

Vibracore	Survey Elev (ft, NAVD88)		gINT Granulometrics						USC	Composition (wt%)	Munsell Color	
			Size Class (wt%)				Descriptive Statistics					
			Gravel	Granular	Sand	<#230	Mean (mm)	Std. Dev.(phi)		Carbonate	AVS (wet)	MN 8/7/19
JB-01	-24.2	-25.1	2.18	1.99	92.25	3.58	0.34	1.42	SW	6.80	10YR-5/1	10YR-6/2
	-25.1	-27.5	3.20	6.66	80.27	9.87	0.45	1.59	SW-SM	6.80	10YR-3/1	10YR-5/2
	-27.5	-30.2	3.94	5.72	86.20	4.14	0.40	1.59	SW	6.80	10YR-3/1	10YR-6/2
	-30.2	-41.2	0.03	0.34	97.21	2.42	0.27	0.63	SP	20.80	10YR-7/1	10YR-7/1
	-41.2	-42.2	20.98	9.20	62.14	7.68	1.02	2.03	SW-SM		10YR-5/1	
	Composite		2.31	2.56	91.10	4.02	0.36			15.86		
JB-06	-23.6	-25.3	2.48	5.24	86.14	6.14	0.33	1.46	SP-SM	13.80	10YR-4/1	10YR-6/1
	-25.3	-25.7	6.87	9.49	80.50	3.14	0.64	1.65	SW	13.80	10YR-6/1	10YR-6/1
	-25.7	-33.6	0.17	1.87	91.05	6.91	0.26	1.11	SW-SM	13.20	10YR-4/1	10YR-7/1
	-33.6	-39.6	4.86	4.28	85.84	5.02	0.63	1.21	SP-SM	13.20	10YR-6/1	
	-39.6	-40.1	1.99	5.30	78.52	14.19	0.35	1.60	SM		10YR-5/1	
	Composite		2.33	3.38	88.01	6.27	0.41			13.28		
JB-07	-21.0	-23.0	0.67	2.69	91.64	5.00	0.26	1.29	SP-SM	9.30	10YR-6/1	10YR-5/2
	-23.0	-26.0	3.74	7.67	82.56	6.03	0.40	1.68	SP-SM	9.30	10YR-5/1	10YR-6/1
	-26.0	-29.0	3.51	7.68	81.03	7.78	0.45	1.58	SP-SM	11.80	10YR-5/1	10YR-6/1
	-29.0	-30.5	1.01	2.68	82.47	13.84	0.22	1.19	SM	16.20	10YR-4/1	
	-30.7	-31.1	0.00	0.31	37.99	61.70	0.22	1.20	ML	16.20	10YR-3/1	
	-31.1	-38.0	0.00	0.20	97.50	2.30	0.40	0.96	SW	7.90	10YR-6/1	
Composite		1.46	3.38	88.36	6.79	0.37			10.03			
JB-08	-17.5	-20.0	0.17	0.61	94.04	5.18	0.18	0.84	SW-SM	9.60	10YR-7/1	10YR-6/1
	-20.0	-22.5	0.71	1.94	95.21	2.14	0.32	1.17	SW	9.60	10YR-7/1	10YR-7/1
	-22.5	-23.5	4.55	6.91	82.26	6.28	0.56	1.54	SW-SM	10.50	10YR-7/1	10YR-5/1
	-23.5	-33.5	0.33	5.01	90.79	3.87	0.39	1.28	SW	10.50	10YR-5/1	
	Composite		0.63	3.96	91.46	3.96	0.36			10.22		
JB-11A	-22.3	-24.3	4.74	3.26	85.71	6.29	0.24	1.60	SP-SM	25.80	10YR-3/1	10YR-7/1
	-24.3	-28.8	2.24	8.46	85.57	3.73	0.43	1.55	SW	25.80	10YR-6/1	10YR-6/1
	-28.8	-29.8	0.80	5.44	87.05	6.71	0.40	1.38	SW-SM	11.20	10YR-5/1	
	-29.8	-34.9	1.78	3.04	91.08	4.10	0.39	1.27	SW	11.20	10YR-7/1	
	-34.9	-36.3	2.22	8.12	76.38	13.28	0.34	1.75	SM		10YR-5/1	
	Composite		2.32	5.49	86.78	5.40	0.38			17.34		
JB-12	-18.8	-20.4	0.15	0.69	97.60	1.56	0.33	1.05	SW	5.90	10YR-6/1	10YR-7/1
	-20.4	-25.8	0.65	2.67	92.11	4.57	0.25	1.26	SW	5.90	10YR-6/1	10YR-6/1
	-25.8	-34.8	3.19	5.36	85.72	5.73	0.35	1.50	SW-SM	18.80	10YR-5/1	10YR-6/1
	Composite		2.03	3.99	89.06	4.92	0.31			13.16		
JB-13	-20.9	-22.4	0.95	2.58	94.42	2.05	0.33	1.30	SW	10.00	10YR-7/1	10YR-7/1
	-22.4	-24.0	0.11	1.05	92.08	6.76	0.19	0.97	SP-SM	10.00	10YR-5/1	10YR-7/1
	-24.0	-25.3	5.90	11.41	76.31	6.38	0.58	1.75	SP-SM	21.10	10YR-5/1	10YR-6/1
	-25.3	-31.4	5.53	5.48	84.25	4.74	0.48	1.55	SW	21.10	10YR-5/1	10YR-6/1
	-31.4	-33.1	5.19	15.13	72.58	7.10	0.76	1.64	SP-SM	49.90	10YR-4/1	
	Composite		4.25	6.52	84.06	5.18	0.47			22.29		
JB-17	-27.1	-28.4	0.47	5.60	86.92	7.01	0.37	1.34	SP-SM	14.70	10YR-4/1	10YR-6/1
	-28.4	-38.7	0.82	1.15	93.95	4.08	0.27	0.84	SP	11.00	10YR-7/1	10YR-6/1
	-38.7	-41.1	0.60	2.60	95.46	1.34	0.58	0.93	SW	11.00	10YR-6/1	
	Composite		0.75	1.81	93.56	3.88	0.33			11.34		
JB-18	-25.7	-26.2	3.98	14.80	75.22	6.00	0.66	1.64	SP-SM	21.20	10YR-4/1	10YR-6/1
	-26.2	-31.7	1.63	7.85	86.06	4.46	0.35	1.41	SW	21.20	10YR-7/1	10YR-6/1
	-31.7	-36.7	0.39	1.82	93.88	3.91	0.33	0.83	SP	27.30	10YR-3/1	
	-36.7	-42.3	2.37	7.17	88.10	2.36	0.66	1.16	SW	27.30	10YR-6/1	
	Composite		1.58	6.01	88.78	3.63	0.46			25.10		

Vibracore	Survey Elev (ft, NAVD88)		gINT Granulometrics						USC	Composition (wt%)	Munsell Color	
			Size Class (wt%)				Descriptive Statistics					
			Gravel	Granular	Sand	<#230	Mean (mm)	Std. Dev.(phi)		Carbonate	AVS (wet)	MN 8/7/19
JB-20	-22.5	-26.5	2.64	5.78	85.19	6.39	0.34	1.60	SP-SM	19.90	10YR-4/1	10YR-5/2
	-26.5	-37.9	0.00	0.72	97.74	1.54	0.26	0.85	SP	19.90	10YR-7/1	
	-37.9	-38.4	4.07	5.19	38.71	52.03	0.42	1.97	ML	18.20	10YR-5/1	
	-38.4	-40.5	7.61	10.17	78.11	4.11	0.79	1.59	SW		10YR-4/1	
	Composite		1.59	3.07	91.02	4.32	0.34			10.77		
JB-21	-21.6	-26.1	0.81	1.71	94.56	2.92	0.31	1.11	SW	19.30	10YR-3/1	10YR-5/1
	-26.1	-27.5	3.04	4.80	84.41	7.75	0.43	1.51	SP-SM	19.30	10YR-4/1	
	-27.5	-32.6	0.13	0.57	94.09	5.21	0.28	0.87	SW-SM	8.00	10YR-5/1	
	-32.6	-40.6	0.00	0.13	97.02	2.85	0.30	0.55	SP	8.00	10YR-7/1	
	Composite		0.45	0.97	94.72	3.86	0.31			11.51		
JB-22	-19.2	-22.2	0.13	1.03	92.87	5.97	0.23	0.89	SP-SM	6.50	10YR-5/1	10YR-7/1
	-22.2	-24.2	3.58	5.52	86.96	3.94	0.39	1.58	SW	18.80	10YR-4/1	10YR-6/1
	-24.2	-25.2	2.63	5.13	84.45	7.79	0.41	1.46	SP-SM	18.80	10YR-4/1	10YR-6/2
	-25.2	-32.2	0.54	1.66	94.79	3.01	0.34	1.01	SW	7.70	10YR-5/1	10YR-6/1
	Composite		1.07	2.38	92.35	4.20	0.33			9.98		
JB-23	-17.7	-24.2	0.00	0.19	98.52	1.29	0.25	0.73	SP	6.20	10YR-6/2	10YR-7/1
	-24.2	-26.0	0.60	2.55	91.05	5.80	0.26	1.24	SP-SM	13.80	10YR-4/1	10YR-6/1
	-26.0	-34.3	0.33	1.70	94.96	3.01	0.33	0.92	SW	20.60	10YR-6/1	
	Composite		0.23	1.20	95.93	2.64	0.29			14.22		

Note: Shaded vibracore samples are not within dredging limits. The composite shown is for the entire vibracore which includes the shaded samples. The project narrative shows the composite for the samples within the dredge limits.

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-01		LOCATION COORDINATES X = 2286596.456 Y = 47360.594		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200 HORIZONTAL NAD 1983 VERTICAL NAVD 88		
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL AVS 80 Pneumatic Sampler ☐ AUTO HAMMER ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES		
8. TOTAL DEPTH OF BORING 19.9 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING 03-07-19 12:08 COMPLETED 03-07-19 12:15		
		16. ELEVATION TOP OF BORING -26.2 Ft.		
		17. TOTAL RECOVERY FOR BORING 18.3 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-26.2	0.0					
-27.1	0.9		Well graded sand (f-c), grainsize increasing with depth, trace shell fragments (up to 0.05' in size), gray (10YR-5/1), (SW).		S1	Sample #S1, Depth = 0.9'
-27.3	1.1		Sandy silt, very dark gray (10YR-3/1), (ML). Well graded silty sand (f-c), few to some shell fragments (up to 0.05' in size), very dark gray (10YR-3/1), (SW-SM).		S2	Sample #S2, Depth = 3.3' Sample #C1, Depth = 0.0' - 6.0'
-29.5	3.3			C1		
-32.2	6.0		Well graded sand (f-c), gray (10YR 6/1), few shell fragments (up to 0.04' in size), mottled with very dark gray (10YR 3/1) silty sand, very dark gray (10YR-3/1), (SW).		S3	Sample #S3, Depth = 6.0'
			Poorly graded sand (f-m), trace shell fragments (up to 0.02'), silt inclusions from 8.0' - 8.1'; 13.6' - 13.7'; and 16.5' gray 10 YR 6/1 grading into, light gray (10YR-7/1), (SP).	C2	S4	Sample #S4, Depth = 17.0' Sample #C2, Depth = 6.0' - 17.0'
-43.2	17.0					
-44.5	18.3		Well graded silty sand (f-c), some shell fragments (up to 0.26'), gray (10YR-5/1), (SW-SM).		S5	Sample #S5, Depth = 18.0'
			End of Boring			

Oak Island
 Multi Decadal Master
 Plan
 2019

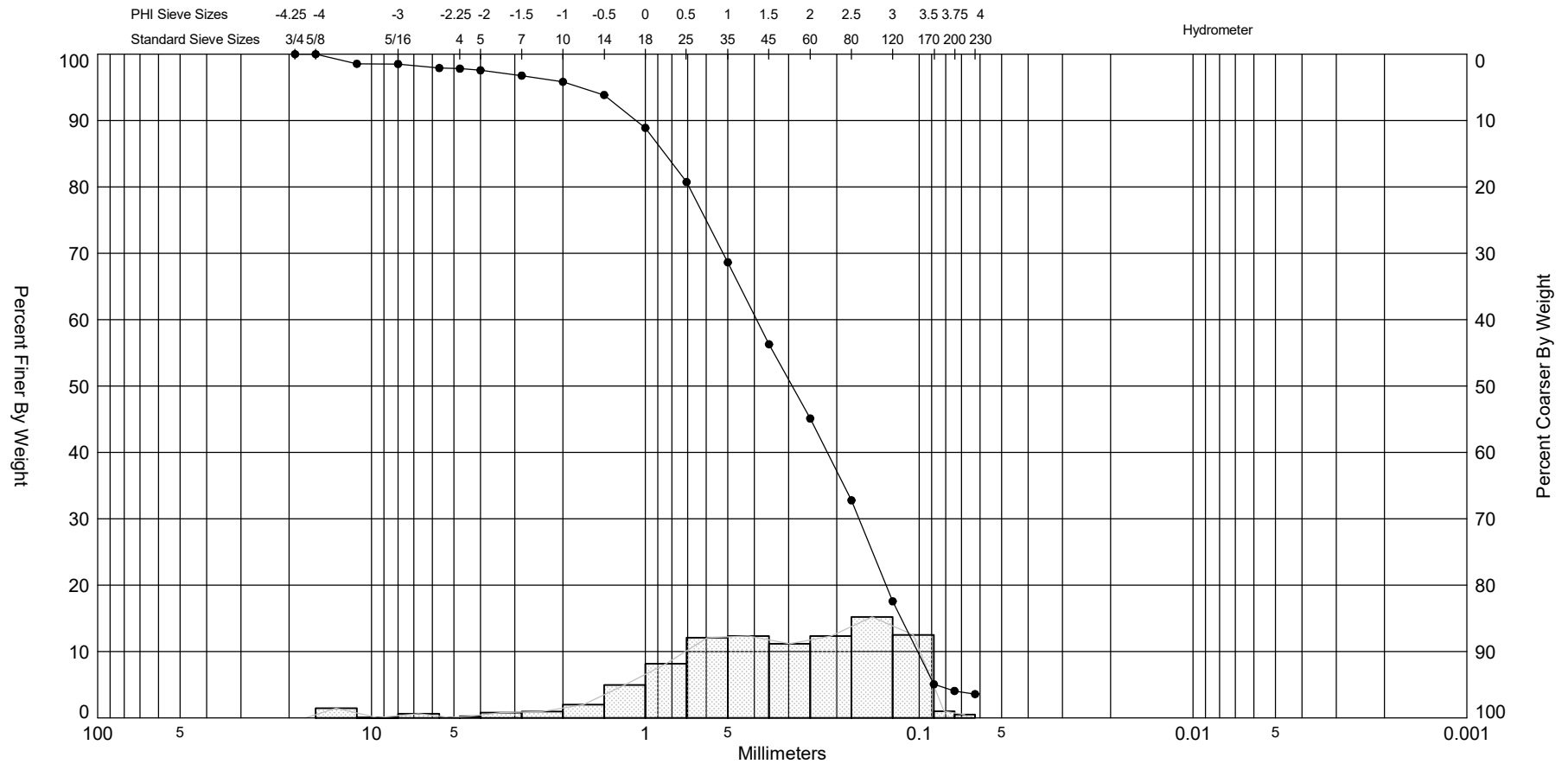
2019-JB-01

Top of Core
 Elevation
 NAVD 88
 -26.2 Ft

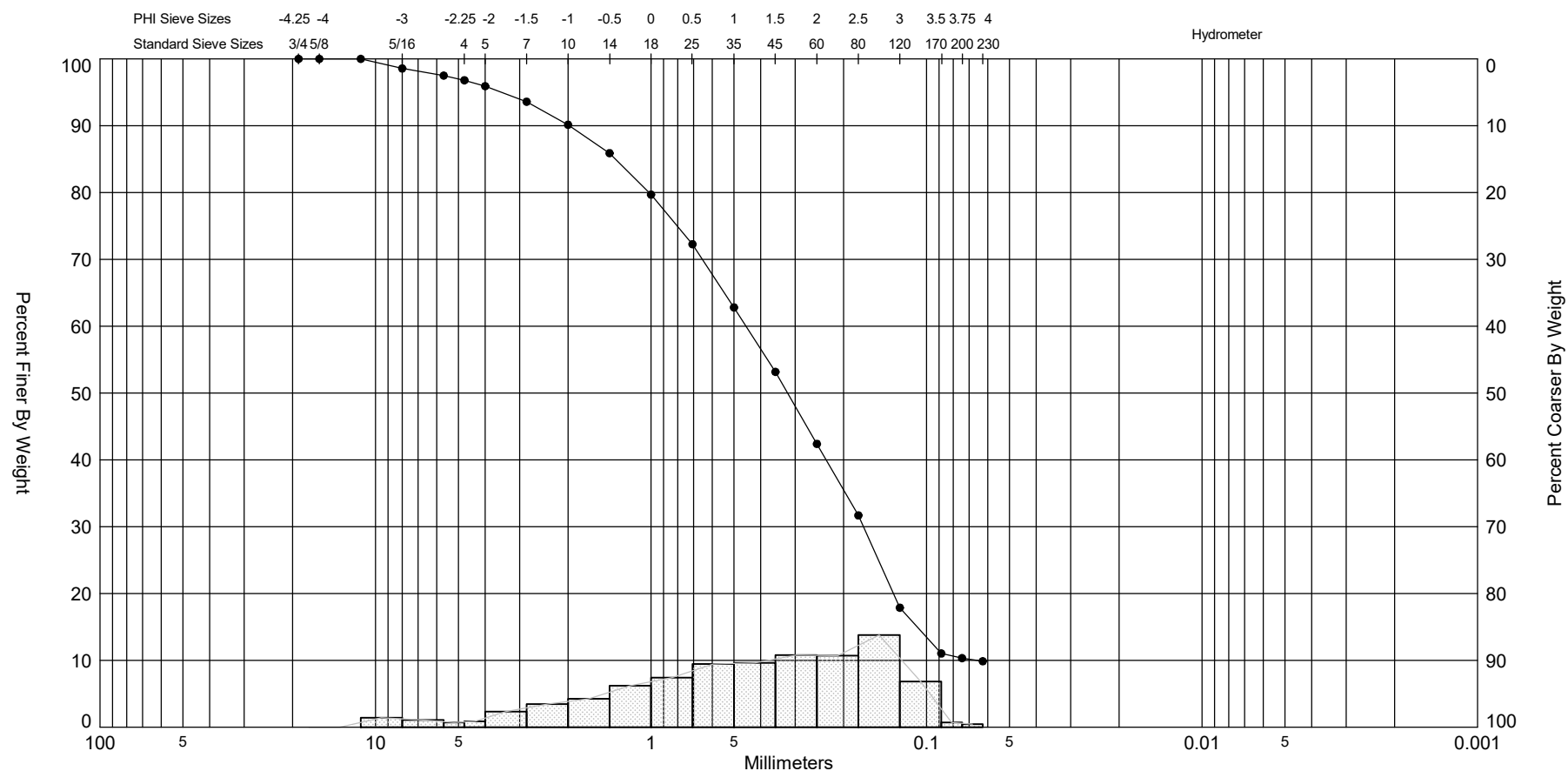
Scale in Tenths of Feet



Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-01 #S1							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2286596.456		Northing (ft): 47360.594		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -27.1 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 218.67	Wash Weight (g): 211.37	Pan Retained (g): 0.45	Sieve Loss (%): 0.04	Fines (%): #200 - 4.06 #230 - 3.58	Organics (%):	Carbonates (%): 6.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	3.16	1.45	3.16	1.45	
5/16"	-3.00	8.00	0.08	0.04	3.24	1.48	
3.5	-2.50	5.66	1.34	0.61	4.58	2.09	
4	-2.25	4.76	0.19	0.09	4.77	2.18	
5	-2.00	4.00	0.54	0.25	5.31	2.43	
7	-1.50	2.83	1.76	0.80	7.07	3.23	
10	-1.00	2.00	2.04	0.93	9.11	4.17	
14	-0.50	1.41	4.33	1.98	13.44	6.15	
18	0.00	1.00	10.85	4.96	24.29	11.11	
25	0.50	0.71	17.85	8.16	42.14	19.27	
35	1.00	0.50	26.44	12.09	68.58	31.36	
45	1.50	0.35	27.01	12.35	95.59	43.71	
60	2.00	0.25	24.43	11.17	120.02	54.89	
80	2.50	0.18	26.98	12.34	147.00	67.22	
120	3.00	0.13	33.25	15.21	180.25	82.43	
170	3.50	0.09	27.33	12.50	207.58	94.93	
200	3.75	0.07	2.22	1.02	209.80	95.94	
230	4.00	0.06	1.04	0.48	210.84	96.42	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.52	3.06	2.76	1.78	0.74	0.30	-0.79	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.54	0.34	1.42	-1.09	4.82		



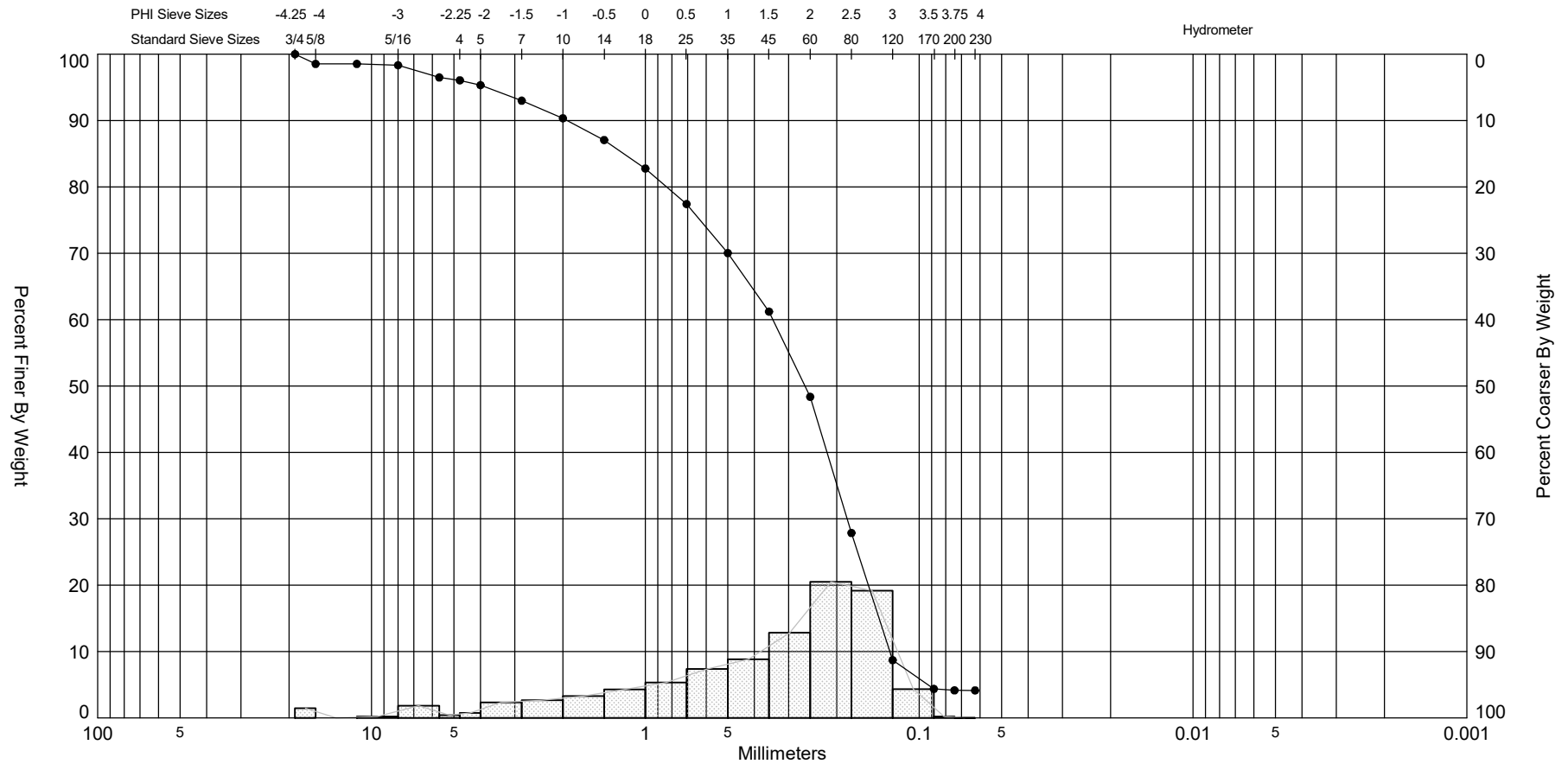
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-01 #S2							
Analysis Date: 04-16-19							
Analyzed By: FKJ							
Easting (ft): 2286596.456		Northing (ft): 47360.594		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -29.5 NAVD 88	
USCS: SW-SM		Munsell:		Comments:			
Dry Weight (g): 200.66	Wash Weight (g): 181.57	Pan Retained (g): 0.67	Sieve Loss (%): 0.02	Fines (%): #200 - 10.33 #230 - 9.87	Organics (%):	Carbonates (%): 6.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	2.87	1.43	2.87	1.43	
3.5	-2.50	5.66	2.14	1.07	5.01	2.50	
4	-2.25	4.76	1.41	0.70	6.42	3.20	
5	-2.00	4.00	1.76	0.88	8.18	4.08	
7	-1.50	2.83	4.68	2.33	12.86	6.41	
10	-1.00	2.00	6.92	3.45	19.78	9.86	
14	-0.50	1.41	8.53	4.25	28.31	14.11	
18	0.00	1.00	12.44	6.20	40.75	20.31	
25	0.50	0.71	14.89	7.42	55.64	27.73	
35	1.00	0.50	18.98	9.46	74.62	37.19	
45	1.50	0.35	19.34	9.64	93.96	46.83	
60	2.00	0.25	21.65	10.79	115.61	57.61	
80	2.50	0.18	21.46	10.69	137.07	68.31	
120	3.00	0.13	27.72	13.81	164.79	82.12	
170	3.50	0.09	13.73	6.84	178.52	88.97	
200	3.75	0.07	1.41	0.70	179.93	89.67	
230	4.00	0.06	0.93	0.46	180.86	90.13	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.14	2.74	1.65	0.32	-0.35	-1.80	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.16	0.45	1.59	-0.7	2.9		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

