e			Fines (230 Sample #5	): 1.19% (SP) Depth = 4.4'		
	[		0.75° a	nd shell fra	gments	s up to 0.25*, gra	y I		6	Mean (mm	): 0.26, Phi Sortin	g: 0.91	
	77		SAND	(5Y-	5/1), (8	SP).	_			Fines (230 Sample #6	): 2.05% (SW) Denth = 5.9'		
	- 8.1	۲üh	distribut	ted in lamin	ae, da	rk gray (2.5Y-4/1	j.  E		8	Mean (mm	): 0.35, Phi Sortin	g: 1.19	1
	8.8		SAND	fine grainer	(SW).	7 little shell has		1	7	Fines (230 Sample #7	): 2.37% (SW) Depth = 8.5'		
	9.8		trace sh	ell fragmer	nts, trac	ce silt, trace who	le		8	Mean (mm	): 0.48, Phi Sortin	g: 1.62	1
	- 0.0		shell, wh	ole shells u 0.5", derk	up to 1.	0", shell fragme 5Y-4/1), (SW)	nts	1		Fines (230 Sample #8	): 3.63% (SW) Depth = 9.2'		
		- HI	SAND, f	ine grained	, quart	z, trace shell has	sh,		9	Mean (mm	): 0.21, Phi Sortin	g: 0.73	1
	11.6		trace s	silt, dark gra	ay (2.5) grainer	Y-4/1), (SP-SM) Louartz, trace s	-	-		Fines (230 Sample #9	): 4.93% (SP-SM Depth = 10.5	)	
		tRill	shell com	ponents are	e shell t	fragments up to	1.0"			Mean (mm	): 0.22, Phi Sortin	g: 0.87	
	_ 13.1	LHT	and whole	e sheils up 1', dark ora	to 0.5*, v (2.5)	, 0.5" clay pocke (-4/1), (SW)	۱۵,	1		+ines (230	): 0.23% (SW-SN	y .	
	L	$\cdots$	SAND, f	ine grained	, quart	z, trace shell has	sh,						
			SAND f	silt, dark gra ine grained	ay (2.5 L quart	Y-4/1), (SP-SM) z. trace shell hav	h.		10	Sample #1 Mean (mm	0, Depth = 14.5 ): 0.17, Phi Sortin	m 0.65	
	F	$\cdots$	trace si	It, silt and s	shell ha	ish increases with	h		.0	Fines (230	): 3.40% (SP)	-g. 0.00	
	- 16.2	····	depth Shelly St	, dark gray	(2.5Y- and she	4/1), (SW-SM).							
			shell ha	sh and she	ll fragn	nents up to 1.5",	2	1	11	Sample #1 Mean (mm	1, Depth = 17.0'	m 2.00	
	17.5		(3.0" x 2.	.0") shell fra ole shell @	agment	ts @ 12.2', (1.75 dark grav (5Y-4)	1).	1		Fines (230	): 2.53% (SW)	g. <b>∠.</b> 08	
	F			and a real of	(GM).		<sup>-</sup> 72						
	L		fragme	D, fine grain nts. trace s	ned, qu hell ha	artz, trace shell sh. trace silt_she							
	20.0		fragment	ts up to 1.0	, (1.0	x 0.5") whole sh	nel						
	20.0	⊢ h	Sandy SH	@ 13.4', gr	ay (5Y-	-5/1), (SP). nell components	are	1					
	- I		whole s	hells and s	hell fra	gments up to 1.0	ř.						
			(2.0" x 1	.5") shell fr	agmen	ts @ 17.2" & 17. nts @ 17.1" & 17	4.						
			(1.20 X	gray (2.5	5Y-5/1)	, (GW).	- <u>-</u> '						
	-			No	Recove	ery.							
	L			End	of Per	ina							
				EAC		and a second		1					

#### DRAFT

Gra Depths and	elevations b	etric R ased on m	eport easured val	ues					P	T		
Project Name: Inventory	of Potential Bea	ch Nourishm	ent and Coast	al Restorat	ion							
Sand Sources on the Atla	intic OCS						Coast	tal Plan	CB&	i Inginee	ring In	c .
Sample Name: FL-BOEN	-2015-VC15	•					2	481 NV	V Boca	Raton E	Blvd.	<b>U</b> .
Analysis Date: 09-30-15								Boca I	Raton, F	E 3343	81	
Analyzed By: SMT Easting (ft):		Northing (f	th:		Coo	rdinate System:		pint	001/00	Elevation	m):	
518,70	6		3,224,81	12			UTM					
uscs: SP	Muns	<sup>oll:</sup> We Dr Washe	t - 5Y-5/1 y - 5Y-7/1 d - 5Y-7/1	Commen	ts:							
Dry Weight (g):	Wash Weight	(g):	Pan Retained (	g):	Sieve Los	s (%):	Fines (%): #200 - 1 1	Organ	nics (%):	Carbon	ates (%):	Shell Hash (%):
92.86	91.8	30	0.02	2		0.02	#230 - 1.	19				
Sieve Number	Sieve (Ph	Size i)	Sieve S (Millime	Size ters)	G Re	rams tained	% Wei Retair	ight ied	Cum	. Gram tained	s C	. % Weight Retained
3/4"	-4.2	25	19.0	3	(	0.00	0.00	)	0	00.0		0.00
5/8"	-4.0	0	16.0	0	(	0.00	0.00	)	0	0.00		0.00
7/16"	-3.5	i0	11.3	1	(	0.00	0.00	)	0	0.00		0.00
5/16"	-3.0	0	8.00	)	(	0.00	0.00	)	0	00.0		0.00
3.5	-2.5	i0	5.66	3	(	0.00	0.00	)	0	00.0		0.00
4	-2.2	25	4.76	6	(	0.06	0.06	6	0	).06		0.06
5	-2.0	0	4.00	)	(	0.00	0.00	)	0	).06		0.06
7	-1.5	i0	2.83	3	(	0.23	0.25	5	0	).29		0.31
10	-1.0	0	2.00	)	(	0.35	0.38	3	0	).64		0.69
14	-0.5	<b>i0</b>	1.41	1		1.00	1.08	3	1	.64		1.77
18	0.0	0	1.00	)		1.29	1.39	9	2	2.93		3.16
25	0.5	0	0.71	1		1.86	2.00	)	4	.79		5.16
35	1.0	0	0.50	)	1	2.70	2.91	1	7	.49		8.07
45	1.5	0	0.35	5		5.84	6.29	)	1	3.33		14.36
60	2.0	0	0.25	5	1	6.97	18.2	7	3	0.30		32.63
80	2.5	0	0.18	3	4	0.33	43.4	3	7	0.63		76.06
120	3.0	0	0.13	3	1	7.60	18.9	5	8	8.23		95.01
170 E	3.5	0	0.09	9	:	3.08	3.32	2	9	1.31		98.33
200	3.7	5	0.07	7	(	0.39	0.42	2	9	1.70		98.75
230	4.0	0	0.06	6	(	0.06	0.06	6	9	1.76		98.81
BOEM												
Phi 5	Phi	16	Phi 2	25	P	hi 50	Phi 7	'5	P	hi 84		Phi 95
3.00	2.7	1	2.49	)	1	2.20	1.79	)	1	.54		0.46
Moment	Mea	in Phi	м	ean m	m	Sor	ting	S	kewnes	s	ł	Kurtosis
Statistics	2	.05		0.24		0.	77		-1.78			7.8





