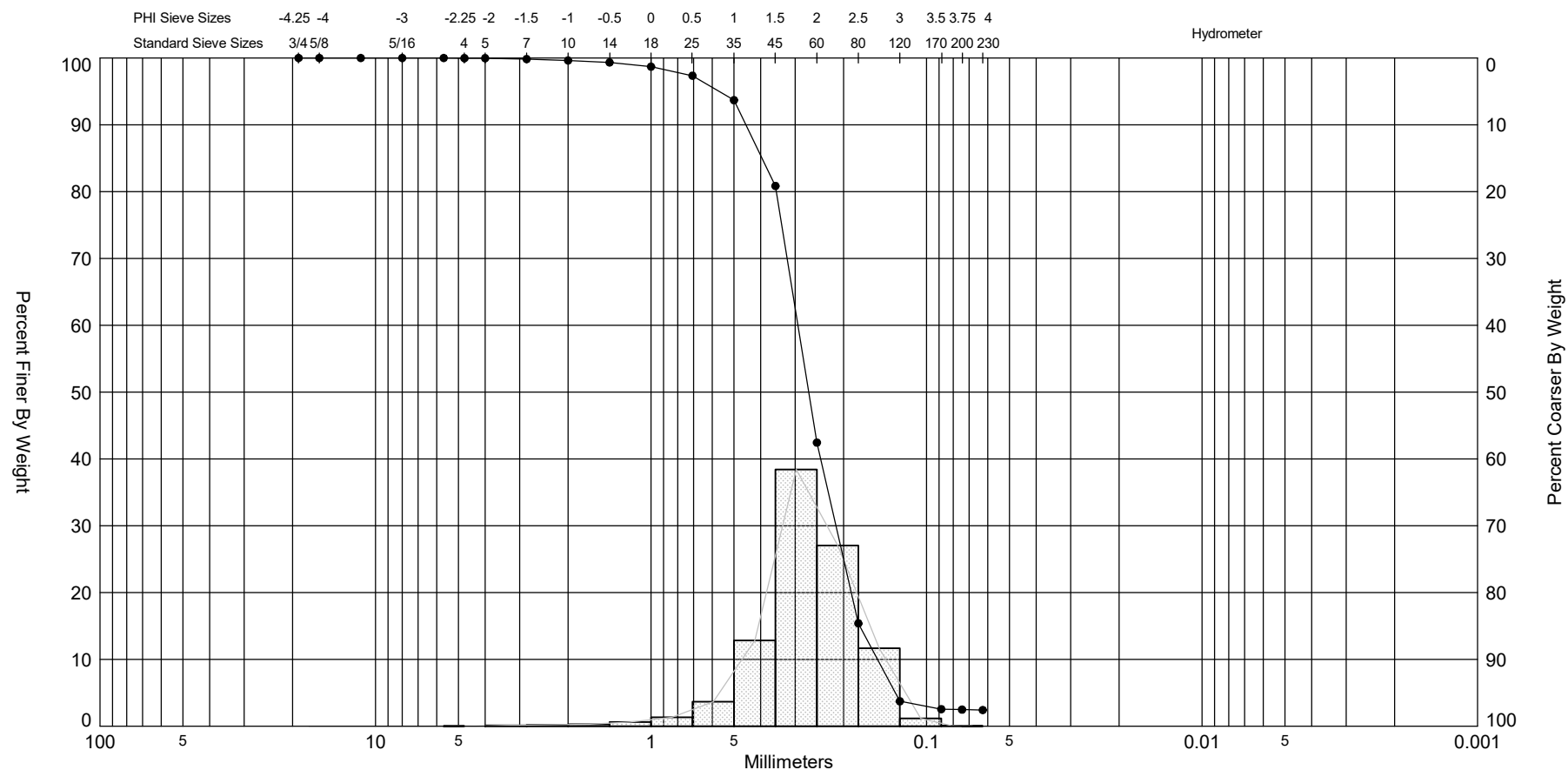
Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-01 #S2		-29.5	SW-SM	#200 - 10.33 #230 - 9.87		6.80	1.65	1.16	-0.7	2.9	1.59	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-16-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2286596.456
												Northing (Y, ft):	47360.594
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-01 #S3							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2286596.456		Northing (ft): 47360.594		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -32.2 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 221.26	Wash Weight (g): 212.19	Pan Retained (g): 0.04	Sieve Loss (%): 0.03	Fines (%): #200 - 4.15 #230 - 4.14	Organics (%):	Carbonates (%): 6.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00	
5/8"	-4.00	16.00	3.26	1.47	3.26	1.47	
7/16"	-3.50	11.31	0.00	0.00	3.26	1.47	
5/16"	-3.00	8.00	0.43	0.19	3.69	1.67	
3.5	-2.50	5.66	4.08	1.84	7.77	3.51	
4	-2.25	4.76	0.95	0.43	8.72	3.94	
5	-2.00	4.00	1.61	0.73	10.33	4.67	
7	-1.50	2.83	5.19	2.35	15.52	7.01	
10	-1.00	2.00	5.85	2.64	21.37	9.66	
14	-0.50	1.41	7.27	3.29	28.64	12.94	
18	0.00	1.00	9.48	4.28	38.12	17.23	
25	0.50	0.71	11.84	5.35	49.96	22.58	
35	1.00	0.50	16.35	7.39	66.31	29.97	
45	1.50	0.35	19.52	8.82	85.83	38.79	
60	2.00	0.25	28.40	12.84	114.23	51.63	
80	2.50	0.18	45.39	20.51	159.62	72.14	
120	3.00	0.13	42.38	19.15	202.00	91.30	
170	3.50	0.09	9.59	4.33	211.59	95.63	
200	3.75	0.07	0.48	0.22	212.07	95.85	
230	4.00	0.06	0.02	0.01	212.09	95.86	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.43	2.81	2.57	1.94	0.66	-0.14	-1.93	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.34	0.40	1.59	-1.32	4.41		



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-01 #S3	—●—	-32.2	SW	#200 - 4.15 #230 - 4.14		6.80	1.94	1.34	-1.32	4.41	1.59	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-17-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2286596.456
												Northing (Y, ft):	47360.594
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-01 #S4							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2286596.456		Northing (ft): 47360.594		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -43.2 NAVD 88	
USCS: SP		Munsell:		Comments:			
Dry Weight (g): 218.80	Wash Weight (g): 213.57	Pan Retained (g): 0.06	Sieve Loss (%): 0.00	Fines (%): #200 - 2.48 #230 - 2.42	Organics (%):	Carbonates (%): 20.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	0.06	0.03	0.06	0.03	
5	-2.00	4.00	0.01	0.00	0.07	0.03	
7	-1.50	2.83	0.28	0.13	0.35	0.16	
10	-1.00	2.00	0.47	0.21	0.82	0.37	
14	-0.50	1.41	0.63	0.29	1.45	0.66	
18	0.00	1.00	1.40	0.64	2.85	1.30	
25	0.50	0.71	2.94	1.34	5.79	2.65	
35	1.00	0.50	8.02	3.67	13.81	6.31	
45	1.50	0.35	28.10	12.84	41.91	19.15	
60	2.00	0.25	84.04	38.41	125.95	57.56	
80	2.50	0.18	59.17	27.04	185.12	84.61	
120	3.00	0.13	25.52	11.66	210.64	96.27	
170	3.50	0.09	2.59	1.18	213.23	97.45	
200	3.75	0.07	0.15	0.07	213.38	97.52	
230	4.00	0.06	0.13	0.06	213.51	97.58	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
2.95	2.49	2.32	1.90	1.58	1.38	0.82	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.87	0.27	0.63	-1.12	7.23		

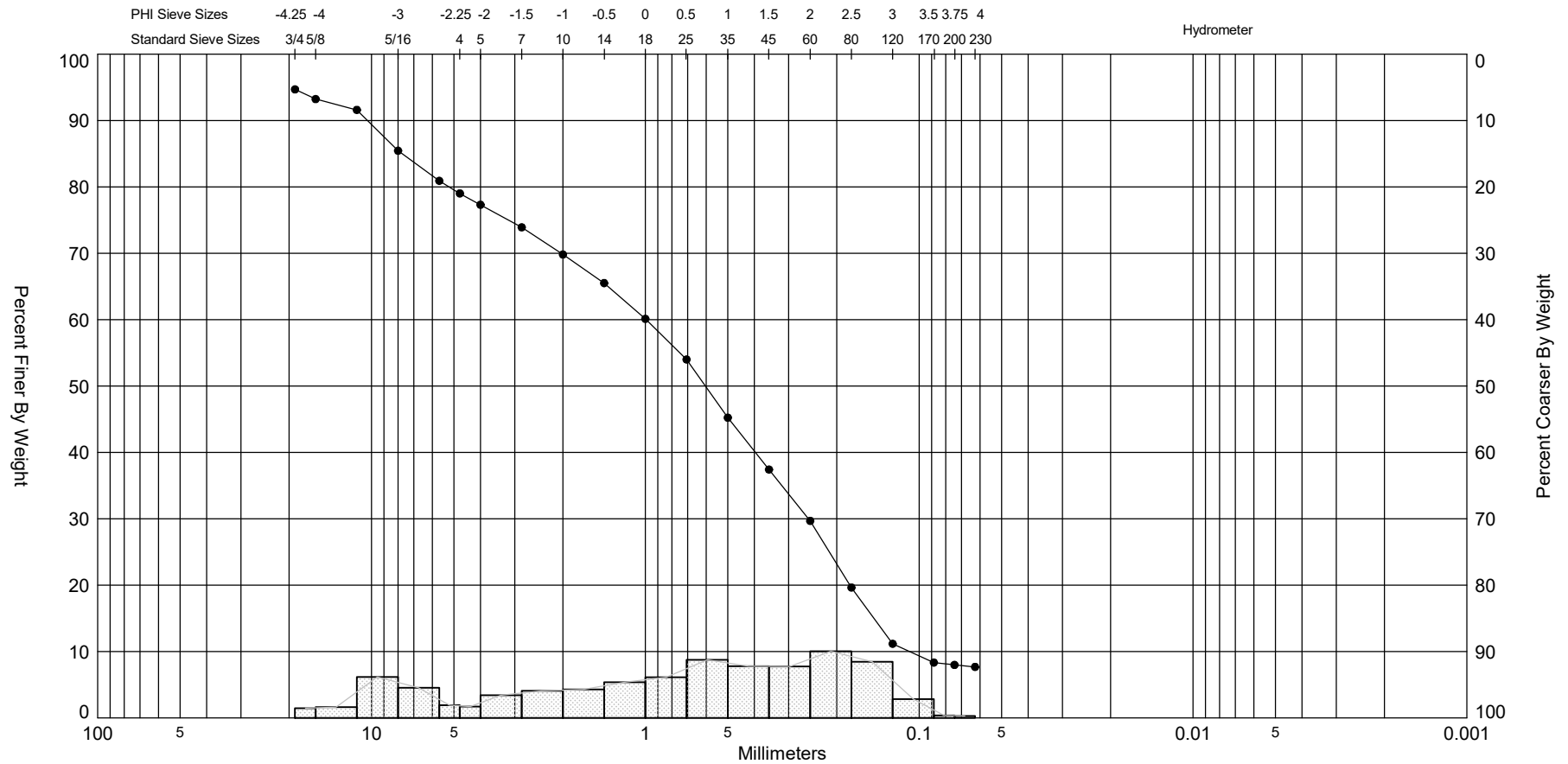


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-01 #S4		-43.2	SP	#200 - 2.48 #230 - 2.42		20.80	1.9	1.87	-1.12	7.23	0.63	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-17-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2286596.456
												Northing (Y, ft):	47360.594
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-01 #S5							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2286596.456		Northing (ft): 47360.594		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -44.2 NAVD 88	
USCS: SW-SM		Munsell:		Comments:			
Dry Weight (g): 241.90	Wash Weight (g): 223.97	Pan Retained (g): 0.51	Sieve Loss (%): 0.05	Fines (%): #200 - 7.98 #230 - 7.68	Organics (%):	Carbonates (%):	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	19.03	12.84	5.31	12.84	5.31	
5/8"	-4.00	16.00	3.53	1.46	16.37	6.77	
7/16"	-3.50	11.31	3.96	1.64	20.33	8.40	
5/16"	-3.00	8.00	14.86	6.14	35.19	14.55	
3.5	-2.50	5.66	10.96	4.53	46.15	19.08	
4	-2.25	4.76	4.59	1.90	50.74	20.98	
5	-2.00	4.00	4.14	1.71	54.88	22.69	
7	-1.50	2.83	8.23	3.40	63.11	26.09	
10	-1.00	2.00	9.89	4.09	73.00	30.18	
14	-0.50	1.41	10.42	4.31	83.42	34.49	
18	0.00	1.00	13.05	5.39	96.47	39.88	
25	0.50	0.71	14.81	6.12	111.28	46.00	
35	1.00	0.50	21.21	8.77	132.49	54.77	
45	1.50	0.35	18.89	7.81	151.38	62.58	
60	2.00	0.25	18.73	7.74	170.11	70.32	
80	2.50	0.18	24.27	10.03	194.38	80.36	
120	3.00	0.13	20.51	8.48	214.89	88.83	
170	3.50	0.09	6.83	2.82	221.72	91.66	
200	3.75	0.07	0.87	0.36	222.59	92.02	
230	4.00	0.06	0.74	0.31	223.33	92.32	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.71	2.23	0.73	-1.66	-2.84		
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	-0.03	1.02	2.03	-0.06	1.97		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-01 #S5		-44.2	SW-SM	#200 - 7.98 #230 - 7.68			0.73	-0.03	-0.06	1.97	2.03	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-17-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2286596.456
												Northing (Y, ft):	47360.594
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-06		LOCATION COORDINATES X = 2287598.32 Y = 46354.622		9. SIZE AND TYPE OF BIT 4.0 In. 10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200 HORIZONTAL NAD 1983 VERTICAL NAVD 88
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER AVS 80 Pneumatic Sampler ☐ MANUAL HAMMER
4. NAME OF DRILLER Brian McCord		12. TOTAL SAMPLES		13. TOTAL NUMBER CORE BOXES 1
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		DEG. FROM VERTICAL	BEARING	14. ELEVATION GROUND WATER
6. THICKNESS OF OVERBURDEN 0.0 Ft.		15. DATE BORING		STARTED 03-07-19 11:24 COMPLETED 03-07-19 11:27
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		16. ELEVATION TOP OF BORING -26.3 Ft.		17. TOTAL RECOVERY FOR BORING 16.5 Ft.
8. TOTAL DEPTH OF BORING 19.9 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-26.3	0.0					
-27.4	1.1		Poorly graded silty sand (f-m), trace shell fragments (up to 0.02' in size), dark grayish brown (10YR-4/2), (SP-SM).	C1	S1	Sample #S1, Depth = 1.7'
-28.0	1.7		Poorly graded silty sand (f-m), few shell fragments (up to 0.06' in size), dark gray (10YR-4/1), (SP-SM).		S2	Sample #C1, Depth = 0.0' - 2.1'
-28.4	2.1		Well graded sand (f-c), trace shell fragments (up to 0.02' in size), gray (10YR-6/1), (SW).			Sample #S2, Depth = 2.1'
			Well graded silty sand (f-c), few shell fragments (up to 0.1' in size), denser shell concentrations from 2.2' - 2.4' and 2.8' - 3.1', dark gray (10YR 4/1) color grading with depth to, gray (10YR-6/1), (SW-SM).		S3	Sample #S3, Depth = 10.0'
				C2		Sample #C2, Depth = 0.0' - 16.0'
-36.3	10.0					
			Poorly graded silty sand (f-m), few shell fragments (up to 0.08' in size), very dark gray (10YR 3/1) silt nodule from 11.2' - 11.4' and 14.3' - 14.4', light gray (10YR 7/1) grading into, gray (10YR-6/1), (SP-SM).		S4	Sample #S4, Depth = 16.0'
-42.3	16.0					
-42.8	16.5		Silty sand (f-c), few shell fragments (up to 0.04' in size), gray (10YR-5/1), (SM).		S5	Sample #S5, Depth = 16.5'
			End of Boring			

Oak Island
Multi Decadal Master
Plan
2019

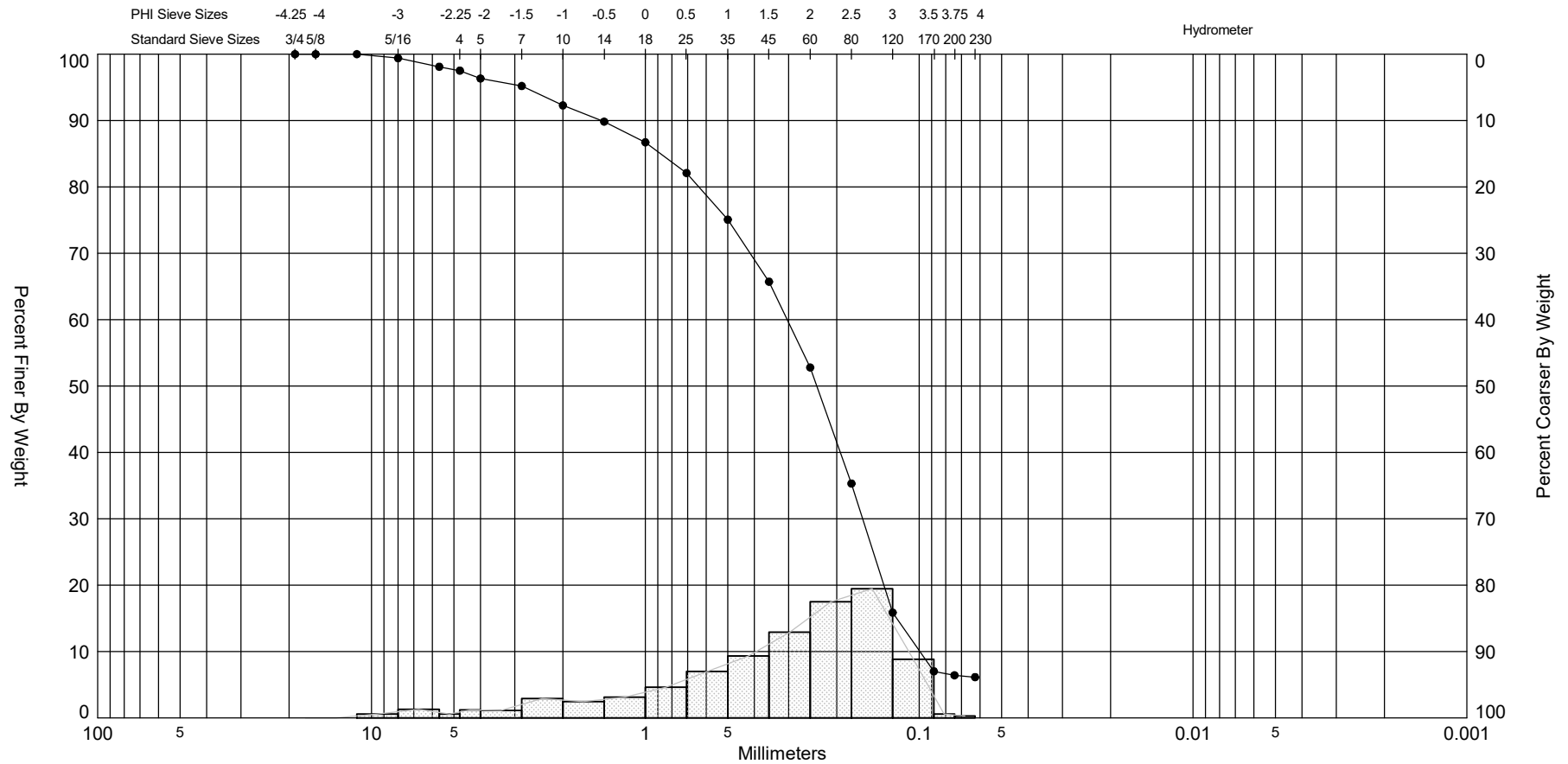
2019-JB-06

Top of Core
Elevation
NAVD 88
-26.3 Ft

Scale in Tenths of Feet



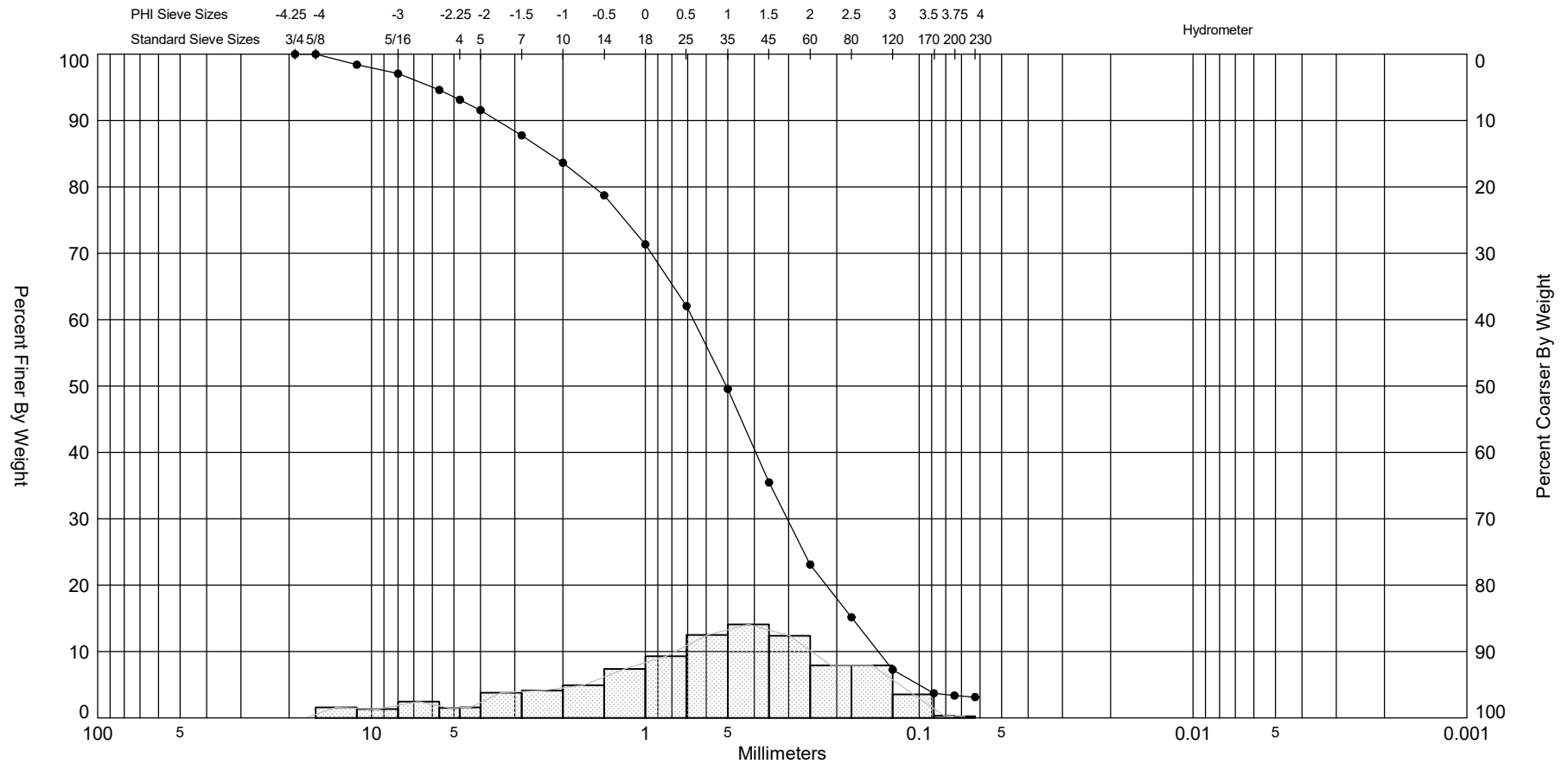
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-06 #S1							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2287598.32		Northing (ft): 46354.622		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -28.0 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 209.24	Wash Weight (g): 196.68	Pan Retained (g): 0.28	Sieve Loss (%): 0.00	Fines (%): #200 - 6.42 #230 - 6.14	Organics (%):	Carbonates (%): 13.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.26	0.60	1.26	0.60	
3.5	-2.50	5.66	2.71	1.30	3.97	1.90	
4	-2.25	4.76	1.21	0.58	5.18	2.48	
5	-2.00	4.00	2.49	1.19	7.67	3.67	
7	-1.50	2.83	2.38	1.14	10.05	4.80	
10	-1.00	2.00	6.11	2.92	16.16	7.72	
14	-0.50	1.41	5.13	2.45	21.29	10.17	
18	0.00	1.00	6.50	3.11	27.79	13.28	
25	0.50	0.71	9.68	4.63	37.47	17.91	
35	1.00	0.50	14.70	7.03	52.17	24.93	
45	1.50	0.35	19.55	9.34	71.72	34.28	
60	2.00	0.25	27.06	12.93	98.78	47.21	
80	2.50	0.18	36.58	17.48	135.36	64.69	
120	3.00	0.13	40.69	19.45	176.05	84.14	
170	3.50	0.09	18.50	8.84	194.55	92.98	
200	3.75	0.07	1.26	0.60	195.81	93.58	
230	4.00	0.06	0.59	0.28	196.40	93.86	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.00	2.77	2.08	1.00	0.29	-1.47	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.58	0.33	1.46	-1.2	4		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-06 #S1	—●—	-28.0	SP-SM	#200 - 6.42 #230 - 6.14		13.80	2.08	1.58	-1.2	4	1.46	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-17-19
Depths and elevations based on measured values												Analyzed By:	FKJ
							American Vibracore Services, Inc.						
							1215 Wallace Drive						
							Delray Beach, FL 33444						
							Easting (X, ft):		2287598.32				
							Northing (Y, ft):		46354.622				
							Horizontal System:		NAD 1983				
							Vertical System:		NAVD 88				

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-06 #S2							
Analysis Date: 04-16-19							
Analyzed By: FKJ							
Easting (ft): 2287598.32		Northing (ft): 46354.622		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -28.4 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 214.26	Wash Weight (g): 207.96	Pan Retained (g): 0.30	Sieve Loss (%): 0.06	Fines (%): #200 - 3.37 #230 - 3.14	Organics (%):	Carbonates (%): 13.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	3.41	1.59	3.41	1.59	
5/16"	-3.00	8.00	2.86	1.33	6.27	2.93	
3.5	-2.50	5.66	5.27	2.46	11.54	5.39	
4	-2.25	4.76	3.19	1.49	14.73	6.87	
5	-2.00	4.00	3.36	1.57	18.09	8.44	
7	-1.50	2.83	8.12	3.79	26.21	12.23	
10	-1.00	2.00	8.85	4.13	35.06	16.36	
14	-0.50	1.41	10.51	4.91	45.57	21.27	
18	0.00	1.00	15.83	7.39	61.40	28.66	
25	0.50	0.71	19.94	9.31	81.34	37.96	
35	1.00	0.50	26.74	12.48	108.08	50.44	
45	1.50	0.35	30.17	14.08	138.25	64.52	
60	2.00	0.25	26.52	12.38	164.77	76.90	
80	2.50	0.18	16.99	7.93	181.76	84.83	
120	3.00	0.13	16.92	7.90	198.68	92.73	
170	3.50	0.09	7.63	3.56	206.31	96.29	
200	3.75	0.07	0.72	0.34	207.03	96.63	
230	4.00	0.06	0.51	0.24	207.54	96.86	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.32	2.45	1.92	0.98	-0.25	-1.04	-2.58	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	0.65	0.64	1.65	-0.65	2.91		