			DF	RAF	T				Borin	ig Designa	ation	FL-BO	EM-2	015-VC0	4
DRI	LLING	LOG	DIVISIO	DN .			INST	TALI	ATION					SHEET 1	
I. PRO.	JECT					-		8175		OF BIT	2.01			OF 1 S	HEETS
Inver	ntory of Pot	ential B	each Nour	ishment and	Coastal	CRI	10.	CO	ORDINATE	SYSTEM/DAT	UM	HORIZON	NTAL	VERTICA	
Rest	oration San	d Sourc	es on the	Atlantic OCS	3			U	TM			NAD 1	1983		
. BORI	ING DESIGN	ATION		LOCATION C	OORDINATE	15	11.	MA	NUFACTUR	ER'S DESIGN	ATION	OF DRILL	- []	AUTO HAMA	MER
DRIL	L-BOEM-20	015-VC	04	X = 560,59	6 Y = 3,0	084,074 R FILE NO.		A	Ipine Pneu	imatic Vibrac	DIST	IRBED	<u> </u>	MANUAL HA	ED (UD)
A	merican Vil	bracore	Services, I	Inc.			12.	TOT	TAL SAMPL	.ES			1		
NAMI	E OF DRILLI	ER					13.	тот		ER CORE BOX	(ES				
B	rian McCor	d		DEG EROM	DEA	PING	14.	ELE	VATION G	ROUND WATE	ER				
	ERTICAL	ORING		VERTICAL	DEA	AIN O	48	DAT			STAR	TED	C	OMPLETED	
	NCLINED							-	E DOMING		07	31-15 10	0:11	07-31-15	10:13
THIC	KNESS OF	OVERBU	IRDEN	0.0 Ft.			16.	ELE	VATION T	OP OF BORIN	G	Not Dete	rmined		
DEPT	TH DRILLED	INTO R	оск (	0.0 Ft.			17.	TOT	TAL RECOV	ERY FOR BO	RING	19.6	Ft.		
тот/	AL DEPTH O	F BORIN	NG 20	.0 Ft.			18.	SIG	NATURE A	ND TITLE OF	INSPE	CTOR			
		9	2.4					- 1	64						
₩.	<b>DEPTH</b> (ft) 0.0	LEGEN	CL Depths and	ASSIFICATIO	ON OF MATE	RIALS easured value	R	ĚC.	BOX O			REMA	RKS		
-	- - -								1	Sample #1 Mean (mm Fines (230	, Dept 1): 0.54 1): 2.06	h = 3.0' 1, Phi Sor 1% (SW)	ting: 0.9	6	
-	- - -		Shelly S/ shell, trac whole she @ 8.7', 1.	AND, fine gra ce silt, shell o ells up to 0.5" 0" clay pocke (5Y-3/	ained, quart component , (1.0" x 0.5 et @ 11.8', ` 1), (SW).	z, little whole is shell hash, 5°) whole shel very dark gray	l r		2	Sample #2 Mean (mm Fines (230	2, Dept 1): 0.57 1): 1.99	h = 6.0' ', Phi Sori % (SW)	ting: 0.8	19	
-	- - -								3	Sample #3 Mean (mm Fines (230	8, Dept n): 0.53 0): 1.65	h = 9.0' 3, Phi Sori 5% (SW)	ting: 0.9	94	
	12.3		SAND, fi trace shell up to 0.25 0.5" clay	ine grained, d I fragments, 1 ", (1.0" x 0.5 / pocket @ 1 (SP	quartz, som trace silt, si ") shell frag 3.6', dark g 2-SM).	e shell hash, hell fragments ment @ 13.8 ray (5Y-4/1),			4	Sample #4 Mean (mm Fines (230 Sample #5	l, Dept i): 0.32 i): 6.16	h = 13.2' 2, Phi Sori 3% (SP-Si b = 14.8'	ting: 0.8 M)	85	
T	15.5		SAND, fin	e grained, qu	uartz, little o	day, little shel			5	Mean (mm	): 0.27	, Phi Sor	ting: 1.0	3	
	- 18.3		Clayey Si shell frag Clayey Si shell frag to 2.0",	ace sneil fra ts up to 0.75" 15.0", clay di nd increases (5Y-4/ HELL, little s ments up to dark greenisi HELL FRAG	(3.0" x 1.0 stributed in with depth, (1), (SC). ilt, shell cor 1.0" and with gray (10Y MENTS, sh	ve sint, snell )") shell hash pockets up to , dark gray mponents are hole shells up (-4/1), (GC). ell fragments	Г Л			Fines (230	)): 14.4	17% (SC)			
	20.0		up to 2	End o	gray (10Y- ecovery. of Boring	t₀/1), (GC)	F								
	ORM 183	6 M		D FOR TH	IE FLOR	IDA DEP									