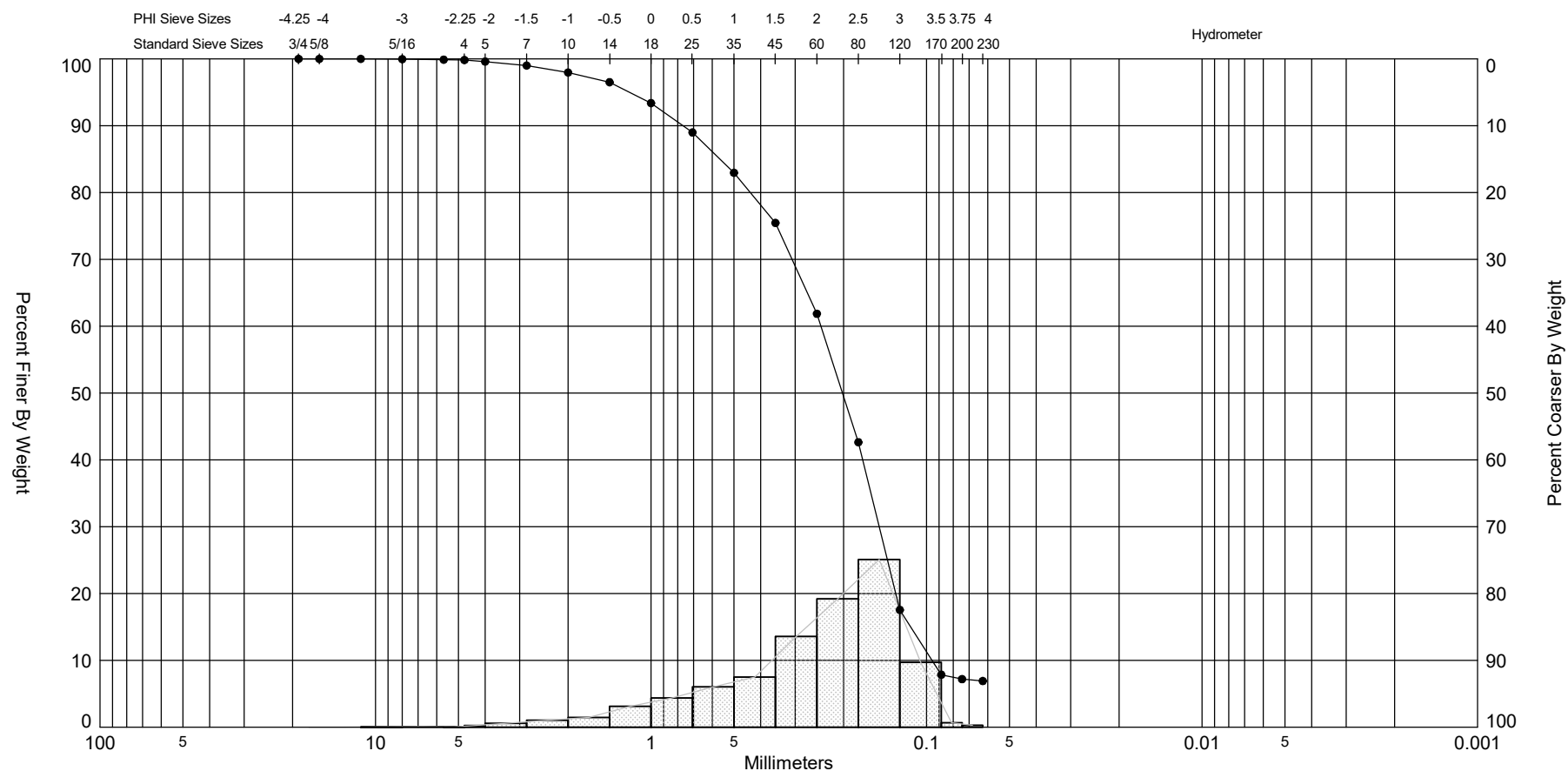


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-06 #S2	—●—	-28.4	SW	#200 - 3.37 #230 - 3.14		13.80	0.98	0.65	-0.65	2.91	1.65	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-16-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2287598.32
												Northing (Y, ft):	46354.622
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

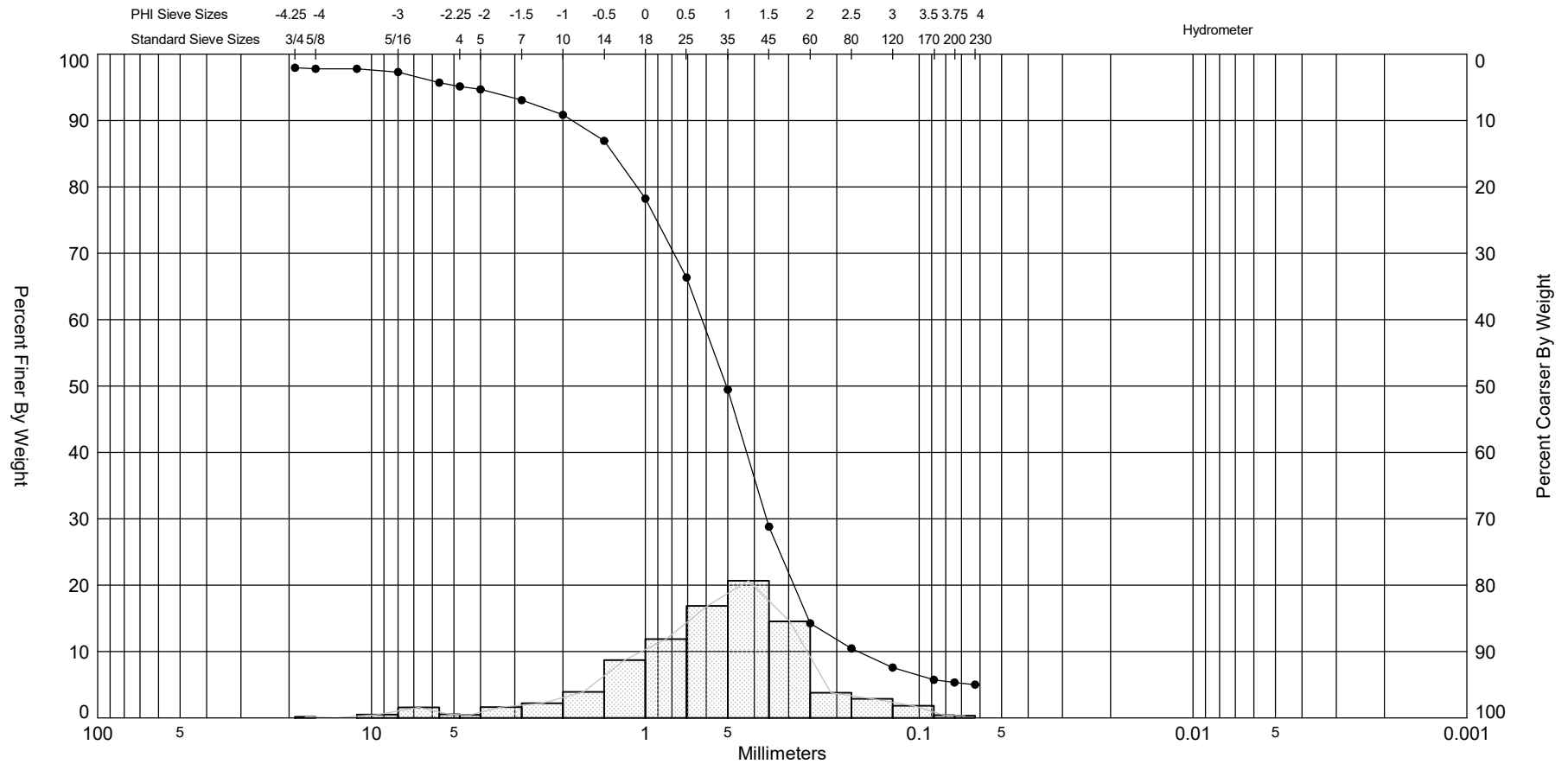
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-06 #S3							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2287598.32		Northing (ft): 46354.622		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -36.3 NAVD 88	
USCS: SW-SM		Munsell:		Comments:			
Dry Weight (g): 202.16	Wash Weight (g): 188.67	Pan Retained (g): 0.20	Sieve Loss (%): 0.13	Fines (%): #200 - 7.19 #230 - 6.91	Organics (%):	Carbonates (%): 13.20	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.08	0.04	0.08	0.04	
3.5	-2.50	5.66	0.17	0.08	0.25	0.12	
4	-2.25	4.76	0.10	0.05	0.35	0.17	
5	-2.00	4.00	0.45	0.22	0.80	0.40	
7	-1.50	2.83	1.23	0.61	2.03	1.00	
10	-1.00	2.00	2.10	1.04	4.13	2.04	
14	-0.50	1.41	2.93	1.45	7.06	3.49	
18	0.00	1.00	6.32	3.13	13.38	6.62	
25	0.50	0.71	8.87	4.39	22.25	11.01	
35	1.00	0.50	12.19	6.03	34.44	17.04	
45	1.50	0.35	15.19	7.51	49.63	24.55	
60	2.00	0.25	27.48	13.59	77.11	38.14	
80	2.50	0.18	38.84	19.21	115.95	57.36	
120	3.00	0.13	50.74	25.10	166.69	82.45	
170	3.50	0.09	19.61	9.70	186.30	92.15	
200	3.75	0.07	1.33	0.66	187.63	92.81	
230	4.00	0.06	0.57	0.28	188.20	93.09	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.08	2.85	2.31	1.52	0.91	-0.26	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.94	0.26	1.11	-1.19	4.34		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-06 #S3		-36.3	SW-SM	#200 - 7.19 #230 - 6.91		13.20	2.31	1.94	-1.19	4.34	1.11	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-17-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2287598.32
												Northing (Y, ft):	46354.622
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-06 #S4							
Analysis Date: 04-16-19							
Analyzed By: FKJ							
Easting (ft): 2287598.32		Northing (ft): 46354.622		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -42.3 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 195.17	Wash Weight (g): 187.06	Pan Retained (g): 0.78	Sieve Loss (%): 0.46	Fines (%): #200 - 5.34 #230 - 5.02	Organics (%):	Carbonates (%): 13.20	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	19.03	4.00	2.05	4.00	2.05	
5/8"	-4.00	16.00	0.29	0.15	4.29	2.20	
7/16"	-3.50	11.31	0.00	0.00	4.29	2.20	
5/16"	-3.00	8.00	0.98	0.50	5.27	2.70	
3.5	-2.50	5.66	3.13	1.60	8.40	4.30	
4	-2.25	4.76	1.09	0.56	9.49	4.86	
5	-2.00	4.00	0.87	0.45	10.36	5.31	
7	-1.50	2.83	3.16	1.62	13.52	6.93	
10	-1.00	2.00	4.31	2.21	17.83	9.14	
14	-0.50	1.41	7.65	3.92	25.48	13.06	
18	0.00	1.00	16.98	8.70	42.46	21.76	
25	0.50	0.71	23.21	11.89	65.67	33.65	
35	1.00	0.50	32.97	16.89	98.64	50.54	
45	1.50	0.35	40.31	20.65	138.95	71.19	
60	2.00	0.25	28.40	14.55	167.35	85.75	
80	2.50	0.18	7.38	3.78	174.73	89.53	
120	3.00	0.13	5.63	2.88	180.36	92.41	
170	3.50	0.09	3.60	1.84	183.96	94.26	
200	3.75	0.07	0.79	0.40	184.75	94.66	
230	4.00	0.06	0.63	0.32	185.38	94.98	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	1.94	1.63	0.98	0.14	-0.33	-2.17	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	0.67	0.63	1.21	-0.46	4.18		

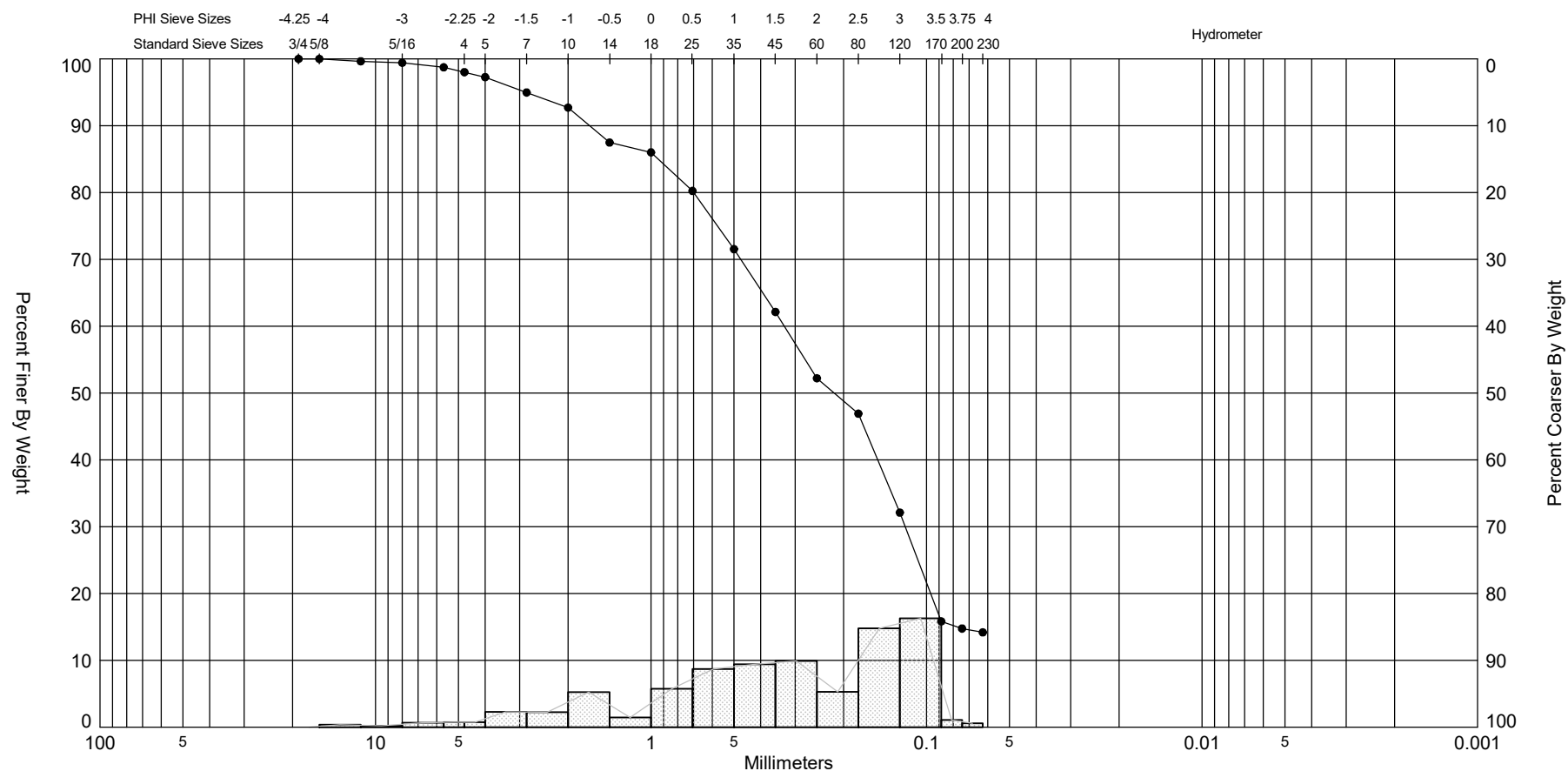


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-06 #S4	—●—	-42.3	SP-SM	#200 - 5.34 #230 - 5.02		13.20	0.98	0.67	-0.46	4.18	1.21	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-16-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2287598.32
												Northing (Y, ft):	46354.622
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-06 #S5							
Analysis Date: 04-16-19							
Analyzed By: FKJ							
Easting (ft): 2287598.32		Northing (ft): 46354.622		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -42.8 NAVD 88	
USCS: SM		Munsell:		Comments:			
Dry Weight (g): 216.93	Wash Weight (g): 187.30	Pan Retained (g): 0.36	Sieve Loss (%): 0.37	Fines (%): #200 - 14.76 #230 - 14.19	Organics (%):	Carbonates (%):	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.78	0.36	0.78	0.36	
5/16"	-3.00	8.00	0.47	0.22	1.25	0.58	
3.5	-2.50	5.66	1.48	0.68	2.73	1.26	
4	-2.25	4.76	1.59	0.73	4.32	1.99	
5	-2.00	4.00	1.60	0.74	5.92	2.73	
7	-1.50	2.83	5.00	2.30	10.92	5.03	
10	-1.00	2.00	4.89	2.25	15.81	7.29	
14	-0.50	1.41	11.35	5.23	27.16	12.52	
18	0.00	1.00	3.18	1.47	30.34	13.99	
25	0.50	0.71	12.53	5.78	42.87	19.76	
35	1.00	0.50	18.89	8.71	61.76	28.47	
45	1.50	0.35	20.40	9.40	82.16	37.87	
60	2.00	0.25	21.52	9.92	103.68	47.79	
80	2.50	0.18	11.49	5.30	115.17	53.09	
120	3.00	0.13	32.11	14.80	147.28	67.89	
170	3.50	0.09	35.31	16.28	182.59	84.17	
200	3.75	0.07	2.33	1.07	184.92	85.24	
230	4.00	0.06	1.22	0.56	186.14	85.81	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.49	3.22	2.21	0.80	0.17	-1.51	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.52	0.35	1.6	-0.83	3.04		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-06 #S5		-42.8	SM	#200 - 14.76 #230 - 14.19			2.21	1.52	-0.83	3.04	1.6	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-16-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2287598.32
												Northing (Y, ft):	46354.622
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-07		LOCATION COORDINATES X = 2288605.827 Y = 46351.514		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200 HORIZONTAL NAD 1983 VERTICAL NAVD 88		
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER AVS 80 Pneumatic Sampler ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)		
8. TOTAL DEPTH OF BORING 20.0 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING STARTED 03-06-19 12:43 COMPLETED 03-06-19 12:47		
		16. ELEVATION TOP OF BORING -20.0 Ft.		
		17. TOTAL RECOVERY FOR BORING 17 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-20.0	0.0					
-22.2	2.2		Poorly graded silty sand (f-m), trace shell (up to 0.04' in size), gray (10YR-6/1), (SP-SM).	C1	S1	Sample #S1, Depth = 2.0' Sample #C1, Depth = 0.0' - 5.0'
-28.0	8.0		Poorly graded silty sand (f-m), few to some shell (up to 0.08' in size), denser shell concentrations from 1.2' - 1.8' and 4.6' - 5.4', gray (10YR-5/1), (SP-SM).	C2	S2	Sample #S2, Depth = 5.0'
-29.7	9.7		Silty sand (f-m), trace shell fragemnets (up to 0.02' in size, dark gray (10YR-4/1), (SM).	C3	S3	Sample #S3, Depth = 8.0' Sample #C2, Depth = 5.0' - 8.0'
-30.1	10.1		Silt, very dark gray (10YR-3/1), (ML).	C3	S4	Sample #S4, Depth = 9.5' Sample #C3, Depth = 8.0' - 10.0'
-37.0	17.0		Well graded sand (f-c), trace to few shell fragments (up to 0.06' in size), gray (10YR-6/1), (SW).	C4	S5	Sample #S5, Depth = 10.1'
			End of Boring		S6	Sample #S6, Depth = 17.0' Sample #C4, Depth = 10.1' - 17.0'

FLORIDA DEP ROSS OAK ISLAND MULTI DECADEAL MASTER PLAN GPJ FL DEP ROSS GDT 8/2/19



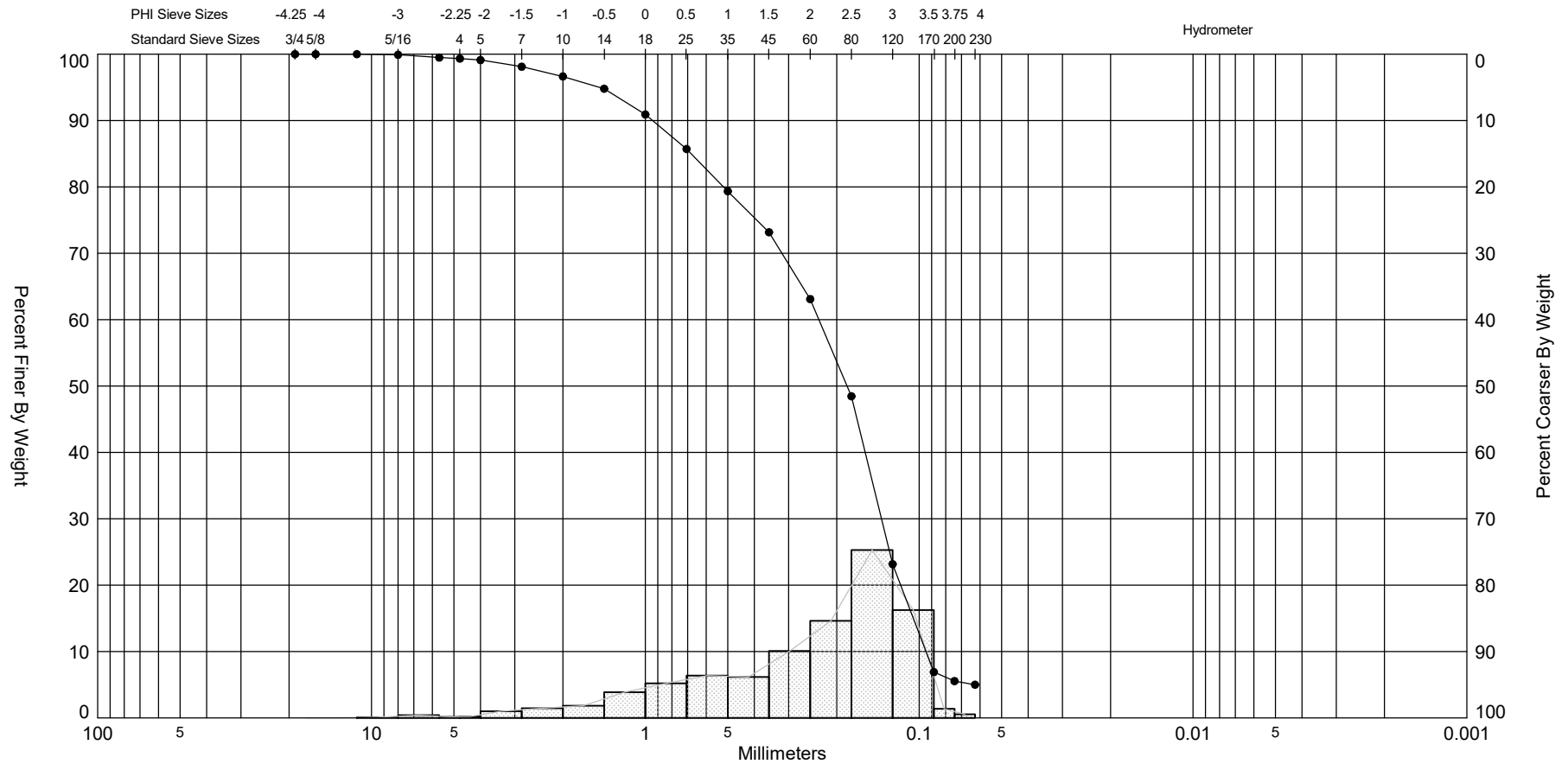
Oak Island
 Multi Decadal Master
 Plan
 2019

2019-JB-07

Top of Core
 Elevation
 NAVD 88
 -20.0 Ft

Scale in Tenths of Feet

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-07 #S1							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2288605.827		Northing (ft): 46351.514		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -22.0 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 180.22	Wash Weight (g): 171.56	Pan Retained (g): 0.30	Sieve Loss (%): 0.03	Fines (%): #200 - 5.55 #230 - 5.00	Organics (%):	Carbonates (%): 9.30	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.17	0.09	0.17	0.09	
3.5	-2.50	5.66	0.76	0.42	0.93	0.52	
4	-2.25	4.76	0.28	0.16	1.21	0.67	
5	-2.00	4.00	0.39	0.22	1.60	0.89	
7	-1.50	2.83	1.80	1.00	3.40	1.89	
10	-1.00	2.00	2.65	1.47	6.05	3.36	
14	-0.50	1.41	3.34	1.85	9.39	5.21	
18	0.00	1.00	6.99	3.88	16.38	9.09	
25	0.50	0.71	9.37	5.20	25.75	14.29	
35	1.00	0.50	11.47	6.36	37.22	20.65	
45	1.50	0.35	11.14	6.18	48.36	26.83	
60	2.00	0.25	18.15	10.07	66.51	36.90	
80	2.50	0.18	26.38	14.64	92.89	51.54	
120	3.00	0.13	45.60	25.30	138.49	76.84	
170	3.50	0.09	29.28	16.25	167.77	93.09	
200	3.75	0.07	2.44	1.35	170.21	94.45	
230	4.00	0.06	0.99	0.55	171.20	95.00	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
4.00	3.22	2.96	2.45	1.35	0.63	-0.56	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.95	0.26	1.29	-1.19	4.03		

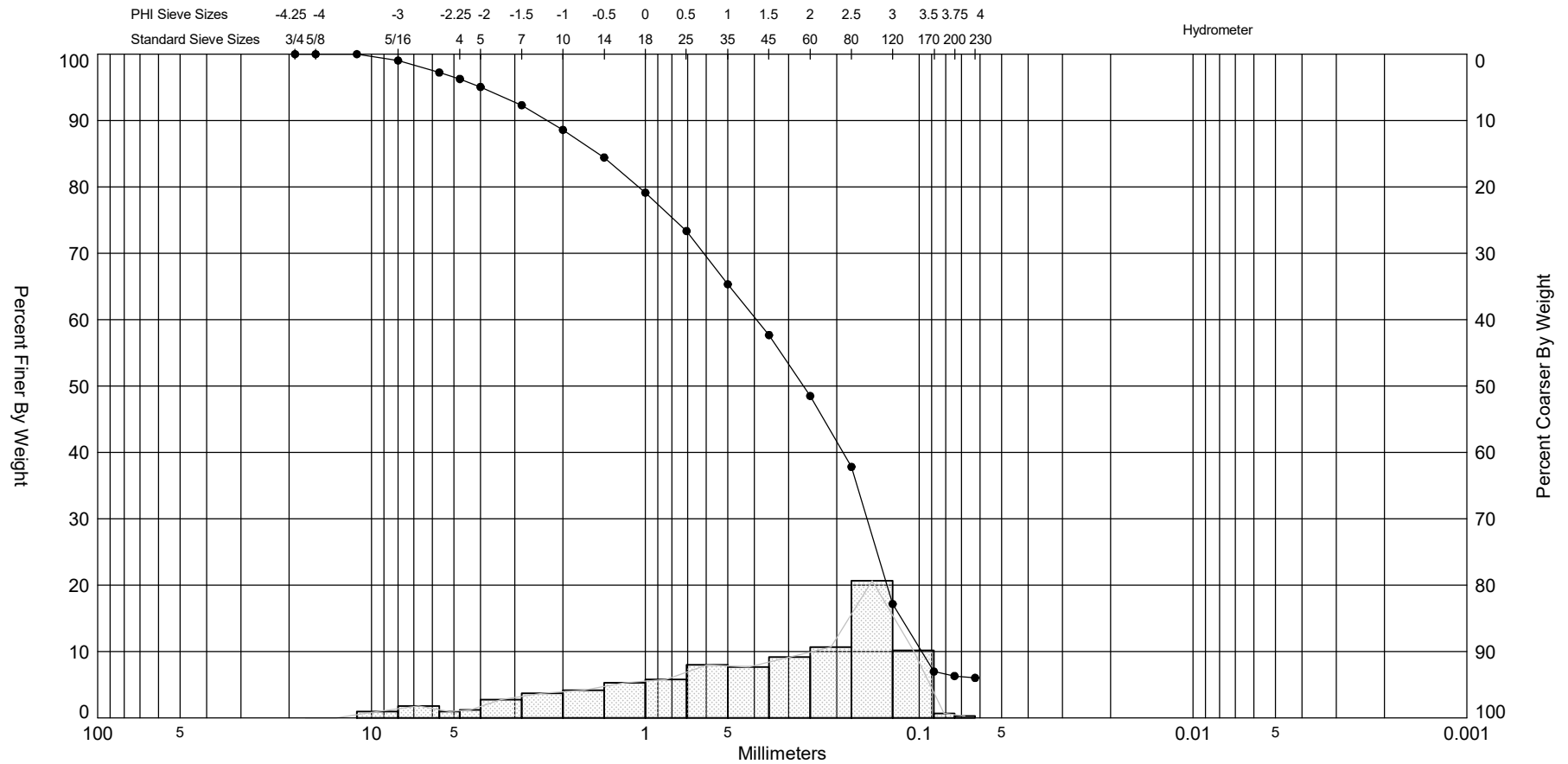


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-07 #S1	—●—	-22.0	SP-SM	#200 - 5.55 #230 - 5.00		9.30	2.45	1.95	-1.19	4.03	1.29	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-17-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2288605.827
												Northing (Y, ft):	46351.514
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-07 #S2							
Analysis Date: 04-16-19							
Analyzed By: FKJ							
Easting (ft): 2288605.827		Northing (ft): 46351.514		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -25.0 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 183.12	Wash Weight (g): 173.31	Pan Retained (g): 0.34	Sieve Loss (%): 0.49	Fines (%): #200 - 6.31 #230 - 6.03	Organics (%):	Carbonates (%): 9.30	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.76	0.96	1.76	0.96	
3.5	-2.50	5.66	3.32	1.81	5.08	2.77	
4	-2.25	4.76	1.77	0.97	6.85	3.74	
5	-2.00	4.00	2.19	1.20	9.04	4.94	
7	-1.50	2.83	5.05	2.76	14.09	7.69	
10	-1.00	2.00	6.80	3.71	20.89	11.41	
14	-0.50	1.41	7.62	4.16	28.51	15.57	
18	0.00	1.00	9.71	5.30	38.22	20.87	
25	0.50	0.71	10.58	5.78	48.80	26.65	
35	1.00	0.50	14.69	8.02	63.49	34.67	
45	1.50	0.35	14.00	7.65	77.49	42.32	
60	2.00	0.25	16.82	9.19	94.31	51.50	
80	2.50	0.18	19.55	10.68	113.86	62.18	
120	3.00	0.13	37.84	20.66	151.70	82.84	
170	3.50	0.09	18.63	10.17	170.33	93.02	
200	3.75	0.07	1.23	0.67	171.56	93.69	
230	4.00	0.06	0.51	0.28	172.07	93.97	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.06	2.81	1.92	0.36	-0.46	-1.99	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.32	0.40	1.68	-0.81	2.75		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



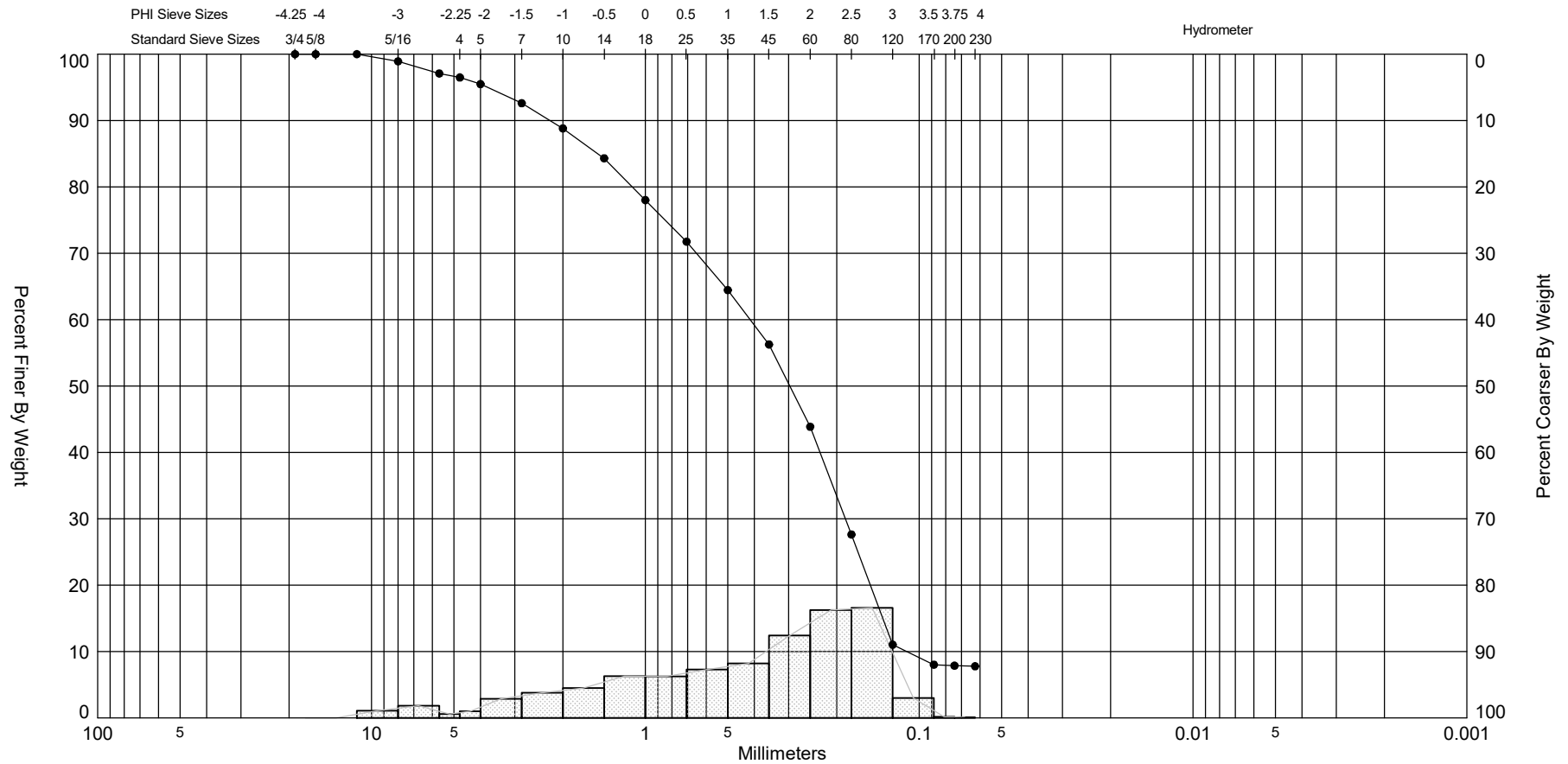
Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-07 #S2	—●—	-25.0	SP-SM	#200 - 6.31 #230 - 6.03		9.30	1.92	1.32	-0.81	2.75	1.68	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-16-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2288605.827
												Northing (Y, ft):	46351.514
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-07 #S3							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2288605.827		Northing (ft): 46351.514		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -28.0 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 177.10	Wash Weight (g): 163.76	Pan Retained (g): 0.16	Sieve Loss (%): 0.15	Fines (%): #200 - 7.87 #230 - 7.78	Organics (%):	Carbonates (%): 11.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.91	1.08	1.91	1.08	
3.5	-2.50	5.66	3.24	1.83	5.15	2.91	
4	-2.25	4.76	1.07	0.60	6.22	3.51	
5	-2.00	4.00	1.77	1.00	7.99	4.51	
7	-1.50	2.83	5.09	2.87	13.08	7.39	
10	-1.00	2.00	6.74	3.81	19.82	11.19	
14	-0.50	1.41	7.97	4.50	27.79	15.69	
18	0.00	1.00	11.15	6.30	38.94	21.99	
25	0.50	0.71	11.09	6.26	50.03	28.25	
35	1.00	0.50	12.93	7.30	62.96	35.55	
45	1.50	0.35	14.50	8.19	77.46	43.74	
60	2.00	0.25	21.97	12.41	99.43	56.14	
80	2.50	0.18	28.73	16.22	128.16	72.37	
120	3.00	0.13	29.41	16.61	157.57	88.97	
170	3.50	0.09	5.33	3.01	162.90	91.98	
200	3.75	0.07	0.26	0.15	163.16	92.13	
230	4.00	0.06	0.17	0.10	163.33	92.22	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.85	2.58	1.75	0.24	-0.48	-1.91	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.14	0.45	1.58	-0.84	2.88		

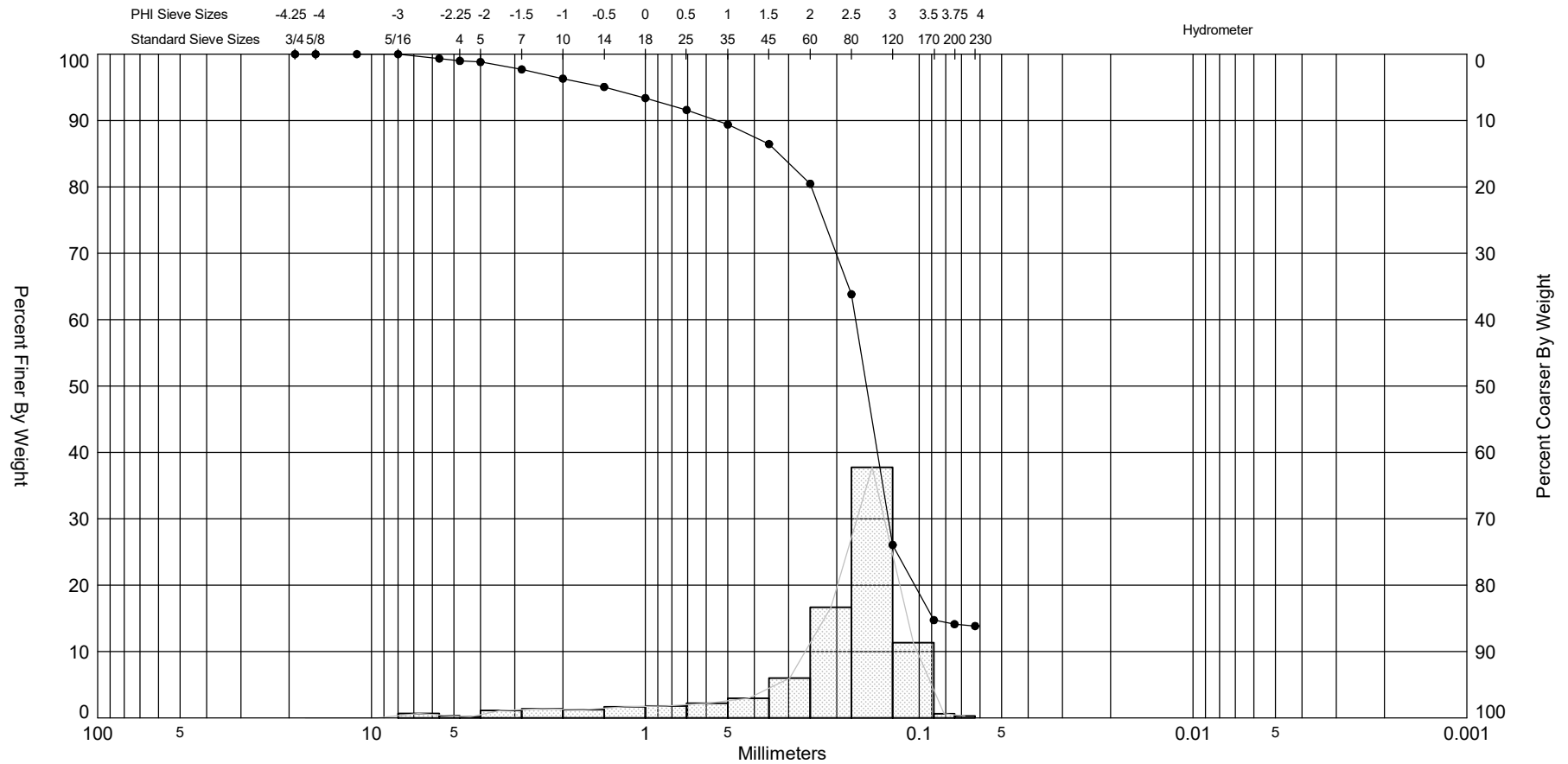
SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-07 #S3	—●—	-28.0	SP-SM	#200 - 7.87 #230 - 7.78		11.80	1.75	1.14	-0.84	2.88	1.58	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-17-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2288605.827
												Northing (Y, ft):	46351.514
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-07 #S4							
Analysis Date: 04-16-19							
Analyzed By: FKJ							
Easting (ft): 2288605.827		Northing (ft): 46351.514		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -29.5 NAVD 88	
USCS: SM		Munsell:		Comments:			
Dry Weight (g): 221.96	Wash Weight (g): 191.92	Pan Retained (g): 0.44	Sieve Loss (%): 0.10	Fines (%): #200 - 14.12 #230 - 13.84	Organics (%):	Carbonates (%): 16.20	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.46	0.66	1.46	0.66	
4	-2.25	4.76	0.79	0.36	2.25	1.01	
5	-2.00	4.00	0.37	0.17	2.62	1.18	
7	-1.50	2.83	2.48	1.12	5.10	2.30	
10	-1.00	2.00	3.08	1.39	8.18	3.69	
14	-0.50	1.41	2.79	1.26	10.97	4.94	
18	0.00	1.00	3.73	1.68	14.70	6.62	
25	0.50	0.71	3.96	1.78	18.66	8.41	
35	1.00	0.50	4.86	2.19	23.52	10.60	
45	1.50	0.35	6.55	2.95	30.07	13.55	
60	2.00	0.25	13.27	5.98	43.34	19.53	
80	2.50	0.18	36.96	16.65	80.30	36.18	
120	3.00	0.13	83.81	37.76	164.11	73.94	
170	3.50	0.09	25.16	11.34	189.27	85.27	
200	3.75	0.07	1.36	0.61	190.63	85.88	
230	4.00	0.06	0.62	0.28	191.25	86.16	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.44	3.05	2.68	2.16	1.70	-0.48	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	2.2	0.22	1.19	-2.12	7.38		

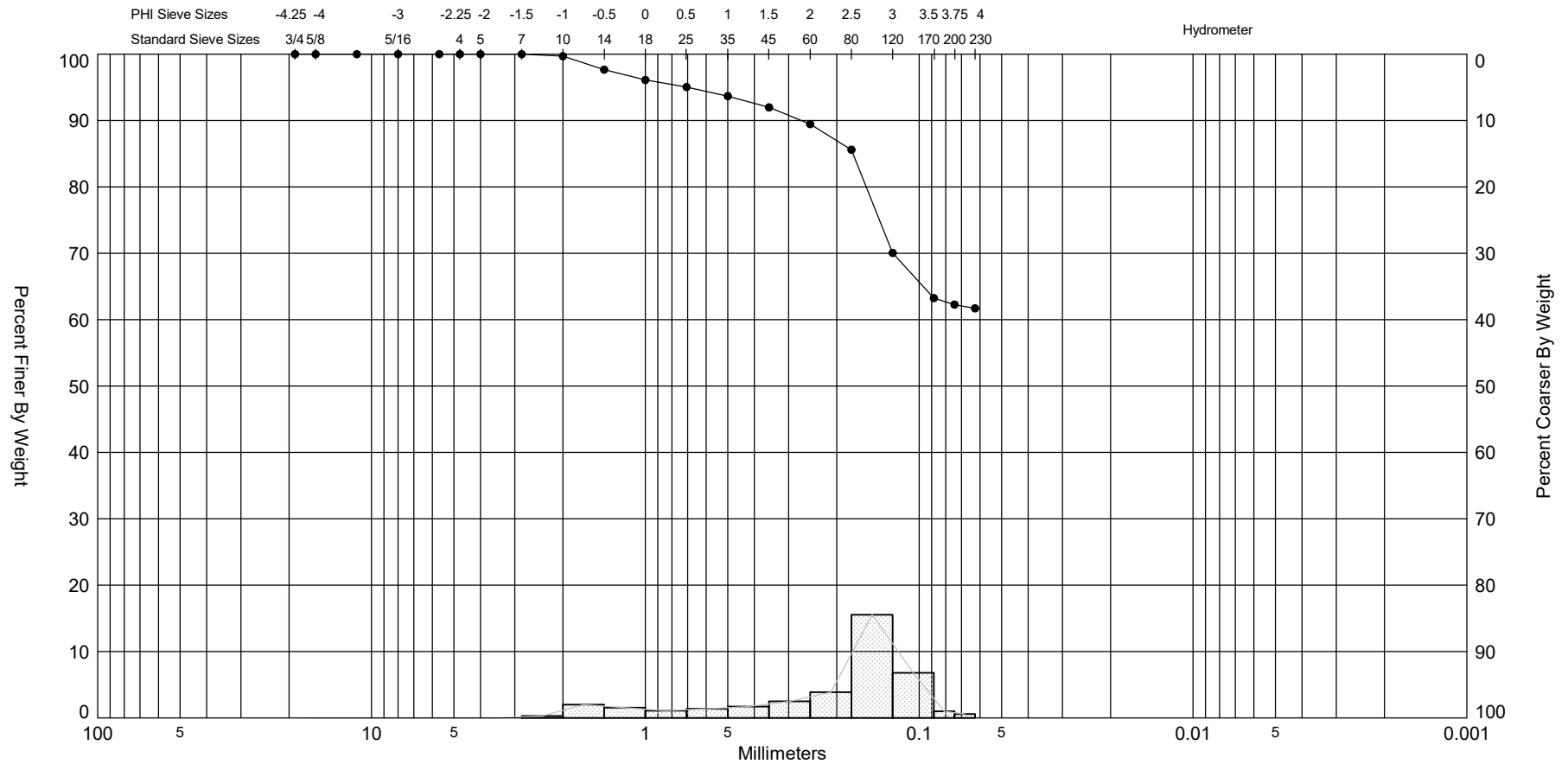


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-07 #S4	—●—	-29.5	SM	#200 - 14.12 #230 - 13.84		16.20	2.68	2.2	-2.12	7.38	1.19	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-16-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2288605.827
												Northing (Y, ft):	46351.514
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-07 #S5							
Analysis Date: 06-06-19							
Analyzed By: FKJ							
Easting (ft): 2288605.827		Northing (ft): 46351.514		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -30.1 NAVD 88	
USCS: ML		Munsell:		Comments:			
Dry Weight (g): 229.50	Wash Weight (g): 89.31	Pan Retained (g): 1.32	Sieve Loss (%): 0.04	Fines (%): #200 - 62.27 #230 - 61.70	Organics (%):	Carbonates (%): 16.20	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	0.00	0.00	0.00	0.00	
5	-2.00	4.00	0.00	0.00	0.00	0.00	
7	-1.50	2.83	0.00	0.00	0.00	0.00	
10	-1.00	2.00	0.72	0.31	0.72	0.31	
14	-0.50	1.41	4.62	2.01	5.34	2.33	
18	0.00	1.00	3.58	1.56	8.92	3.89	
25	0.50	0.71	2.46	1.07	11.38	4.96	
35	1.00	0.50	3.13	1.36	14.51	6.32	
45	1.50	0.35	3.90	1.70	18.41	8.02	
60	2.00	0.25	5.79	2.52	24.20	10.54	
80	2.50	0.18	8.85	3.86	33.05	14.40	
120	3.00	0.13	35.67	15.54	68.72	29.94	
170	3.50	0.09	15.62	6.81	84.34	36.75	
200	3.75	0.07	2.24	0.98	86.58	37.73	
230	4.00	0.06	1.31	0.57	87.89	38.30	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
				2.84	2.55	0.51	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	2.21	0.22	1.2	-1.32	3.74		

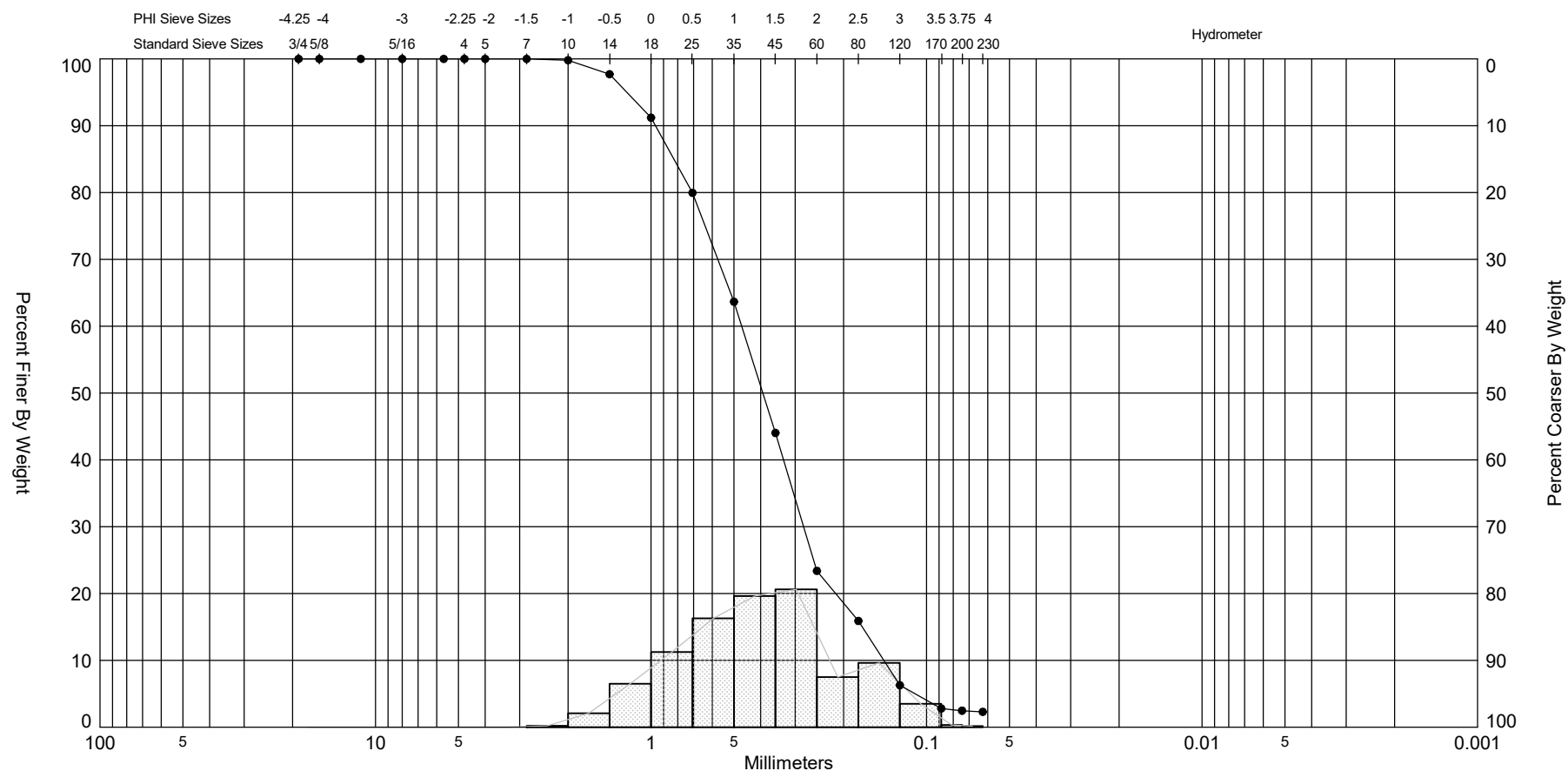


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-07 #S5	—●—	-30.1	ML	#200 - 62.27 #230 - 61.70		16.20		2.21	-1.32	3.74	1.2	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	06-06-19
Depths and elevations based on measured values												Analyzed By:	FKJ
							American Vibracore Services, Inc.						
							1215 Wallace Drive						
							Delray Beach, FL 33444						
							Easting (X, ft):		2288605.827				
							Northing (Y, ft):		46351.514				
							Horizontal System:		NAD 1983				
							Vertical System:		NAVD 88				

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-07 #S6							
Analysis Date: 06-06-19							
Analyzed By: FKJ							
Easting (ft): 2288605.827		Northing (ft): 46351.514		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -37.0 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 318.84	Wash Weight (g): 311.92	Pan Retained (g): 0.41	Sieve Loss (%): 0.00	Fines (%): #200 - 2.47 #230 - 2.30	Organics (%):	Carbonates (%): 7.90	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	0.00	0.00	0.00	0.00	
5	-2.00	4.00	0.00	0.00	0.00	0.00	
7	-1.50	2.83	0.00	0.00	0.00	0.00	
10	-1.00	2.00	0.64	0.20	0.64	0.20	
14	-0.50	1.41	6.67	2.09	7.31	2.29	
18	0.00	1.00	20.76	6.51	28.07	8.80	
25	0.50	0.71	35.85	11.24	63.92	20.05	
35	1.00	0.50	51.95	16.29	115.87	36.34	
45	1.50	0.35	62.60	19.63	178.47	55.97	
60	2.00	0.25	65.78	20.63	244.25	76.61	
80	2.50	0.18	23.88	7.49	268.13	84.10	
120	3.00	0.13	30.68	9.62	298.81	93.72	
170	3.50	0.09	11.10	3.48	309.91	97.20	
200	3.75	0.07	1.04	0.33	310.95	97.53	
230	4.00	0.06	0.56	0.18	311.51	97.70	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.18	2.49	1.96	1.35	0.65	0.32	-0.29	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.32	0.40	0.96	0.05	2.57		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-07 #S6		-37.0	SW	#200 - 2.47 #230 - 2.30		7.90	1.35	1.32	0.05	2.57	0.96	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	06-06-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2288605.827
												Northing (Y, ft):	46351.514
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-08		LOCATION COORDINATES X = 2289609.752 Y = 46352.651		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200 HORIZONTAL NAD 1983 VERTICAL NAVD 88		
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL AVS 80 Pneumatic Sampler ☐ AUTO HAMMER ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES		
8. TOTAL DEPTH OF BORING 20.0 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING 03-06-19 09:32 COMPLETED 03-06-19 09:41		
		16. ELEVATION TOP OF BORING -21.9 Ft.		
		17. TOTAL RECOVERY FOR BORING 16 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-21.9	0.0					
-24.4	2.5		Well graded silty sand (f-c), trace shell fragments (up to 0.02' in size), light gray (10YR-7/1), (SW-SM).	C1	S1	Sample #S1, Depth = 2.5' Sample #C1, Depth = 0.0' - 5.0'
-26.9	5.0		Well graded sand (f-c), trace shell fragments (up to 0.02' in size), light gray (10YR-7/1), (SW).		S2	Sample #S2, Depth = 5.0'
-27.9	6.0		Well graded silty sand (f-c), trace shell fragments (up to 0.02' in size), light gray (10YR-7/1), (SW-SM).		S3	Sample #S3, Depth = 6.0' Sample #C2, Depth = 5.0' - 16.0'
-37.9	16.0		Well graded sand (f-c), few shell fragments (up to 0.14' in size), gray (10YR 5/1) to, gray (10YR-6/1), (SW).	C2	S4	Sample #S4, Depth = 16.0'
			End of Boring			