#### DRAFT

Granularmetric Report Depths and elevations based on measured values						CBL							
Project Name: Inventory of Potential Beach Nourishment and Coastal Restoration													
Sand Sources on the Atlantic OCS						CB&I Coastal Planning & Engineering, Inc. 2481 NW Boca Raton Blvd. Boca Raton, FL 33431 pb (561) 391 8102							
Sample Name: FL-BOEM-2015-VC04 #2													
Analysis Date: 10-29-15													
Analyzed By: SMT Easting /#k						pn (501) 391 8102							
560,596 3,084,074						UTM							
USCS: Munsell: Wet - 5Y-3/1 Dry - 5Y-5/1 SW Washed - 5Y-5/1													
Dry Weight (g):	Wash Weight (g):		Pan Retained (g):		Sieve Los	s (%):	Fines (%): #200 - 2.03		nics (%): Carbonates		itos (%):	Shell Hash (%):	
94.71	92.8	36	0.00	)		0.02	#230 - 1.99						
Sieve Number	Sieve Size (Phi)		Sieve Size (Millimeters)		G Re	rams tained	% Weight Retained		Cum. Grams Retained		s C	C. % Weight Retained	
3/4"	-4.25		19.03		(	0.00	0.00		0.00			0.00	
5/8"	-4.0	00	16.00		0.00		0.00		0.00			0.00	
7/16"	-3.50		11.31		0.00		0.00		0.00			0.00	
5/16"	-3.00		8.00		(	0.00	0.00		0.00			0.00	
3.5	-2.50		5.66		(	0.00	0.00		0.00			0.00	
4	-2.25		4.76		(	0.07	0.07		0.07			0.07	
5	-2.00		4.00		0.18		0.19		0.25			0.26	
7	-1.50		2.83		0.59		0.62		0.84			0.88	
10	-1.00		2.00		1.04		1.10		1.88			1.98	
14	-0.50		1.41		4.21		4.45		6.09			6.43	
18	0.00		1.00		12.80		13.51		18.89			19.94	
25	0.50		0.71		14.64		15.46		33.53			35.40	
35	1.00		0.50		15.94		16.83		49.47			52.23	
45	1.50		0.35		21.89		23.11		71.36			75.34	
60	2.00		0.25		15.61		16.48		86.97			91.82	
80	2.50		0.18		4.63		4.89		91.60			96.71	
120	3.00		0.13		0.92		0.97		92.52			97.68	
g 170	3.50		0.09		0.22		0.23		92.74			97.91	
200	3.75		0.07		0.06		0.06		92.80			97.97	
230	4.00		0.06		0.04		0.04		92.84			98.01	
Phi 5	Phi 16		Phi 25		Phi 50		Phi 75		Phi 84			Phi 95	
2.33	1.7	6 1.49		)	(	).93	0.16		-0.15		-0.66		
Moment	Mea	Mean Phi Mean mm		m	So	ting	ng Skew		wness		Kurtosis		
Statistics	0.81			0.57		0.	39		-0.28	Ī	2.92		