FLORIDA DEP ROSS OAK ISLAND MULTI DECADEAL MASTER PLAN GPJ FL DEP ROSS GDT 8/2/19



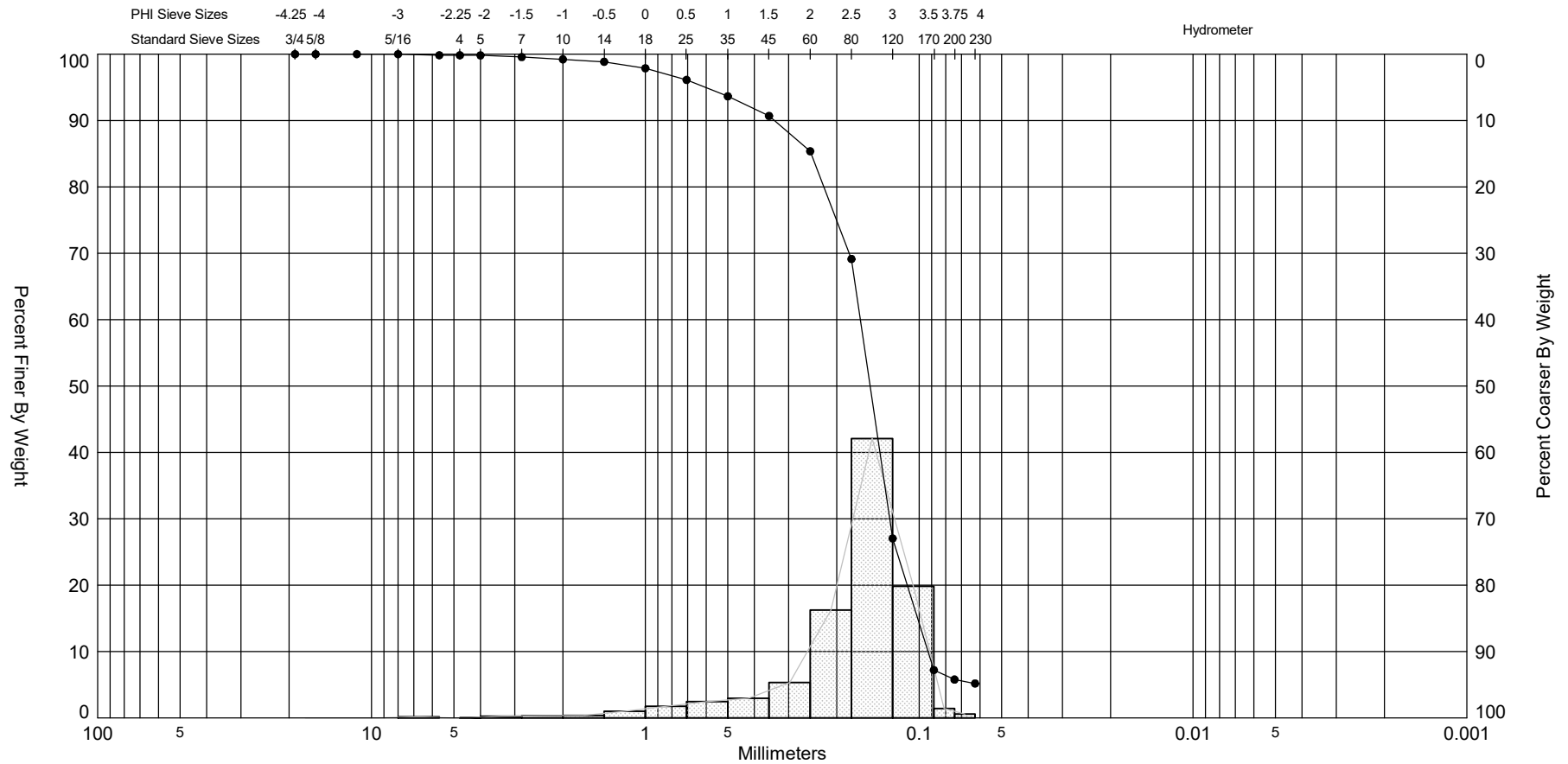
Oak Island Multi Decadal Master Plan 2019

2019-JB-08

Top of Core
Elevation
NAVD 88
-21.9 Ft

Scale in Tenths of Feet

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-08 #S1							
Analysis Date: 04-16-19							
Analyzed By: FKJ							
Easting (ft): 2289609.752		Northing (ft): 46352.651		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -24.4 NAVD 88	
USCS: SW-SM		Munsell:		Comments:			
Dry Weight (g): 198.18	Wash Weight (g): 189.30	Pan Retained (g): 0.37	Sieve Loss (%): 0.51	Fines (%): #200 - 5.78 #230 - 5.18	Organics (%):	Carbonates (%): 9.60	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.34	0.17	0.34	0.17	
4	-2.25	4.76	0.00	0.00	0.34	0.17	
5	-2.00	4.00	0.02	0.01	0.36	0.18	
7	-1.50	2.83	0.50	0.25	0.86	0.43	
10	-1.00	2.00	0.69	0.35	1.55	0.78	
14	-0.50	1.41	0.72	0.36	2.27	1.15	
18	0.00	1.00	1.96	0.99	4.23	2.13	
25	0.50	0.71	3.45	1.74	7.68	3.88	
35	1.00	0.50	4.90	2.47	12.58	6.35	
45	1.50	0.35	5.87	2.96	18.45	9.31	
60	2.00	0.25	10.54	5.32	28.99	14.63	
80	2.50	0.18	32.16	16.23	61.15	30.86	
120	3.00	0.13	83.44	42.10	144.59	72.96	
170	3.50	0.09	39.31	19.84	183.90	92.79	
200	3.75	0.07	2.82	1.42	186.72	94.22	
230	4.00	0.06	1.20	0.61	187.92	94.82	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.28	3.05	2.73	2.32	2.04	0.73	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	2.51	0.18	0.84	-2.23	9.88		

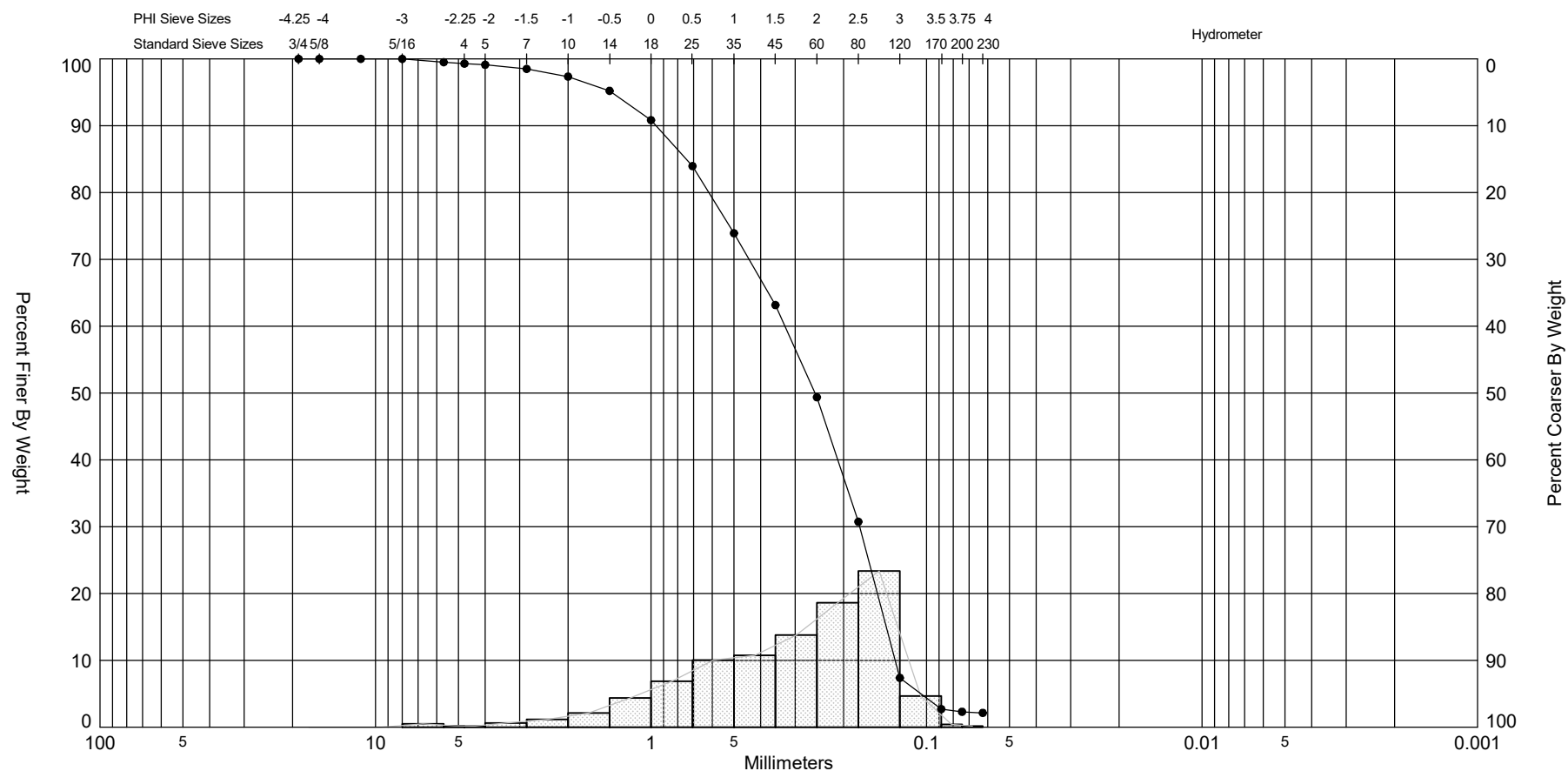


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-08 #S1		-24.4	SW-SM	#200 - 5.78 #230 - 5.18		9.60	2.73	2.51	-2.23	9.88	0.84	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-16-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2289609.752
												Northing (Y, ft):	46352.651
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

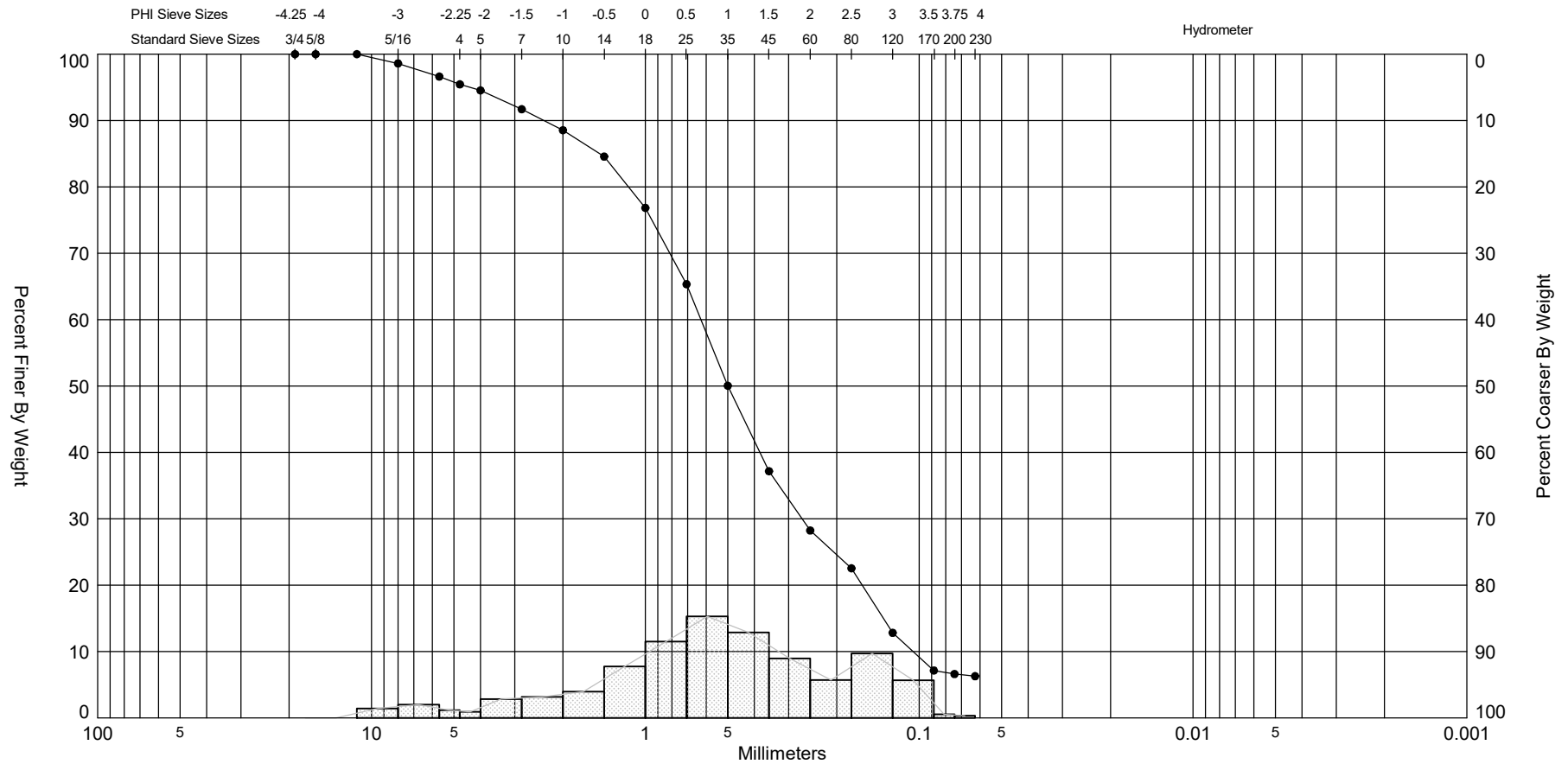
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-08 #S2							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2289609.752		Northing (ft): 46352.651		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -26.9 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 205.06	Wash Weight (g): 200.72	Pan Retained (g): 0.04	Sieve Loss (%): 0.00	Fines (%): #200 - 2.31 #230 - 2.14	Organics (%):	Carbonates (%): 9.60	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.02	0.50	1.02	0.50	
4	-2.25	4.76	0.43	0.21	1.45	0.71	
5	-2.00	4.00	0.35	0.17	1.80	0.88	
7	-1.50	2.83	1.27	0.62	3.07	1.50	
10	-1.00	2.00	2.37	1.16	5.44	2.65	
14	-0.50	1.41	4.37	2.13	9.81	4.78	
18	0.00	1.00	8.99	4.38	18.80	9.17	
25	0.50	0.71	14.12	6.89	32.92	16.05	
35	1.00	0.50	20.58	10.04	53.50	26.09	
45	1.50	0.35	22.04	10.75	75.54	36.84	
60	2.00	0.25	28.28	13.79	103.82	50.63	
80	2.50	0.18	38.21	18.63	142.03	69.26	
120	3.00	0.13	47.90	23.36	189.93	92.62	
170	3.50	0.09	9.57	4.67	199.50	97.29	
200	3.75	0.07	0.82	0.40	200.32	97.69	
230	4.00	0.06	0.36	0.18	200.68	97.86	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.25	2.82	2.62	1.98	0.95	0.50	-0.47	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.66	0.32	1.17	-0.97	3.79		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-08 #S2		-26.9	SW	#200 - 2.31 #230 - 2.14		9.60	1.98	1.66	-0.97	3.79	1.17	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-17-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2289609.752
												Northing (Y, ft):	46352.651
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

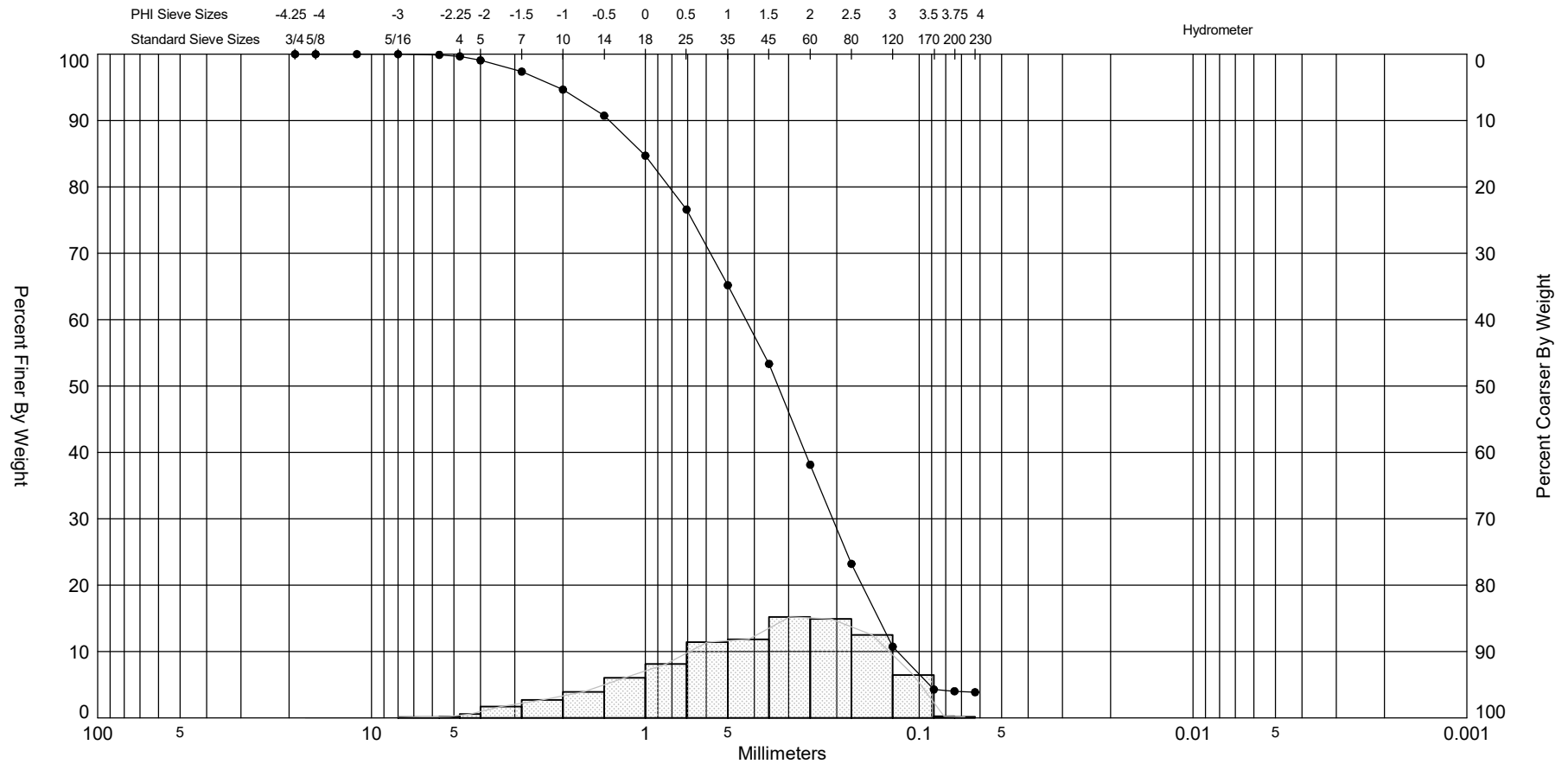
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-08 #S3							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2289609.752		Northing (ft): 46352.651		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -27.9 NAVD 88	
USCS: SW-SM		Munsell:		Comments:			
Dry Weight (g): 188.26	Wash Weight (g): 177.54	Pan Retained (g): 0.53	Sieve Loss (%): 0.31	Fines (%): #200 - 6.61 #230 - 6.28	Organics (%):	Carbonates (%): 10.50	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	2.63	1.40	2.63	1.40	
3.5	-2.50	5.66	3.73	1.98	6.36	3.38	
4	-2.25	4.76	2.20	1.17	8.56	4.55	
5	-2.00	4.00	1.72	0.91	10.28	5.46	
7	-1.50	2.83	5.35	2.84	15.63	8.30	
10	-1.00	2.00	5.95	3.16	21.58	11.46	
14	-0.50	1.41	7.47	3.97	29.05	15.43	
18	0.00	1.00	14.56	7.73	43.61	23.16	
25	0.50	0.71	21.65	11.50	65.26	34.66	
35	1.00	0.50	28.80	15.30	94.06	49.96	
45	1.50	0.35	24.23	12.87	118.29	62.83	
60	2.00	0.25	16.82	8.93	135.11	71.77	
80	2.50	0.18	10.71	5.69	145.82	77.46	
120	3.00	0.13	18.30	9.72	164.12	87.18	
170	3.50	0.09	10.69	5.68	174.81	92.86	
200	3.75	0.07	1.00	0.53	175.81	93.39	
230	4.00	0.06	0.62	0.33	176.43	93.72	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.84	2.28	1.00	0.08	-0.46	-2.13	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	0.84	0.56	1.54	-0.48	2.96		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-08 #S3	—●—	-27.9	SW-SM	#200 - 6.61 #230 - 6.28		10.50	1	0.84	-0.48	2.96	1.54	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-17-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289609.752
												Northing (Y, ft):	46352.651
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-08 #S4							
Analysis Date: 04-17-19							
Analyzed By: FKJ							
Easting (ft): 2289609.752		Northing (ft): 46352.651		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -37.9 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 193.50	Wash Weight (g): 186.26	Pan Retained (g): 0.25	Sieve Loss (%): 0.00	Fines (%): #200 - 4.02 #230 - 3.87	Organics (%):	Carbonates (%): 10.50	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.22	0.11	0.22	0.11	
4	-2.25	4.76	0.41	0.21	0.63	0.33	
5	-2.00	4.00	1.17	0.60	1.80	0.93	
7	-1.50	2.83	3.29	1.70	5.09	2.63	
10	-1.00	2.00	5.25	2.71	10.34	5.34	
14	-0.50	1.41	7.60	3.93	17.94	9.27	
18	0.00	1.00	11.67	6.03	29.61	15.30	
25	0.50	0.71	15.68	8.10	45.29	23.41	
35	1.00	0.50	22.06	11.40	67.35	34.81	
45	1.50	0.35	22.93	11.85	90.28	46.66	
60	2.00	0.25	29.41	15.20	119.69	61.86	
80	2.50	0.18	28.89	14.93	148.58	76.79	
120	3.00	0.13	24.16	12.49	172.74	89.27	
170	3.50	0.09	12.48	6.45	185.22	95.72	
200	3.75	0.07	0.51	0.26	185.73	95.98	
230	4.00	0.06	0.28	0.14	186.01	96.13	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.44	2.79	2.44	1.61	0.57	0.04	-1.06	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.35	0.39	1.28	-0.59	2.79		



Boring Designation 2019-JB-11A

DRILLING LOG		DIVISION Moffatt Nichol		INSTALLATION Raleigh, Nc		SHEET 1 OF 1 SHEETS	
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing 				9. SIZE AND TYPE OF BIT 4.0 In.			
				10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200		HORIZONTAL NAD 1983	
2. BORING DESIGNATION 2019-JB-11A		LOCATION COORDINATES X = 2288592.579 Y = 45357.101		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER AVS 80 Pneumatic Sampler ☐ MANUAL HAMMER			
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		12. TOTAL SAMPLES		DISTURBED UNDISTURBED (UD)	
4. NAME OF DRILLER Brian McCord				13. TOTAL NUMBER CORE BOXES 1			
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		DEG. FROM VERTICAL		BEARING		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 03-06-19 13:22 COMPLETED 03-06-19 13:26	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -21.1 Ft.			
8. TOTAL DEPTH OF BORING 19.9 Ft.				17. TOTAL RECOVERY FOR BORING 14 Ft.			
				18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting			

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-21.1	0.0					
-22.1	1.0		Poorly graded silty sand (f-m), very dark gray (10YR-3/1), (SP-SM).		S1	Sample #S1, Depth = 2.0'
-23.1	2.0		Poorly graded sand (f-m), gray (10YR-5/1), (SP).			Sample #C1, Depth = 0.0' - 6.5'
			Well graded sand (f-c), trace to few shell fragments (up to 0.04' in size), gray (10YR-6/1), (SW).	C1	S2	Sample #S2, Depth = 6.5'
-27.6	6.5					
-28.6	7.5		Well graded silty sand (f-c), trace to few shell fragments (up to 0.04' in size), gray (10YR-5/1), (SW-SM).		S3	Sample #S3, Depth = 7.5'
			Well graded sand (f-c), trace limestone (up to 0.10' in size), mottled with dark gray (10YR 4/1) silty sand (SP-SM), light gray (10YR-7/1), (SW).	C2	S4	Sample #S4, Depth = 12.6'
-33.8	12.7					
-35.1	14.0		Silty sand (f-c), few to some shell fragments. trace silt increasing with depth, gray (10YR-5/1), (SM).		S5	Sample #S5, Depth = 14.0'
			End of Boring			