DRAFT Boring Designation FL-BOEM-2015-VC01 INSTALLATION DIVISION SHEET 1 DRILLING LOG OF 1 SHEETS 1. PROJECT 9. SIZE AND TYPE OF BIT 3.0 In. Inventory of Potential Beach Nourishment and Coastal 10. COORDINATE SYSTEM/DATUM HORIZONTAL VERTICAL CB Restoration Sand Sources on the Atlantic OCS UTM NAD 1983 2. BORING DESIGNATION LOCATION COORDINATES 11. MANUFACTURER'S DESIGNATION OF DRILL AUTO HAMMER FL-BOEM-2015-VC01 X = 596.390 Y = 2.995.020 MANUAL HAMMER Alpine Pneumatic Vibracore CONTRACTOR FILE NO. UNDISTURBED (UD) 3. DRILLING AGENCY DISTURBED 12. TOTAL SAMPLES American Vibracore Services, Inc. 4. NAME OF DRILLER 13. TOTAL NUMBER CORE BOXES Brian McCord 14. ELEVATION GROUND WATER 5. DIRECTION OF BORING DEG. FROM BEARING X VERTICAL STARTED COMPLETED 15. DATE BORING INCLINED 07-29-15 17:54 07-29-15 17:59 6. THICKNESS OF OVERBURDEN 0.0 Et. 16. ELEVATION TOP OF BORING Not Determined 17. TOTAL RECOVERY FOR BORING 15 Et. 7. DEPTH DRILLED INTO ROCK 0.0 Ft. 18. SIGNATURE AND TITLE OF INSPECTOR 8. TOTAL DEPTH OF BORING 18.0 Ft. DA BOX OR SAMPLE CLASSIFICATION OF MATERIALS and elevations based on measured values ELEV. DEPTH EGE. REMARKS RÊC 0 Sample #1, Depth = 0.4 1 SAND, fine grained, quartz, trace shell 0.7 Mean (mm): 0.16, Phi Sorting: 1.24 fragments, trace silt, shell fragments up to 2 1.3 0.25", 1.75" shell fragment @ 0.5', gray Fines (230): 6,78% (SW-SM) Sample #2, Depth = 1.0' (2.5Y-5/1), (SW-SM). Mean (mm): 0.49, Phi Sorting: 1.51 Sandy SHELL HASH, trace silt, gray (2.5Y-5/1), Fines (230): 3.05% (SW) Sample #3, Depth = 4.1' (SW). SAND, fine grained, quartz, trace shell 3 Mean (mm): 0.13, Phi Sorting: 0.78 fragments, trace shell hash, trace silt, shell Fines (230): 4.01% (SP-SM) fragments up to 0.5", shell hash distributed in pockets up to 0.5" and throughout layer, gray (2.5Y-5/1), (SP-SM). -5 SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell Sample #4, Depth = 7.0' fragments up to 0.5", shell hash distributed in 4 Mean (mm): 0.11, Phi Sorting: 0.73 pockets up to 0.5" and throughout layer, gray Fines (230): 6.03% (SM) (2.5Y-5/1), (SM). 9.8 10 SAND, fine grained, quartz, some silt, little shell Sample #5. Depth = 11.3 hash, (1.75" x 1.25") shell fragment @ 11.3', gray (2.5Y-5/1), (SM). Mean (mm): 0.16, Phi Sorting: 1.69 5 Fines (230): 22.18% (SM) 12.7 Sandy ROCK FRAGMENTS, some shell 13.6 fragments, rock fragments up to 3.25\*, shell fragments up to 0.5\*, dark gray (2.5Y-4/1), Sample #6, Depth = 14.3' 6 Mean (mm): 0.41, Phi Sorting: 0.98 Fines (230): 10.16% (SW-SM) (GW). 15.0 SAND, medium to coarse grained, quartz, little -15 shell hash, little silt, trace rock fragments, rock fragments up to 0.5", dark gray (2.5Y-4/1), (SW-SM). No Recovery. 18.0 End of Boring -20