Oak Island
Multi Decadal Master
Plan
2019

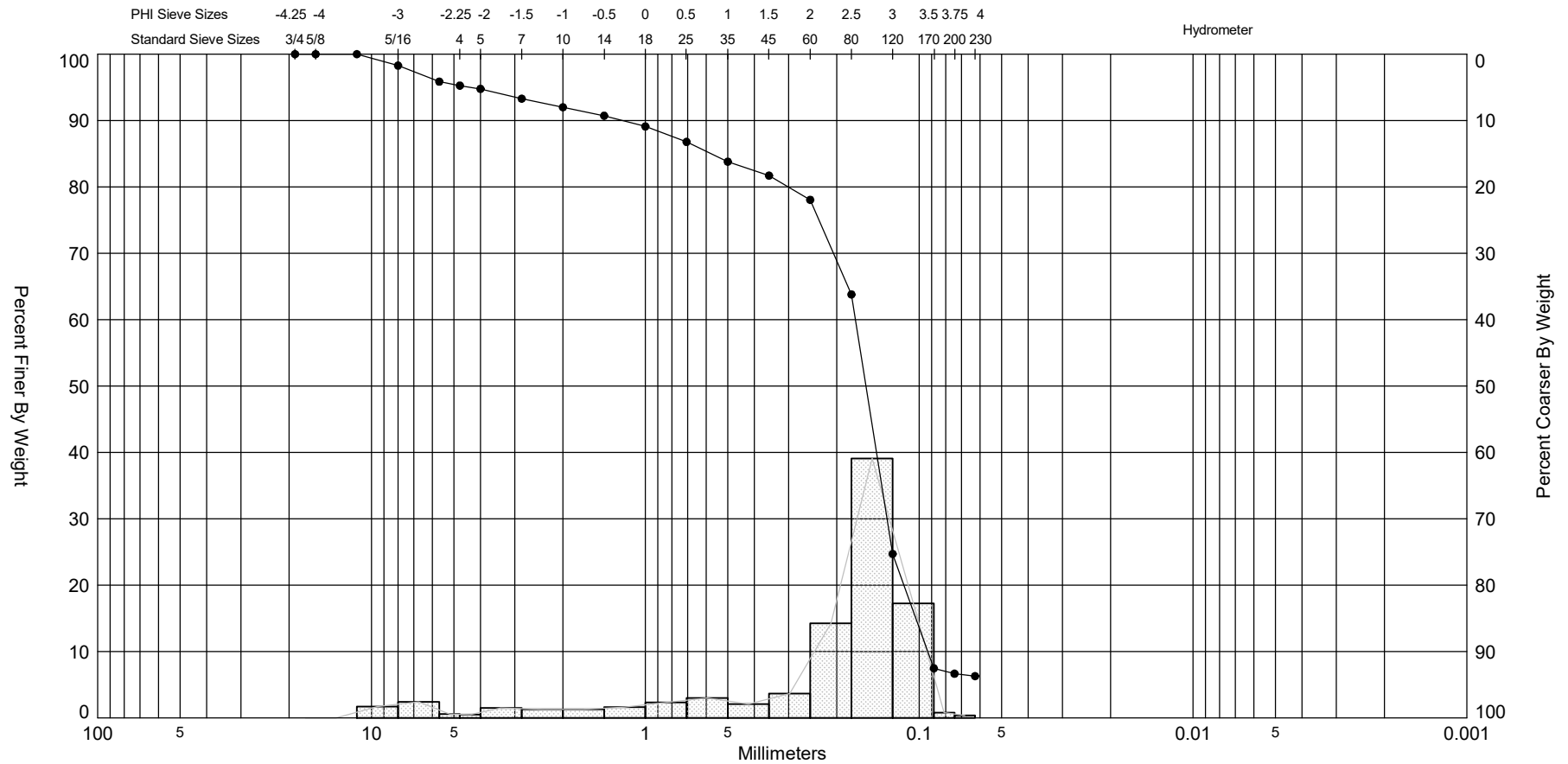
2019-JB-11A

Top of Core
Elevation
NAVD 88
-21.1 Ft

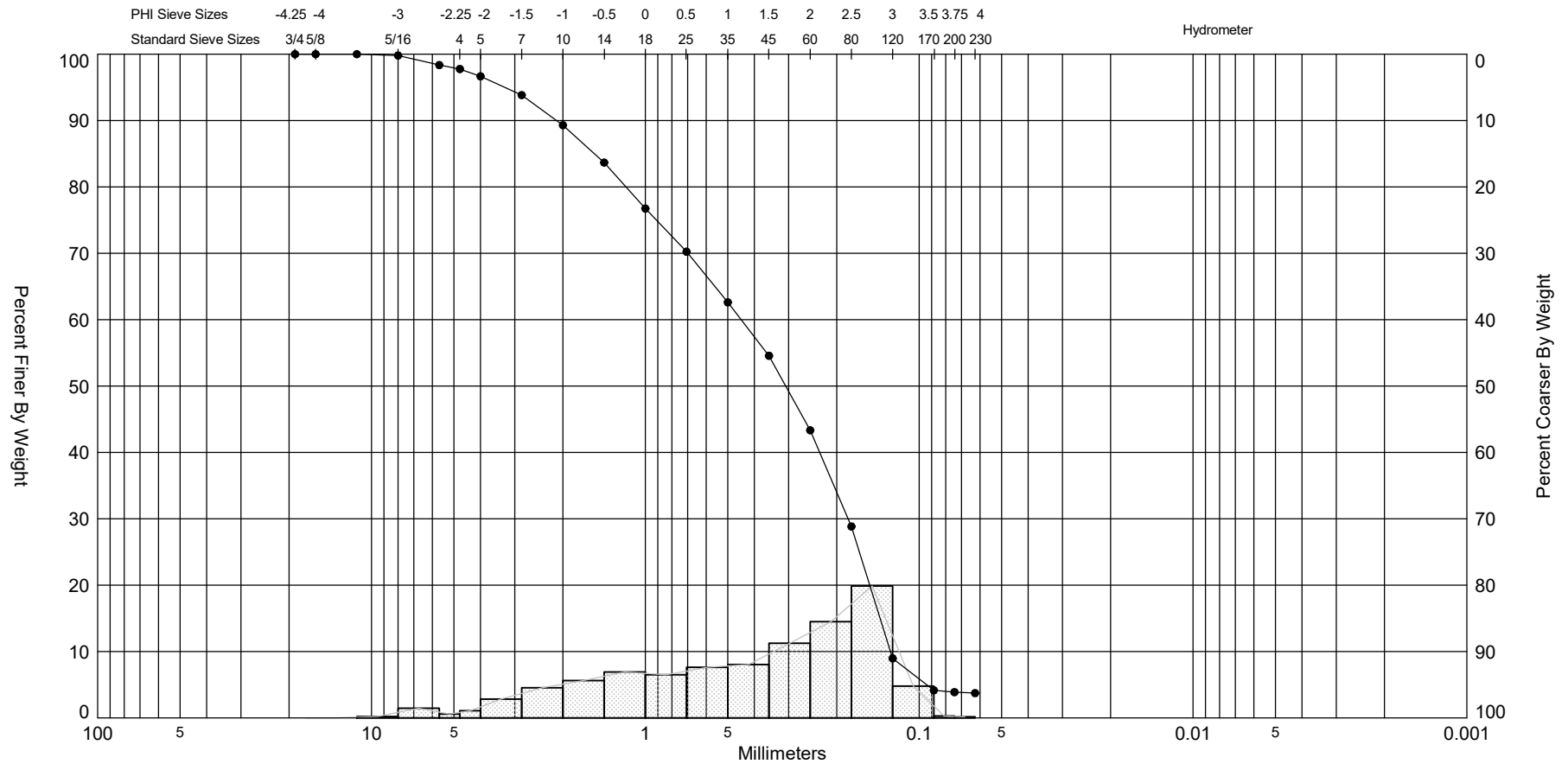
Scale in Tenths of Feet



Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-11A #S1							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2288592.579		Northing (ft): 45357.101		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -23.1 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 217.60	Wash Weight (g): 204.39	Pan Retained (g): 0.47	Sieve Loss (%): 0.00	Fines (%): #200 - 6.66 #230 - 6.29	Organics (%):	Carbonates (%): 18.50	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	3.75	1.72	3.75	1.72	
3.5	-2.50	5.66	5.25	2.41	9.00	4.14	
4	-2.25	4.76	1.31	0.60	10.31	4.74	
5	-2.00	4.00	1.08	0.50	11.39	5.23	
7	-1.50	2.83	3.22	1.48	14.61	6.71	
10	-1.00	2.00	2.80	1.29	17.41	8.00	
14	-0.50	1.41	2.78	1.28	20.19	9.28	
18	0.00	1.00	3.51	1.61	23.70	10.89	
25	0.50	0.71	5.06	2.33	28.76	13.22	
35	1.00	0.50	6.49	2.98	35.25	16.20	
45	1.50	0.35	4.58	2.10	39.83	18.30	
60	2.00	0.25	7.94	3.65	47.77	21.95	
80	2.50	0.18	31.00	14.25	78.77	36.20	
120	3.00	0.13	85.07	39.09	163.84	75.29	
170	3.50	0.09	37.51	17.24	201.35	92.53	
200	3.75	0.07	1.76	0.81	203.11	93.34	
230	4.00	0.06	0.81	0.37	203.92	93.71	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.25	3.00	2.68	2.11	0.97	-2.12	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	2.04	0.24	1.6	-1.96	5.96		



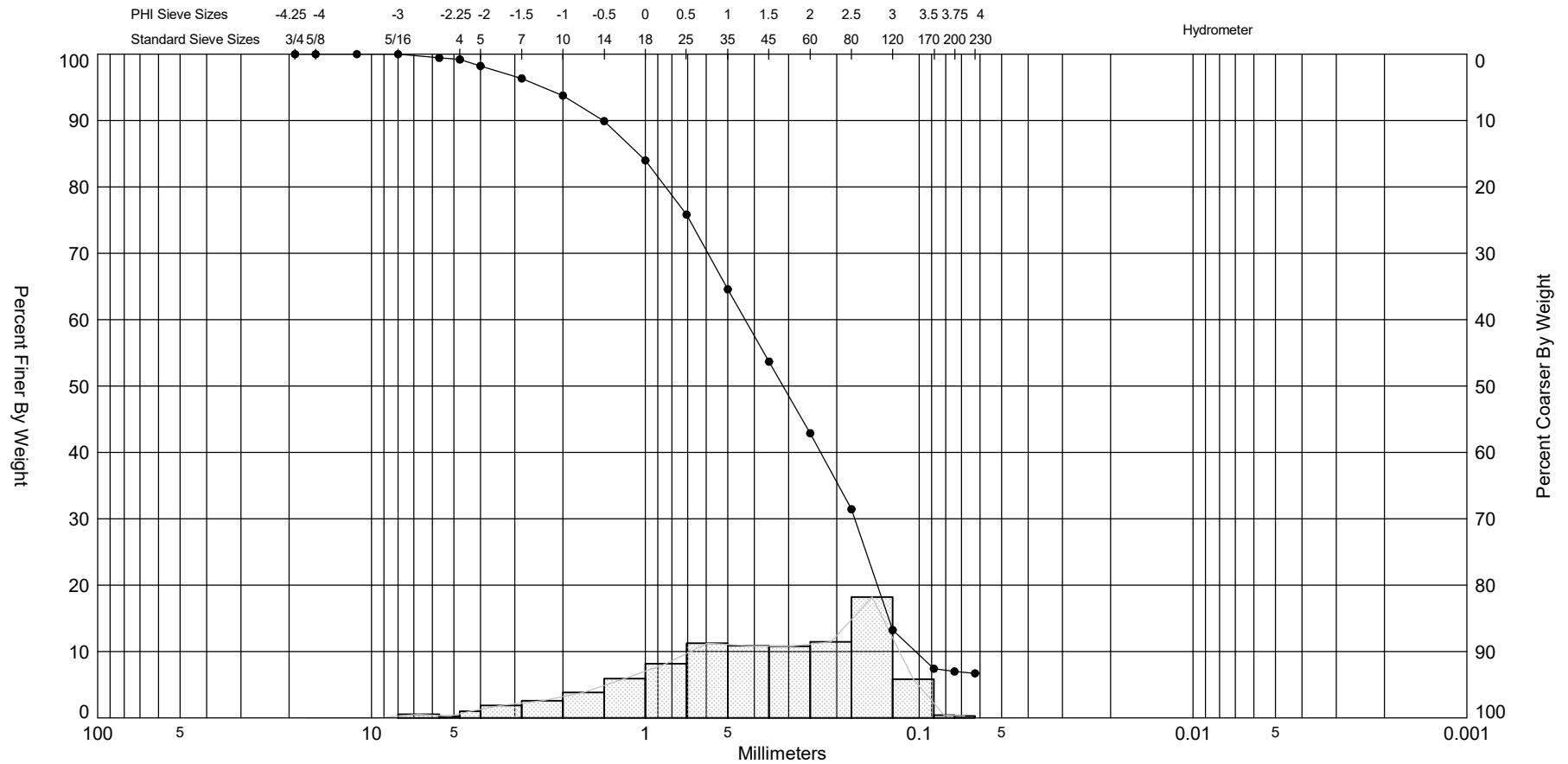
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-11A #S2							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2288592.579		Northing (ft): 45357.101		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -27.6 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 218.80	Wash Weight (g): 210.91	Pan Retained (g): 0.27	Sieve Loss (%): 0.00	Fines (%): #200 - 3.88 #230 - 3.73	Organics (%):	Carbonates (%): 18.50	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.43	0.20	0.43	0.20	
3.5	-2.50	5.66	3.15	1.44	3.58	1.64	
4	-2.25	4.76	1.32	0.60	4.90	2.24	
5	-2.00	4.00	2.41	1.10	7.31	3.34	
7	-1.50	2.83	6.18	2.82	13.49	6.17	
10	-1.00	2.00	9.93	4.54	23.42	10.70	
14	-0.50	1.41	12.30	5.62	35.72	16.33	
18	0.00	1.00	15.17	6.93	50.89	23.26	
25	0.50	0.71	14.22	6.50	65.11	29.76	
35	1.00	0.50	16.69	7.63	81.80	37.39	
45	1.50	0.35	17.63	8.06	99.43	45.44	
60	2.00	0.25	24.56	11.22	123.99	56.67	
80	2.50	0.18	31.71	14.49	155.70	71.16	
120	3.00	0.13	43.47	19.87	199.17	91.03	
170	3.50	0.09	10.53	4.81	209.70	95.84	
200	3.75	0.07	0.60	0.27	210.30	96.12	
230	4.00	0.06	0.34	0.16	210.64	96.27	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.41	2.82	2.60	1.70	0.13	-0.53	-1.71	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.21	0.43	1.55	-0.69	2.52		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-11A #S2	—●—	-27.6	SW	#200 - 3.88 #230 - 3.73		18.50	1.7	1.21	-0.69	2.52	1.55	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2288592.579
												Northing (Y, ft):	45357.101
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-11A #S3							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2288592.579		Northing (ft): 45357.101		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -28.6 NAVD 88	
USCS: SW-SM		Munsell:		Comments:			
Dry Weight (g): 213.10	Wash Weight (g): 199.30	Pan Retained (g): 0.50	Sieve Loss (%): 0.00	Fines (%): #200 - 6.99 #230 - 6.71	Organics (%):	Carbonates (%): 16.10	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.20	0.56	1.20	0.56	
4	-2.25	4.76	0.50	0.23	1.70	0.80	
5	-2.00	4.00	2.10	0.99	3.80	1.78	
7	-1.50	2.83	4.00	1.88	7.80	3.66	
10	-1.00	2.00	5.50	2.58	13.30	6.24	
14	-0.50	1.41	8.20	3.85	21.50	10.09	
18	0.00	1.00	12.60	5.91	34.10	16.00	
25	0.50	0.71	17.40	8.17	51.50	24.17	
35	1.00	0.50	24.00	11.26	75.50	35.43	
45	1.50	0.35	23.20	10.89	98.70	46.32	
60	2.00	0.25	23.00	10.79	121.70	57.11	
80	2.50	0.18	24.40	11.45	146.10	68.56	
120	3.00	0.13	38.80	18.21	184.90	86.77	
170	3.50	0.09	12.40	5.82	197.30	92.59	
200	3.75	0.07	0.90	0.42	198.20	93.01	
230	4.00	0.06	0.60	0.28	198.80	93.29	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.92	2.68	1.67	0.54	0.00	-1.24	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.34	0.40	1.38	-0.63	2.76		

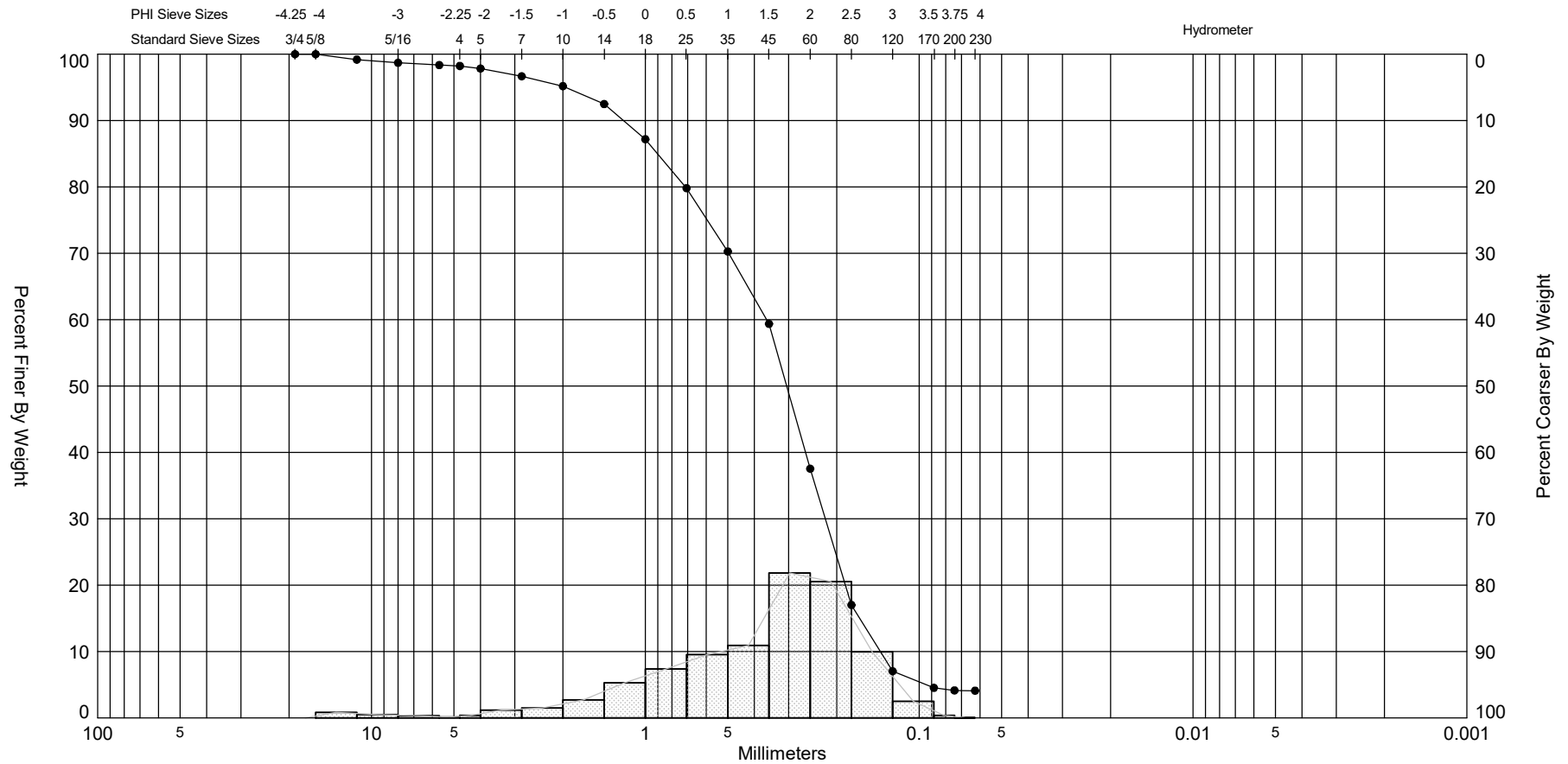


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-11A #S3	—●—	-28.6	SW-SM	#200 - 6.99 #230 - 6.71		16.10	1.67	1.34	-0.63	2.76	1.38	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2288592.579
												Northing (Y, ft):	45357.101
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-11A #S4							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2288592.579		Northing (ft): 45357.101		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -33.7 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 207.50	Wash Weight (g): 199.10	Pan Retained (g): 0.10	Sieve Loss (%): 0.00	Fines (%): #200 - 4.14 #230 - 4.10	Organics (%):	Carbonates (%): 16.10	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.70	0.82	1.70	0.82	
5/16"	-3.00	8.00	1.00	0.48	2.70	1.30	
3.5	-2.50	5.66	0.70	0.34	3.40	1.64	
4	-2.25	4.76	0.30	0.14	3.70	1.78	
5	-2.00	4.00	0.80	0.39	4.50	2.17	
7	-1.50	2.83	2.40	1.16	6.90	3.33	
10	-1.00	2.00	3.10	1.49	10.00	4.82	
14	-0.50	1.41	5.60	2.70	15.60	7.52	
18	0.00	1.00	11.00	5.30	26.60	12.82	
25	0.50	0.71	15.30	7.37	41.90	20.19	
35	1.00	0.50	19.80	9.54	61.70	29.73	
45	1.50	0.35	22.60	10.89	84.30	40.63	
60	2.00	0.25	45.30	21.83	129.60	62.46	
80	2.50	0.18	42.60	20.53	172.20	82.99	
120	3.00	0.13	20.70	9.98	192.90	92.96	
170	3.50	0.09	5.20	2.51	198.10	95.47	
200	3.75	0.07	0.80	0.39	198.90	95.86	
230	4.00	0.06	0.10	0.05	199.00	95.90	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.41	2.55	2.31	1.71	0.75	0.22	-0.97	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.36	0.39	1.27	-1.33	5.37		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19

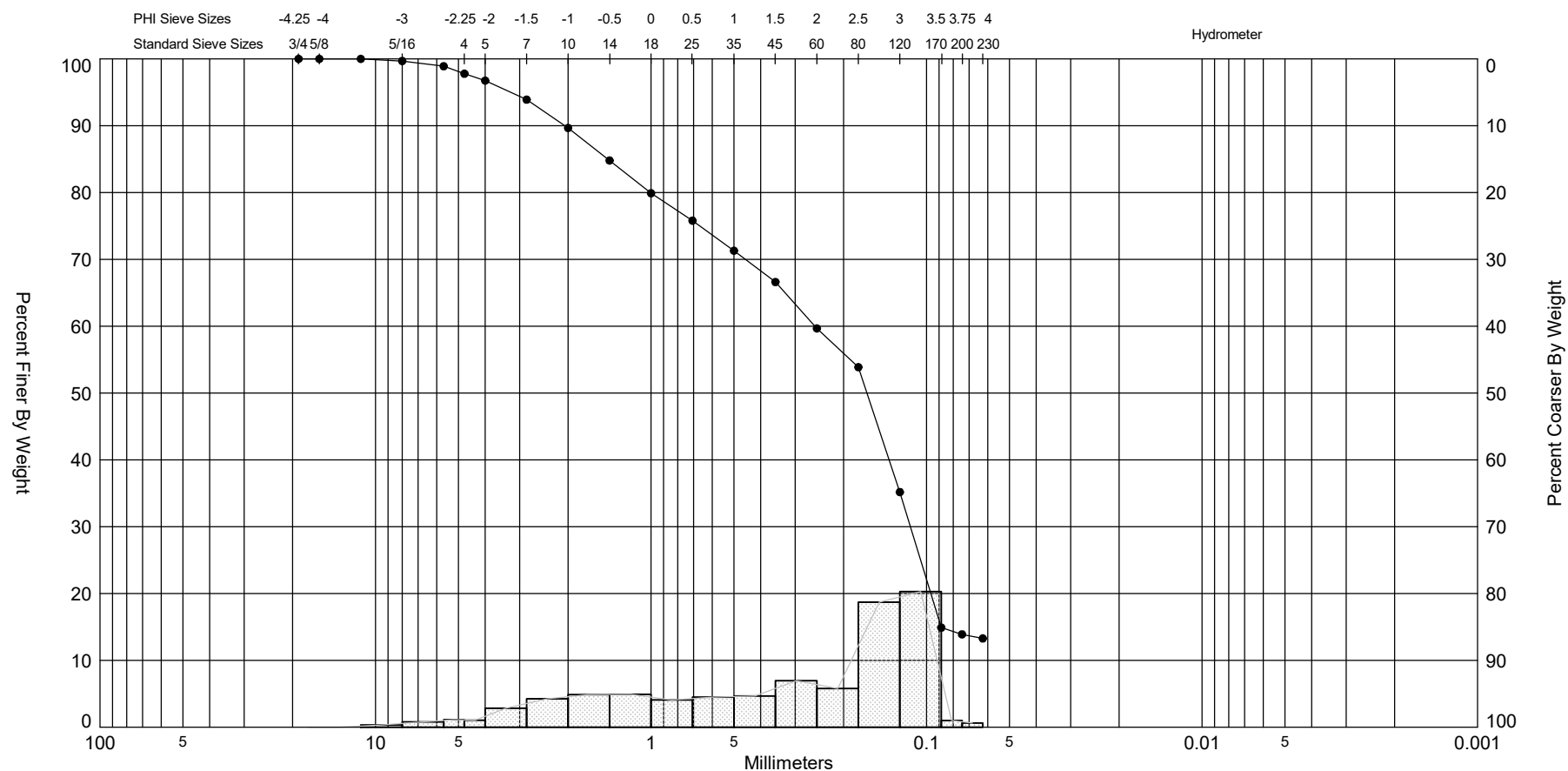


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-11A #S4	—●—	-33.7	SW	#200 - 4.14 #230 - 4.10		16.10	1.71	1.36	-1.33	5.37	1.27	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
							American Vibracore Services, Inc.						
							1215 Wallace Drive						
							Delray Beach, FL 33444						
												Easting (X, ft):	2288592.579
												Northing (Y, ft):	45357.101
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-11A #S5							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2288592.579		Northing (ft): 45357.101		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -35.1 NAVD 88	
USCS: SM		Munsell:		Comments:			
Dry Weight (g): 201.70	Wash Weight (g): 175.35	Pan Retained (g): 0.34	Sieve Loss (%): 0.05	Fines (%): #200 - 13.89 #230 - 13.28	Organics (%):	Carbonates (%):	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.65	0.32	0.65	0.32	
3.5	-2.50	5.66	1.57	0.78	2.22	1.10	
4	-2.25	4.76	2.26	1.12	4.48	2.22	
5	-2.00	4.00	2.07	1.03	6.55	3.25	
7	-1.50	2.83	5.75	2.85	12.30	6.10	
10	-1.00	2.00	8.56	4.24	20.86	10.34	
14	-0.50	1.41	9.79	4.85	30.65	15.20	
18	0.00	1.00	9.90	4.91	40.55	20.10	
25	0.50	0.71	8.27	4.10	48.82	24.20	
35	1.00	0.50	9.09	4.51	57.91	28.71	
45	1.50	0.35	9.44	4.68	67.35	33.39	
60	2.00	0.25	13.99	6.94	81.34	40.33	
80	2.50	0.18	11.70	5.80	93.04	46.13	
120	3.00	0.13	37.71	18.70	130.75	64.82	
170	3.50	0.09	40.89	20.27	171.64	85.10	
200	3.75	0.07	2.05	1.02	173.69	86.11	
230	4.00	0.06	1.22	0.60	174.91	86.72	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.47	3.25	2.60	0.59	-0.42	-1.69	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.56	0.34	1.75	-0.8	2.41		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-11A #S5		-35.1	SM	#200 - 13.89 #230 - 13.28			2.6	1.56	-0.8	2.41	1.75	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2288592.579
												Northing (Y, ft):	45357.101
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-12		LOCATION COORDINATES X = 2289595.113 Y = 45348.518		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200 HORIZONTAL NAD 1983 VERTICAL NAVD 88		
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL AVS 80 Pneumatic Sampler ☐ AUTO HAMMER ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES		
8. TOTAL DEPTH OF BORING 19.9 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING 03-06-19 10:19 COMPLETED 03-06-19 10:22		
		16. ELEVATION TOP OF BORING -20.1 Ft.		
		17. TOTAL RECOVERY FOR BORING 16 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-20.1	0.0					
					S1	Sample #S1, Depth = 1.6' Sample #C1, Depth = 0.0' - 7.0'
			Well graded sand (f-c), trace shell (up to 0.06' in size), light grayish brown (10YR 6/2) to, gray (10YR-6/1), (SW).	C1	S2	Sample #S2, Depth = 7.0'
-27.5	7.4					
			Well graded sand (f-c), few shell (up to 0.08' in size), gray (10YR-5/1), (SW-SM).	C2	S3	Sample #S3, Depth = 16.0' Sample #C2, Depth = 0.0' - 16.0'
-33.0	12.9					
			Well graded sand (f-c), trace to few shell (up to 0.08' in size), light gray (10YR-7/1), (SW-SM).			
-36.1	16.0					
			End of Boring			

FLORIDA DEP ROSS OAK ISLAND MULTI DECADEAL MASTER PLAN GPJ FL DEP ROSS GDT 8/2/19



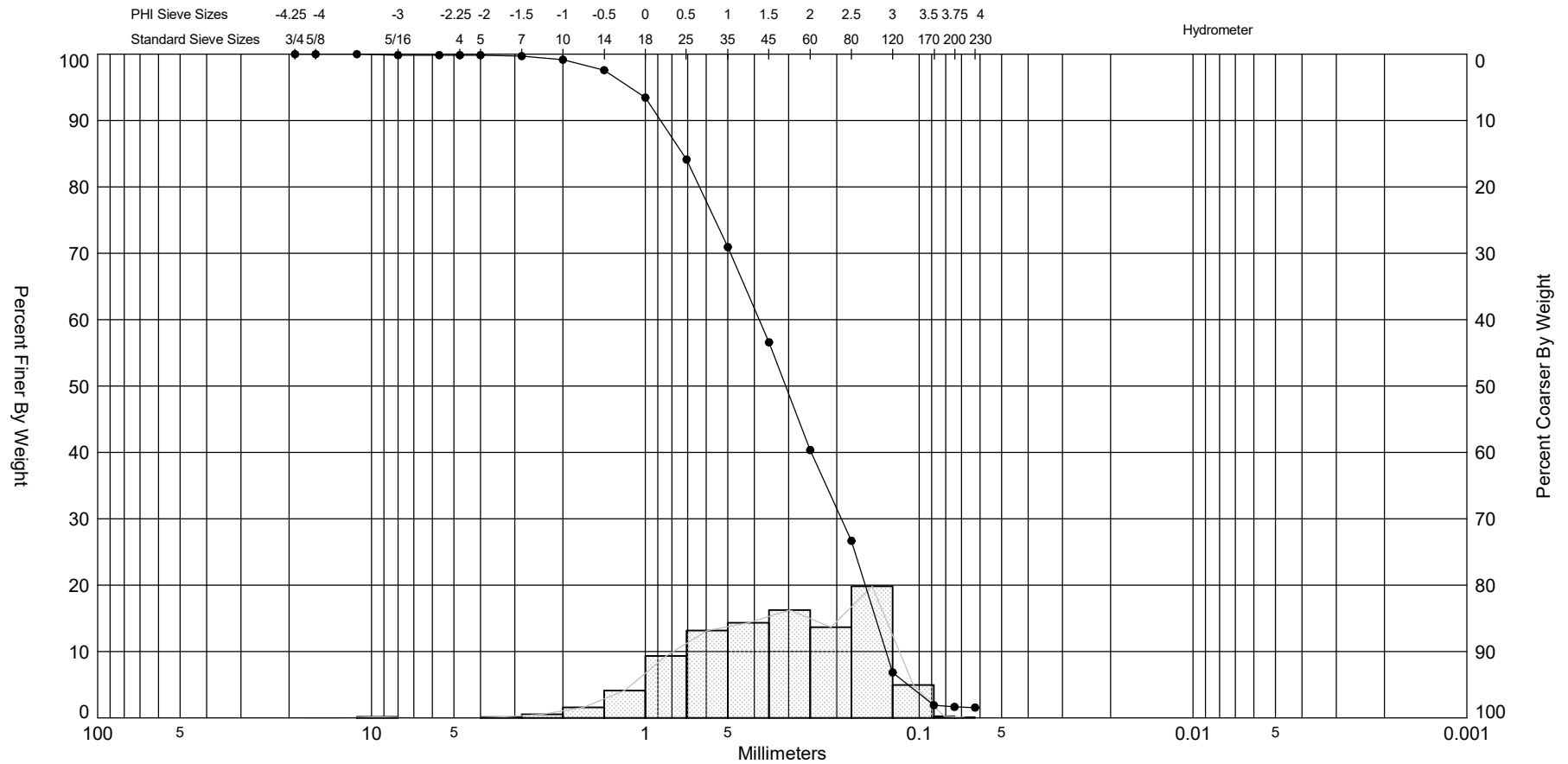
Oak Island Multi Decadal Master Plan 2019

2019-JB-12

Top of Core
Elevation
NAVD 88
-20.1 Ft

Scale in Tenths of Feet

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-12 #S1							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2289595.113		Northing (ft): 45348.518		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -21.7 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 203.50	Wash Weight (g): 200.35	Pan Retained (g): 0.02	Sieve Loss (%): 0.00	Fines (%): #200 - 1.66 #230 - 1.56	Organics (%):	Carbonates (%): 5.90	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.30	0.15	0.30	0.15	
3.5	-2.50	5.66	0.00	0.00	0.30	0.15	
4	-2.25	4.76	0.00	0.00	0.30	0.15	
5	-2.00	4.00	0.00	0.00	0.30	0.15	
7	-1.50	2.83	0.30	0.15	0.60	0.29	
10	-1.00	2.00	1.11	0.55	1.71	0.84	
14	-0.50	1.41	3.22	1.58	4.93	2.42	
18	0.00	1.00	8.39	4.12	13.32	6.55	
25	0.50	0.71	19.00	9.34	32.32	15.88	
35	1.00	0.50	26.82	13.18	59.14	29.06	
45	1.50	0.35	29.19	14.34	88.33	43.41	
60	2.00	0.25	33.06	16.25	121.39	59.65	
80	2.50	0.18	27.82	13.67	149.21	73.32	
120	3.00	0.13	40.35	19.83	189.56	93.15	
170	3.50	0.09	10.05	4.94	199.61	98.09	
200	3.75	0.07	0.51	0.25	200.12	98.34	
230	4.00	0.06	0.21	0.10	200.33	98.44	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.19	2.77	2.54	1.70	0.85	0.50	-0.19	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.6	0.33	1.05	-0.48	2.96		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

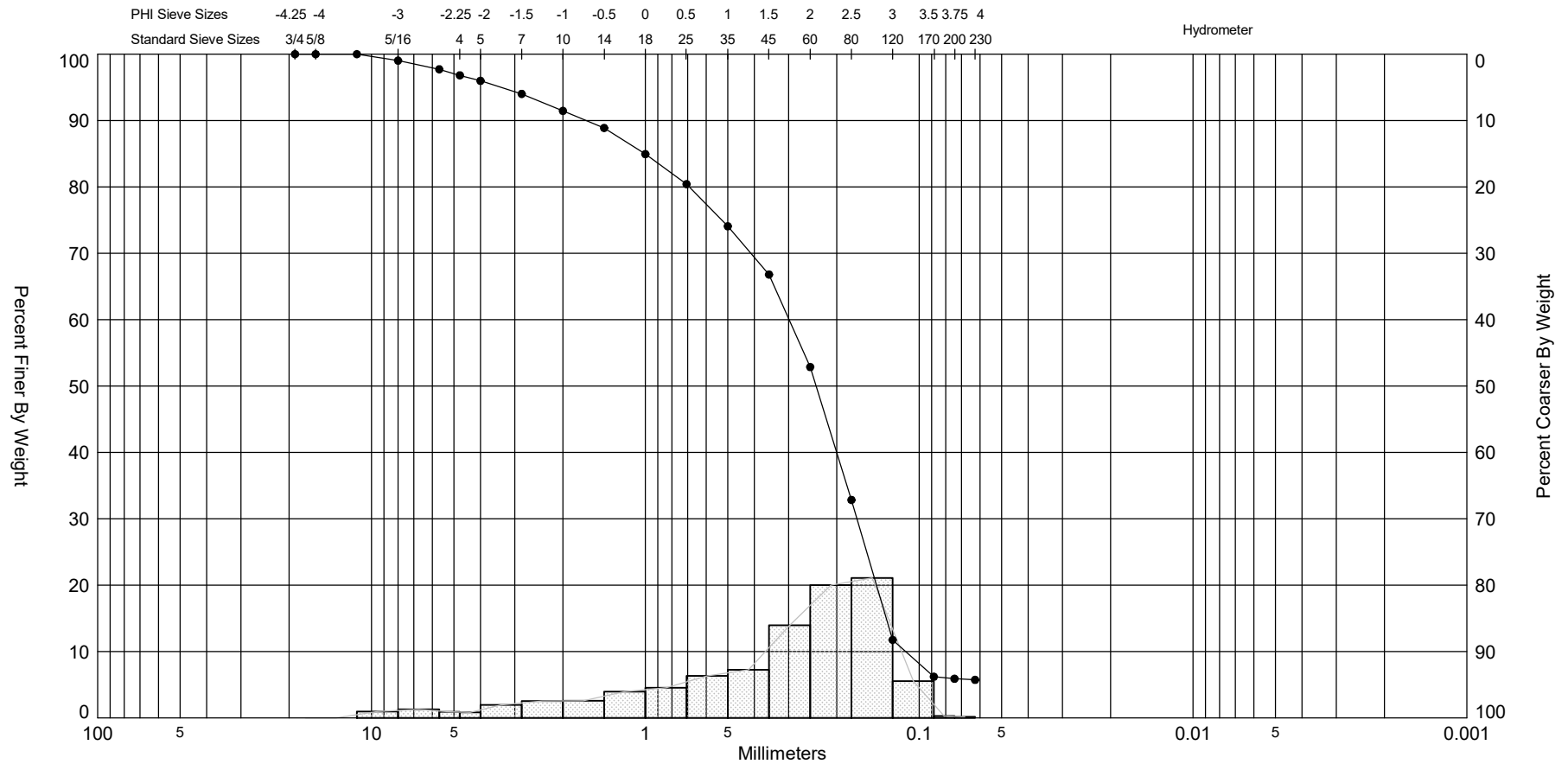
Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-12 #S1	—●—	-21.7	SW	#200 - 1.66 #230 - 1.56		5.90	1.7	1.6	-0.48	2.96	1.05	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289595.113
												Northing (Y, ft):	45348.518
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-12 #S2							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2289595.113		Northing (ft): 45348.518		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -27.1 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 216.70	Wash Weight (g): 207.30	Pan Retained (g): 0.40	Sieve Loss (%): 0.05	Fines (%): #200 - 5.12 #230 - 4.57	Organics (%):	Carbonates (%): 5.90	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.60	0.28	0.60	0.28	
3.5	-2.50	5.66	0.50	0.23	1.10	0.51	
4	-2.25	4.76	0.30	0.14	1.40	0.65	
5	-2.00	4.00	1.10	0.51	2.50	1.15	
7	-1.50	2.83	2.10	0.97	4.60	2.12	
10	-1.00	2.00	2.60	1.20	7.20	3.32	
14	-0.50	1.41	3.00	1.38	10.20	4.71	
18	0.00	1.00	5.60	2.58	15.80	7.29	
25	0.50	0.71	10.10	4.66	25.90	11.95	
35	1.00	0.50	15.60	7.20	41.50	19.15	
45	1.50	0.35	20.20	9.32	61.70	28.47	
60	2.00	0.25	19.70	9.09	81.40	37.56	
80	2.50	0.18	26.90	12.41	108.30	49.98	
120	3.00	0.13	61.10	28.20	169.40	78.17	
170	3.50	0.09	33.80	15.60	203.20	93.77	
200	3.75	0.07	2.40	1.11	205.60	94.88	
230	4.00	0.06	1.20	0.55	206.80	95.43	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.80	3.19	2.94	2.50	1.31	0.78	-0.44	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.98	0.25	1.26	-1.28	4.59		

Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-12 #S2		-27.1	SW	#200 - 5.12 #230 - 4.57		5.90	2.5	1.98	-1.28	4.59	1.26	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2289595.113
												Northing (Y, ft):	45348.518
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-12 #S3							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2289595.113		Northing (ft): 45348.518		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -36.1 NAVD 88	
USCS: SW-SM		Munsell:		Comments:			
Dry Weight (g): 208.36	Wash Weight (g): 196.69	Pan Retained (g): 0.22	Sieve Loss (%): 0.02	Fines (%): #200 - 5.90 #230 - 5.73	Organics (%):	Carbonates (%): 18.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	2.02	0.97	2.02	0.97	
3.5	-2.50	5.66	2.73	1.31	4.75	2.28	
4	-2.25	4.76	1.89	0.91	6.64	3.19	
5	-2.00	4.00	1.73	0.83	8.37	4.02	
7	-1.50	2.83	4.12	1.98	12.49	5.99	
10	-1.00	2.00	5.33	2.56	17.82	8.55	
14	-0.50	1.41	5.36	2.57	23.18	11.12	
18	0.00	1.00	8.20	3.94	31.38	15.06	
25	0.50	0.71	9.43	4.53	40.81	19.59	
35	1.00	0.50	13.22	6.34	54.03	25.93	
45	1.50	0.35	15.14	7.27	69.17	33.20	
60	2.00	0.25	29.05	13.94	98.22	47.14	
80	2.50	0.18	41.71	20.02	139.93	67.16	
120	3.00	0.13	43.95	21.09	183.88	88.25	
170	3.50	0.09	11.57	5.55	195.45	93.80	
200	3.75	0.07	0.62	0.30	196.07	94.10	
230	4.00	0.06	0.36	0.17	196.43	94.27	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.90	2.69	2.07	0.93	0.10	-1.75	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.51	0.35	1.5	-1.26	3.99		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-12 #S3	—●—	-36.1	SW-SM	#200 - 5.90 #230 - 5.73		18.80	2.07	1.51	-1.26	3.99	1.5	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289595.113
												Northing (Y, ft):	45348.518
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-13		LOCATION COORDINATES X = 2289602.136 Y = 44354.299		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200	HORIZONTAL NAD 1983	VERTICAL NAVD 88
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER AVS 80 Pneumatic Sampler ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)		
8. TOTAL DEPTH OF BORING 19.9 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING STARTED 03-06-19 10:40 COMPLETED 03-06-19 10:41		
		16. ELEVATION TOP OF BORING -20.8 Ft.		
		17. TOTAL RECOVERY FOR BORING 19.3 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS	
-20.8	0.0						
-22.3	1.5		Well graded sand (f-c), few shell fragments (up to 0.12' in size), grainsize and shell content increasing with depth, light gray (10YR-7/1), (SW).	C1	S1	Sample #S1, Depth = 1.5' Sample #C1, Depth = 0.0' - 3.1'	0
-23.9	3.1		Poorly graded silty sand (f-m), trace shell fragments (up to 0.04' in size), gray (10YR-5/1), (SP-SM).		S2	Sample #S2, Depth = 3.1'	
-25.2	4.4		Poorly graded silty sand (f-m), some shell fragments (up to 0.14' in size), gray (10YR-5/1), (SP-SM).		S3	Sample #S3, Depth = 4.4' Sample #C2, Depth = 3.1' - 10.5'	5
-31.4	10.6		Well graded sand (f-c), few to some shell fragments (up to 0.08' in size), dense shell concentrations from 6.1' - 6.8' ; and 7.3' - 7.4', gray (10YR-5/1), (SW).	C2	S4	Sample #S4, Depth = 10.5'	10
-40.1	19.3		Poorly graded silty sand (f-m), some shell fragments (shell up to 0.06' in size), silt nodules from 15.2' - 15.4' and 16.1' - 16.5', dark gray (10YR-4/1), (SP-SM).	C3	S5	Sample #S5, Depth = 12.2' Sample #C3, Depth = 10.5' - 12.2'	15
			End of Boring				20

FLORIDA DEP ROSS OAK ISLAND MULTI DECADEAL MASTER PLAN GPJ FL DEP ROSS GDT 8/2/19

Oak Island
Multi Decadal Master
Plan
2019

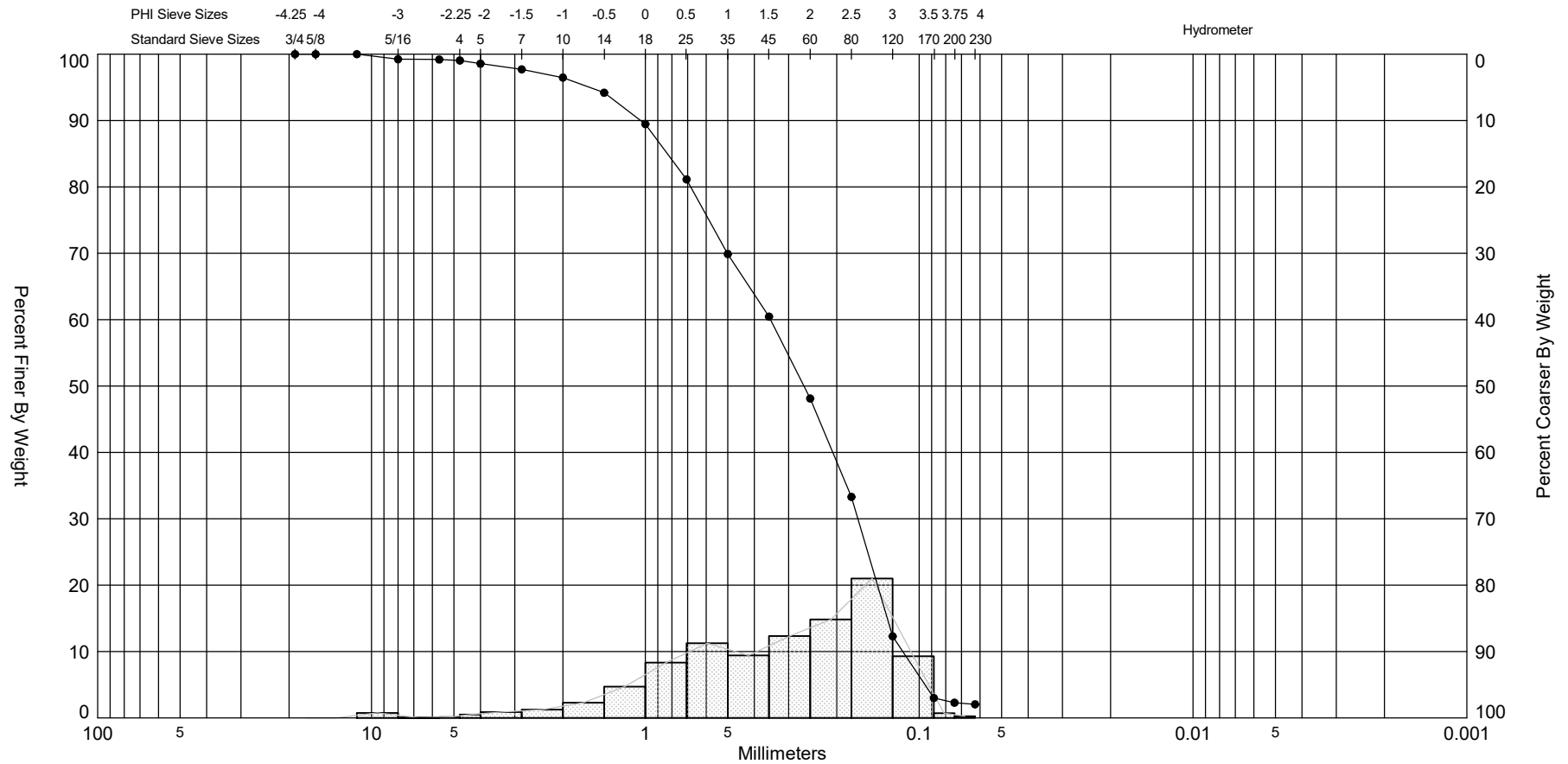
2019-JB-13

Top of Core
Elevation
NAVD 88
-20.8 Ft

Scale in Tenths of Feet



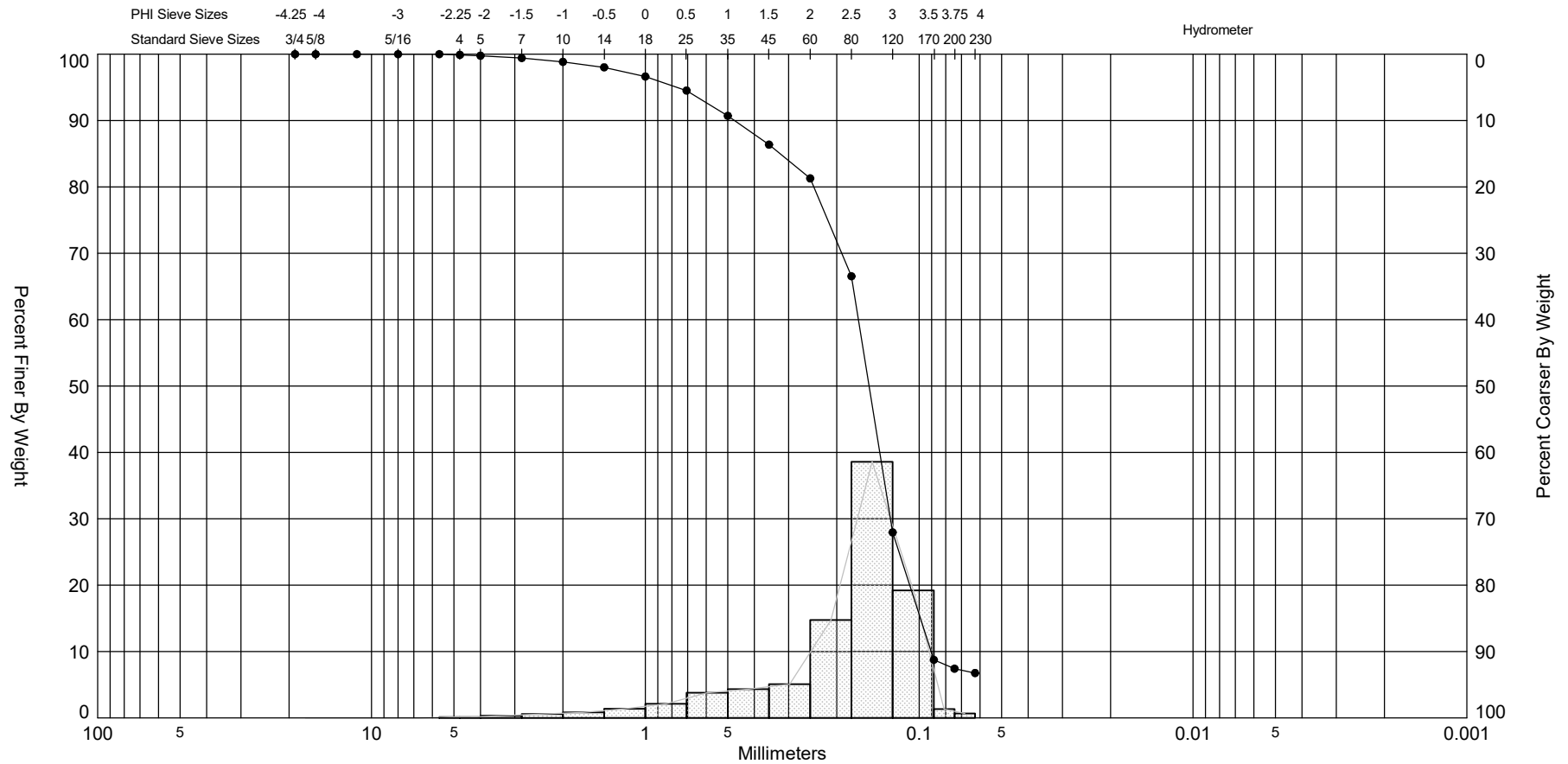
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-13 #S1							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2289602.136		Northing (ft): 44354.299		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -22.3 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 209.90	Wash Weight (g): 205.90	Pan Retained (g): 0.10	Sieve Loss (%): 0.10	Fines (%): #200 - 2.29 #230 - 2.05	Organics (%):	Carbonates (%): 10.00	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.60	0.76	1.60	0.76	
3.5	-2.50	5.66	0.10	0.05	1.70	0.81	
4	-2.25	4.76	0.30	0.14	2.00	0.95	
5	-2.00	4.00	1.00	0.48	3.00	1.43	
7	-1.50	2.83	1.80	0.86	4.80	2.29	
10	-1.00	2.00	2.60	1.24	7.40	3.53	
14	-0.50	1.41	4.80	2.29	12.20	5.81	
18	0.00	1.00	9.90	4.72	22.10	10.53	
25	0.50	0.71	17.50	8.34	39.60	18.87	
35	1.00	0.50	23.60	11.24	63.20	30.11	
45	1.50	0.35	19.80	9.43	83.00	39.54	
60	2.00	0.25	25.90	12.34	108.90	51.88	
80	2.50	0.18	31.10	14.82	140.00	66.70	
120	3.00	0.13	44.10	21.01	184.10	87.71	
170	3.50	0.09	19.50	9.29	203.60	97.00	
200	3.75	0.07	1.50	0.71	205.10	97.71	
230	4.00	0.06	0.50	0.24	205.60	97.95	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.39	2.91	2.70	1.92	0.77	0.33	-0.68	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.62	0.33	1.3	-0.92	3.83		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-13 #S1	—●—	-22.3	SW	#200 - 2.29 #230 - 2.05		10.00	1.92	1.62	-0.92	3.83	1.3	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289602.136
												Northing (Y, ft):	44354.299
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-13 #S2							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2289602.136		Northing (ft): 44354.299		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -23.9 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 204.60	Wash Weight (g): 191.28	Pan Retained (g): 0.51	Sieve Loss (%): 0.00	Fines (%): #200 - 7.42 #230 - 6.76	Organics (%):	Carbonates (%): 10.00	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	0.22	0.11	0.22	0.11	
5	-2.00	4.00	0.26	0.13	0.48	0.23	
7	-1.50	2.83	0.71	0.35	1.19	0.58	
10	-1.00	2.00	1.19	0.58	2.38	1.16	
14	-0.50	1.41	1.67	0.82	4.05	1.98	
18	0.00	1.00	2.84	1.39	6.89	3.37	
25	0.50	0.71	4.33	2.12	11.22	5.48	
35	1.00	0.50	7.79	3.81	19.01	9.29	
45	1.50	0.35	8.87	4.34	27.88	13.63	
60	2.00	0.25	10.42	5.09	38.30	18.72	
80	2.50	0.18	30.16	14.74	68.46	33.46	
120	3.00	0.13	78.95	38.59	147.41	72.05	
170	3.50	0.09	39.28	19.20	186.69	91.25	
200	3.75	0.07	2.72	1.33	189.41	92.58	
230	4.00	0.06	1.36	0.66	190.77	93.24	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.31	3.08	2.71	2.21	1.73	0.39	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	2.4	0.19	0.97	-1.86	6.94		