#### DRAFT

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Granularmetric Report Depths and elevations based on measured values						CBI							
Project Name: Inventory of Potential Beach Nourishment and Coastal Restoration													
Sand Sources on the Atla		CB&I Coastal Planning & Engineering, Inc. 2481 NW Boca Raton Blvd. Boca Raton, FL 33431 ph (561) 391 8102											
Sample Name: FL-BOEN													
Analyzed By: DA													
Easting (ft): Northing (ft):						Coordinate System: Elevation (ft):							
596,390 2,995,020						UTM							
USCS: Munsell: Wet			- 2.5Y-5/1 Comments: - 2.5Y-7/1										
SP-SM		Washed - 2	- 2.5Y-8/1										
Dry Weight (g):	Wash Weight (g):		in Retained (g	9)¢	Sieve Loss (%):		#200 - 7.64 Organi		nics (%):	(%): Carbonates		Shell Hash (%):	
93.03	89.83		0.51		(	).02	#230 - 4.0	1					
Sieve Number	Sieve Size (Phi)		Sieve Size (Millimeters)		Grams Retained		% Weight Retained		Cum. Grams Retained		is (	C. % Weight Retained	
3/4"	-4.2	5	19.03		0.00		0.00		0.00			0.00	
5/8"	-4.00		16.00		0.00		0.00		0.00			0.00	
7/16"	-3.50		11.31		0.00		0.00		0.00			0.00	
5/16"	-3.00		8.00		0.00		0.00		0.00			0.00	
3.5	-2.50		5.66		0.14		0.15		0.14			0.15	
4	-2.25		4.76		0.09		0.10		0.23			0.25	
5	-2.00		4.00		0.00		0.00		0.23			0.25	
7	-1.50		2.83		0.16		0.17		0.39			0.42	
10	-1.00		2.00		0.37		0.40		0.76			0.82	
14	-0.50		1.41		0.36		0.39		1.12			1.21	
18	0.00		1.00		0.51		0.55		1.63			1.76	
25	0.50		0.71		0.61		0.66		2.24			2.42	
35	1.00		0.50		0.86		0.92		3.10			3.34	
45	1.50		0.35		0.94		1.01		4.04			4.35	
60	2.00		0.25		1.26		1.35		5.30			5.70	
80	2.50		0.18		3.21		3.45		8.51			9.15	
120	3.00		0.13		31.11		33.44		39.62			42.59	
170	3.50		0.09		35.81		38.49		75.43			81.08	
200	3.75		0.07		10.49		11.28		85.92			92.36	
230	4.00		0.06		3.38		3.63		89.30			95.99	
Phi 5	Phi 16		Phi 25		Phi 50		Phi 75		Phi 84			Phi 95	
3.93	3.5	3.56 3.42			3.10		2.74		2.60			1.74	
Moment	Mean Phi Mean mm		n	Sor	ting	ng Skewn		ess		Kurtosis			
Statistics	2.94			0.13		0.	78		-3.31			18.22	

A World of **Solutions** 

**JUN 04** 

SAJ FORM 1836

MODIFIED FOR THE FLORIDA DEP



- Geophysical Survey
  - Total contracted survey effort (5,600 km's) less 2015 planned reconnaissance effort (4,262 km's) allows planned 2016 design level effort (1,338 km's)
  - 2016 planned design level effort (1,338 km's) plus Maine's allocation (50 km's) totals adjusted 2016 design level effort (1,388 km's)
  - 1,388 km's of geophysical data
    - 554 km's to NY & NJ to satisfy 40% total effort stipulation
    - 834 km's remaining to allocate
- Geologic Sampling
  - 350 total samples less 260 reconnaissance samples allows 90 samples for design level geologic sampling effort
    - Approx. 39 samples to NY/NJ to satisfy 40% total effort stipulation
    - Approx. 51 samples remaining to allocate to other states based on geophysical data



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