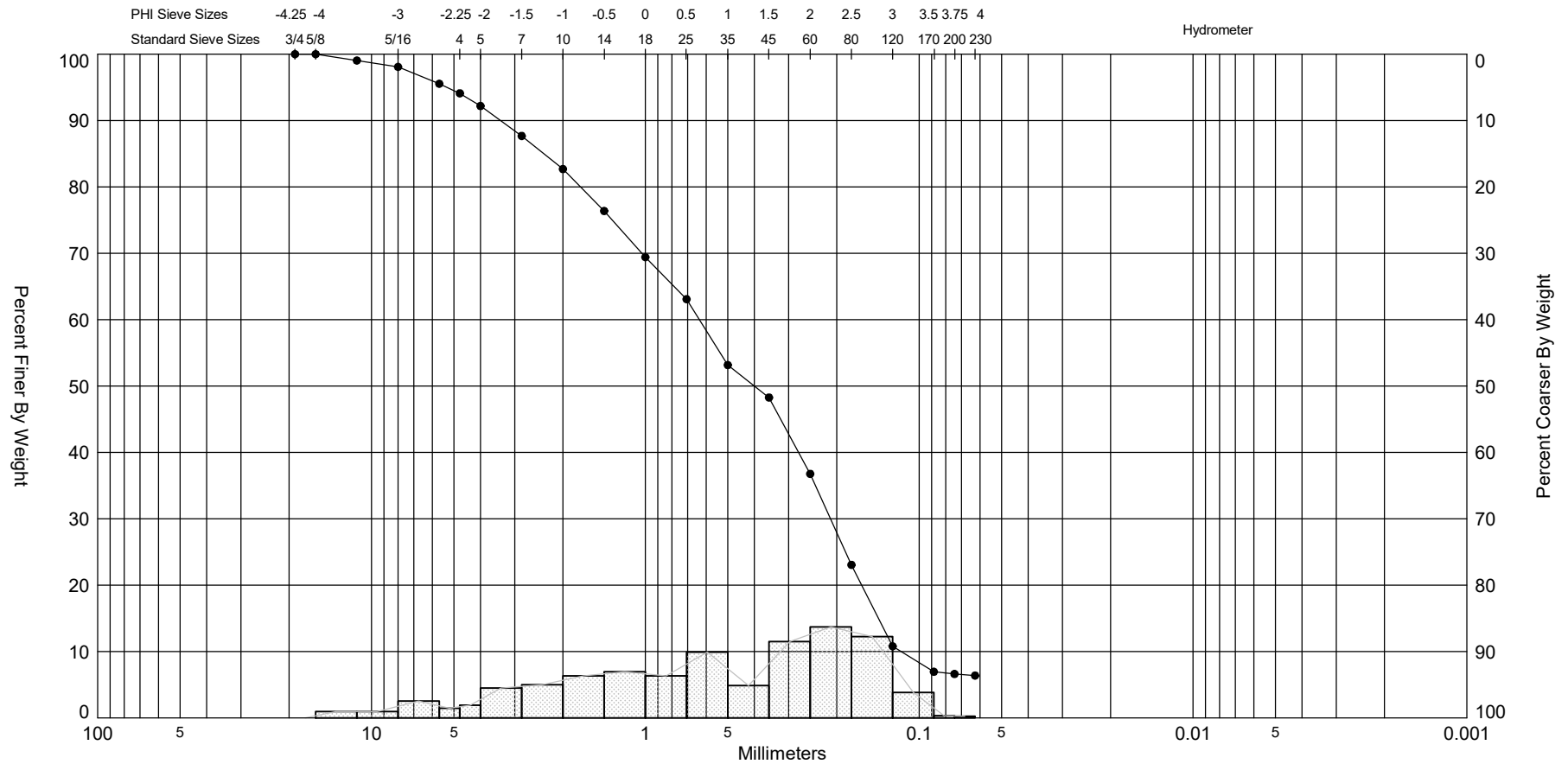


Gravel		Sand			Silt and Clay	
Coarse	Fine	Coarse	Medium	Fine		

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-13 #S2	—●—	-23.9	SP-SM	#200 - 7.42 #230 - 6.76		10.00	2.71	2.4	-1.86	6.94	0.97	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289602.136
												Northing (Y, ft):	44354.299
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-13 #S3							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2289602.136		Northing (ft): 44354.299		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -25.2 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 208.60	Wash Weight (g): 195.50	Pan Retained (g): 0.20	Sieve Loss (%): 0.00	Fines (%): #200 - 6.62 #230 - 6.38	Organics (%):	Carbonates (%): 21.10	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	2.00	0.96	2.00	0.96	
5/16"	-3.00	8.00	2.00	0.96	4.00	1.92	
3.5	-2.50	5.66	5.30	2.54	9.30	4.46	
4	-2.25	4.76	3.00	1.44	12.30	5.90	
5	-2.00	4.00	4.00	1.92	16.30	7.81	
7	-1.50	2.83	9.40	4.51	25.70	12.32	
10	-1.00	2.00	10.40	4.99	36.10	17.31	
14	-0.50	1.41	13.20	6.33	49.30	23.63	
18	0.00	1.00	14.50	6.95	63.80	30.58	
25	0.50	0.71	13.20	6.33	77.00	36.91	
35	1.00	0.50	20.70	9.92	97.70	46.84	
45	1.50	0.35	10.20	4.89	107.90	51.73	
60	2.00	0.25	24.00	11.51	131.90	63.23	
80	2.50	0.18	28.60	13.71	160.50	76.94	
120	3.00	0.13	25.60	12.27	186.10	89.21	
170	3.50	0.09	8.00	3.84	194.10	93.05	
200	3.75	0.07	0.70	0.34	194.80	93.38	
230	4.00	0.06	0.50	0.24	195.30	93.62	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.79	2.43	1.32	-0.40	-1.13	-2.41	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	0.78	0.58	1.75	-0.55	2.35		

SIEVE ANALYSIS OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



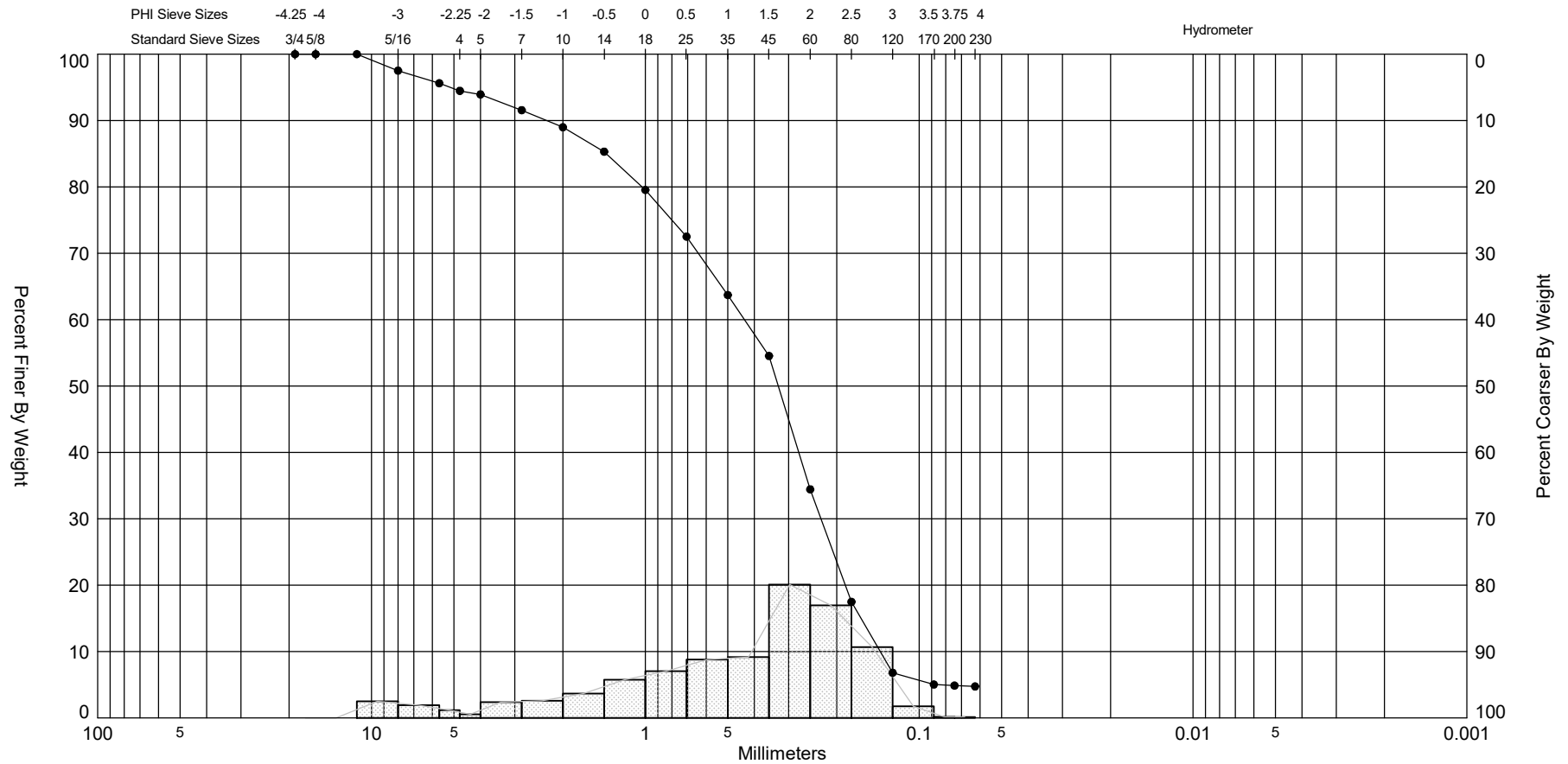
Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-13 #S3	—●—	-25.2	SP-SM	#200 - 6.62 #230 - 6.38		21.10	1.32	0.78	-0.55	2.35	1.75	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289602.136
												Northing (Y, ft):	44354.299
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-13 #S4							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2289602.136		Northing (ft): 44354.299		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -31.3 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 207.20	Wash Weight (g): 197.55	Pan Retained (g): 0.18	Sieve Loss (%): 0.00	Fines (%): #200 - 4.87 #230 - 4.74	Organics (%):	Carbonates (%): 21.10	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	5.14	2.48	5.14	2.48	
3.5	-2.50	5.66	3.93	1.90	9.07	4.38	
4	-2.25	4.76	2.39	1.15	11.46	5.53	
5	-2.00	4.00	1.12	0.54	12.58	6.07	
7	-1.50	2.83	4.91	2.37	17.49	8.44	
10	-1.00	2.00	5.33	2.57	22.82	11.01	
14	-0.50	1.41	7.61	3.67	30.43	14.69	
18	0.00	1.00	11.97	5.78	42.40	20.46	
25	0.50	0.71	14.56	7.03	56.96	27.49	
35	1.00	0.50	18.23	8.80	75.19	36.29	
45	1.50	0.35	19.03	9.18	94.22	45.47	
60	2.00	0.25	41.65	20.10	135.87	65.57	
80	2.50	0.18	35.12	16.95	170.99	82.52	
120	3.00	0.13	22.13	10.68	193.12	93.20	
170	3.50	0.09	3.65	1.76	196.77	94.97	
200	3.75	0.07	0.33	0.16	197.10	95.13	
230	4.00	0.06	0.27	0.13	197.37	95.26	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.55	2.57	2.28	1.61	0.32	-0.39	-2.37	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.06	0.48	1.55	-1.07	3.55		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19

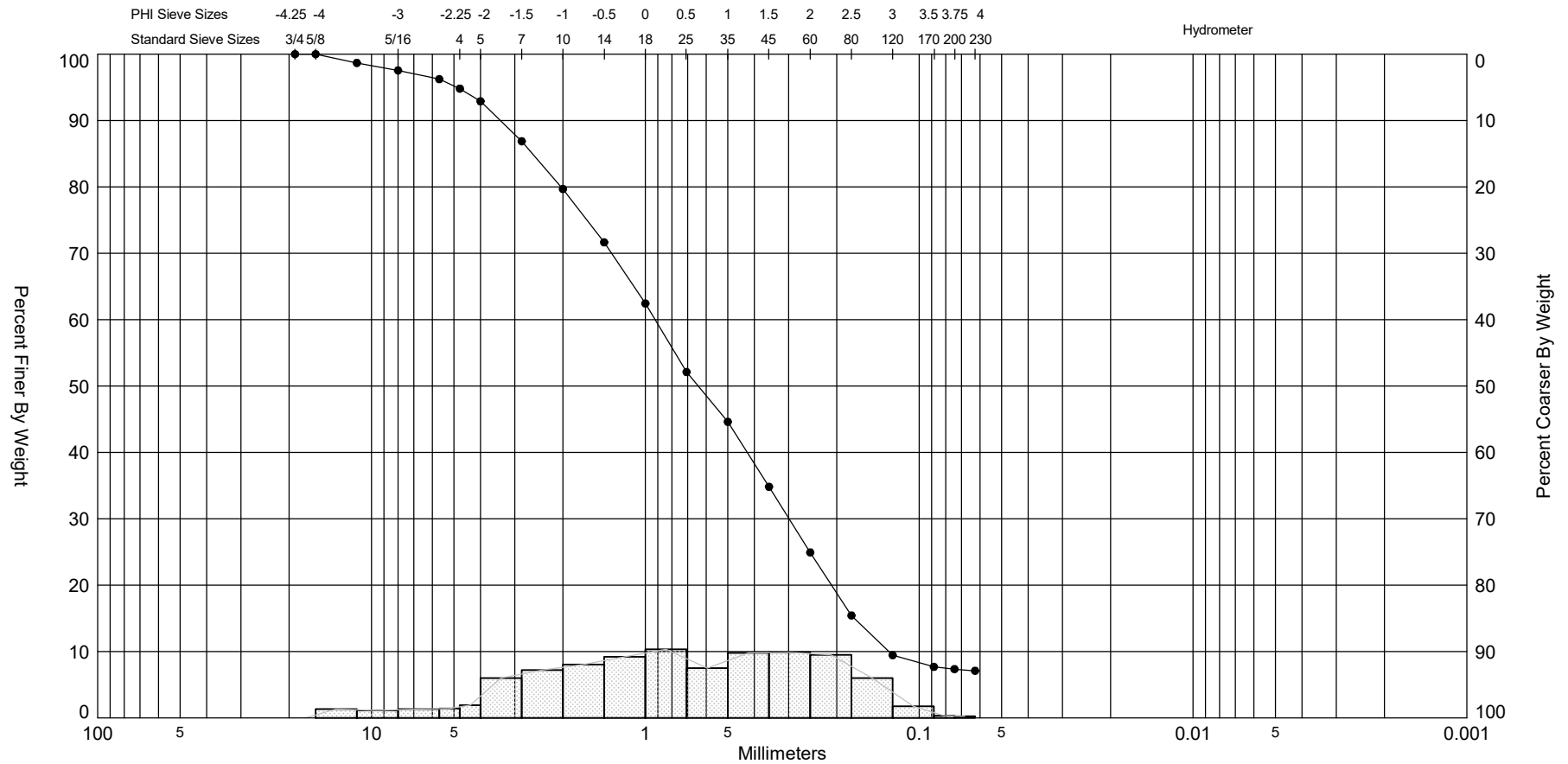


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-13 #S4	—●—	-31.3	SW	#200 - 4.87 #230 - 4.74		21.10	1.61	1.06	-1.07	3.55	1.55	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289602.136
												Northing (Y, ft):	44354.299
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-13 #S5							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2289602.136		Northing (ft): 44354.299		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -33.0 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 204.20	Wash Weight (g): 190.30	Pan Retained (g): 0.40	Sieve Loss (%): 0.10	Fines (%): #200 - 7.35 #230 - 7.10	Organics (%):	Carbonates (%): 49.90	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	2.70	1.32	2.70	1.32	
5/16"	-3.00	8.00	2.30	1.13	5.00	2.45	
3.5	-2.50	5.66	2.70	1.32	7.70	3.77	
4	-2.25	4.76	2.90	1.42	10.60	5.19	
5	-2.00	4.00	3.90	1.91	14.50	7.10	
7	-1.50	2.83	12.30	6.02	26.80	13.12	
10	-1.00	2.00	14.70	7.20	41.50	20.32	
14	-0.50	1.41	16.40	8.03	57.90	28.35	
18	0.00	1.00	18.80	9.21	76.70	37.56	
25	0.50	0.71	21.10	10.33	97.80	47.89	
35	1.00	0.50	15.30	7.49	113.10	55.39	
45	1.50	0.35	20.00	9.79	133.10	65.18	
60	2.00	0.25	20.20	9.89	153.30	75.07	
80	2.50	0.18	19.40	9.50	172.70	84.57	
120	3.00	0.13	12.20	5.97	184.90	90.55	
170	3.50	0.09	3.60	1.76	188.50	92.31	
200	3.75	0.07	0.70	0.34	189.20	92.65	
230	4.00	0.06	0.50	0.24	189.70	92.90	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.47	2.00	0.64	-0.71	-1.30	-2.28	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	0.39	0.76	1.64	-0.29	2.4		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-13 #S5	—●—	-33.0	SP-SM	#200 - 7.35 #230 - 7.10		49.90	0.64	0.39	-0.29	2.4	1.64	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289602.136
												Northing (Y, ft):	44354.299
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

DRILLING LOG		DIVISION Moffatt Nichol		INSTALLATION Raleigh, Nc		SHEET 1 OF 1 SHEETS	
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing 				9. SIZE AND TYPE OF BIT 4.0 In.			
				10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200		HORIZONTAL NAD 1983	
2. BORING DESIGNATION 2019-JB-17		LOCATION COORDINATES X = 2285603.086 Y = 46356.272		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER AVS 80 Pneumatic Sampler ☐ MANUAL HAMMER			
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		12. TOTAL SAMPLES		DISTURBED UNDISTURBED (UD)	
4. NAME OF DRILLER Brian McCord				13. TOTAL NUMBER CORE BOXES 1			
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		DEG. FROM VERTICAL		BEARING		14. ELEVATION GROUND WATER	
6. THICKNESS OF OVERBURDEN 0.0 Ft.				15. DATE BORING		STARTED 03-14-19 16:19 COMPLETED 03-14-19 16:23	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.				16. ELEVATION TOP OF BORING -28.4 Ft.			
8. TOTAL DEPTH OF BORING 14.9 Ft.				17. TOTAL RECOVERY FOR BORING 14 Ft.			
				18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting			

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-28.4	0.0					
-29.1	0.7		Poorly graded silty sand (f-m), trace to few shell fragments (up to 0.02' in size), silt content decreasing with depth, dark gray (10YR-4/1), (SP-SM).	C1	S1	Sample #S1, Depth = 1.3' Sample #C1, Depth = 0.0' - 1.3'
			Poorly graded sand (f-m), trace shell fragments (up to 0.04' in size), dark gray (10YR 4/1) silt nodules from 6.7' - 6.8' ; 7.7' - 7.8' ; 10.4' - 10.5' ; and 11.0' - 11.1', sand grainsize increasing with depth, light gray (10YR-7/1), (SP).	C2	S2	Sample #S2, Depth = 11.6' Sample #C2, Depth = 1.3' - 14.0'
-40.1	11.7					
-40.4	12.0		Well graded sand (f-c), some shell fragments (up to 0.04' in size), gray (10YR-6/1), (SW).			
			Well graded sand (f-c), trace shell fragments (up to 0.02' in size), light gray (10YR-7/1), (SW).		S3	Sample #S3, Depth = 14.0'
-42.4	14.0					
			End of Boring			



Oak Island
Multi Decadal Master
Plan
2019

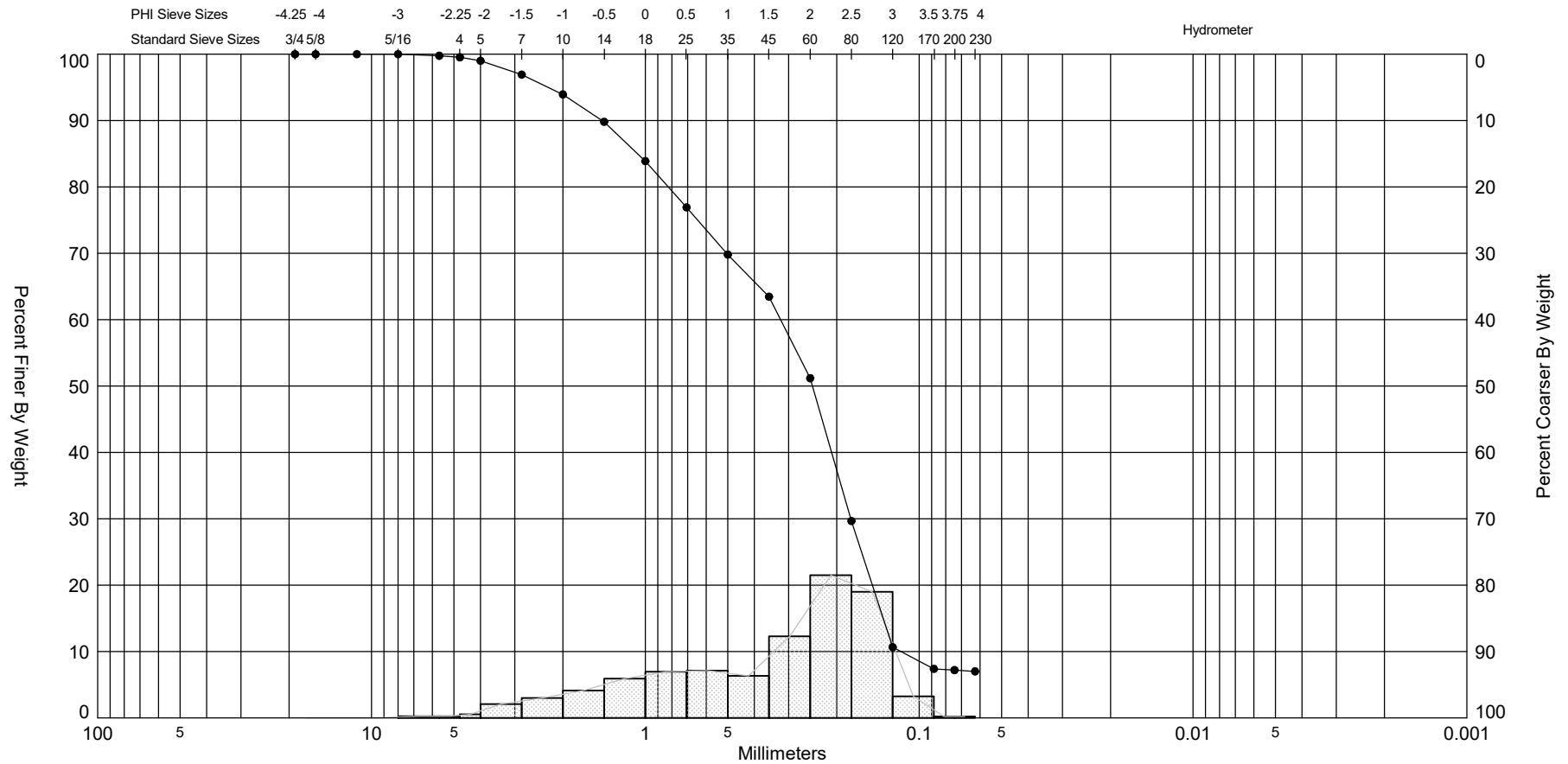
2019-JB-17

Top of Core
Elevation
NAVD 88
-28.4 Ft

Scale in Tenths of Feet

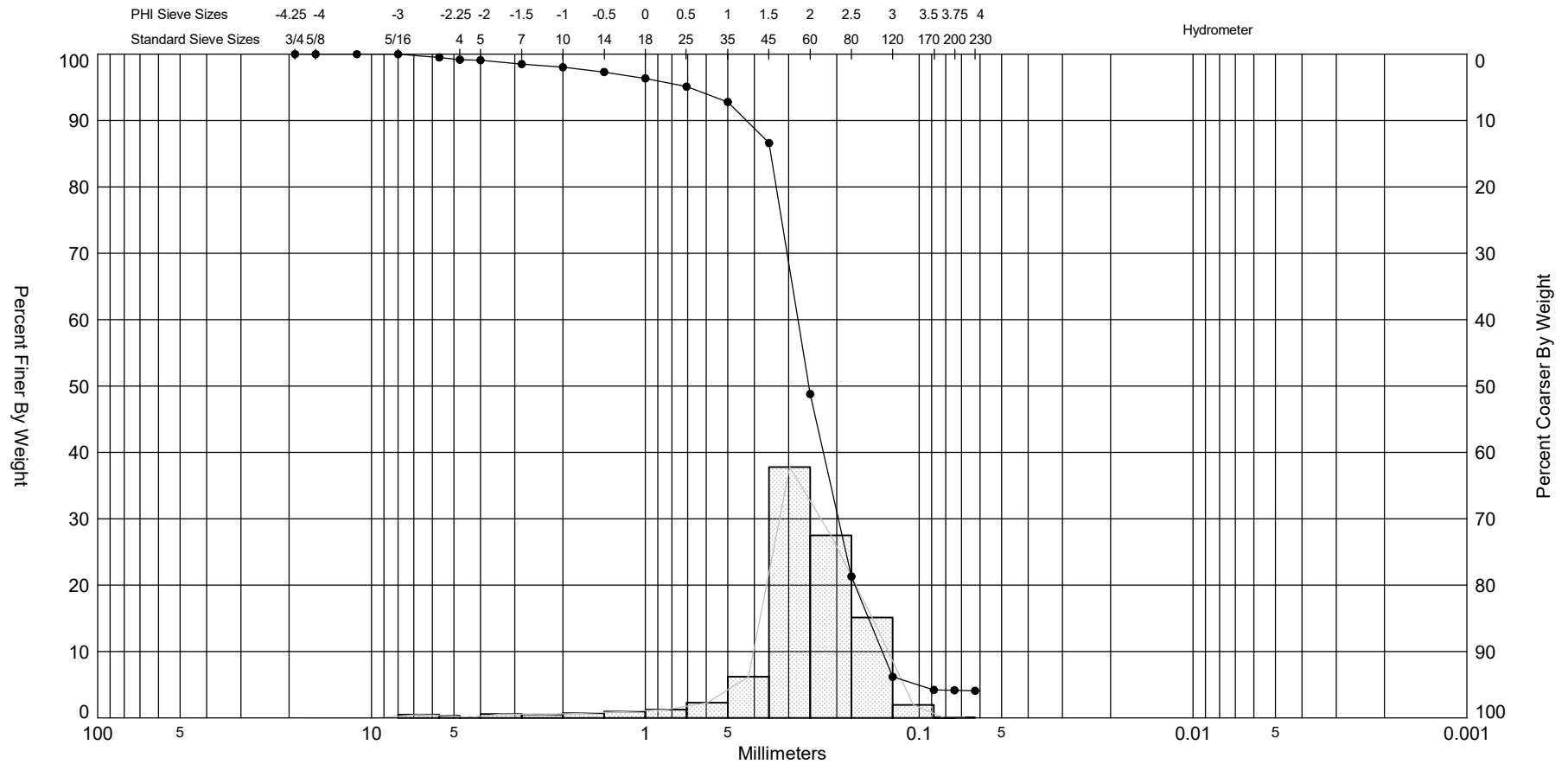
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-17 #S1							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2285603.086		Northing (ft): 46356.272		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -29.7 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 211.00	Wash Weight (g): 196.50	Pan Retained (g): 0.30	Sieve Loss (%): 0.00	Fines (%): #200 - 7.20 #230 - 7.01	Organics (%):	Carbonates (%): 14.70	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.50	0.24	0.50	0.24	
4	-2.25	4.76	0.50	0.24	1.00	0.47	
5	-2.00	4.00	1.10	0.52	2.10	1.00	
7	-1.50	2.83	4.40	2.09	6.50	3.08	
10	-1.00	2.00	6.30	2.99	12.80	6.07	
14	-0.50	1.41	8.70	4.12	21.50	10.19	
18	0.00	1.00	12.50	5.92	34.00	16.11	
25	0.50	0.71	14.70	6.97	48.70	23.08	
35	1.00	0.50	15.00	7.11	63.70	30.19	
45	1.50	0.35	13.40	6.35	77.10	36.54	
60	2.00	0.25	25.90	12.27	103.00	48.82	
80	2.50	0.18	45.40	21.52	148.40	70.33	
120	3.00	0.13	40.10	19.00	188.50	89.34	
170	3.50	0.09	6.90	3.27	195.40	92.61	
200	3.75	0.07	0.40	0.19	195.80	92.80	
230	4.00	0.06	0.40	0.19	196.20	92.99	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.86	2.62	2.03	0.64	-0.01	-1.18	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.45	0.37	1.34	-0.86	2.83		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-17 #S1	—●—	-29.7	SP-SM	#200 - 7.20 #230 - 7.01		14.70	2.03	1.45	-0.86	2.83	1.34	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444							Easting (X, ft):		2285603.086				
							Northing (Y, ft):		46356.272				
							Horizontal System:		NAD 1983				
							Vertical System:		NAVD 88				

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-17 #S2							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2285603.086		Northing (ft): 46356.272		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -40.0 NAVD 88	
USCS: SP		Munsell:		Comments:			
Dry Weight (g): 208.40	Wash Weight (g): 200.10	Pan Retained (g): 0.20	Sieve Loss (%): 0.00	Fines (%): #200 - 4.17 #230 - 4.08	Organics (%):	Carbonates (%): 11.00	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.00	0.48	1.00	0.48	
4	-2.25	4.76	0.70	0.34	1.70	0.82	
5	-2.00	4.00	0.20	0.10	1.90	0.91	
7	-1.50	2.83	1.20	0.58	3.10	1.49	
10	-1.00	2.00	1.00	0.48	4.10	1.97	
14	-0.50	1.41	1.50	0.72	5.60	2.69	
18	0.00	1.00	2.00	0.96	7.60	3.65	
25	0.50	0.71	2.60	1.25	10.20	4.89	
35	1.00	0.50	4.80	2.30	15.00	7.20	
45	1.50	0.35	12.90	6.19	27.90	13.39	
60	2.00	0.25	78.80	37.81	106.70	51.20	
80	2.50	0.18	57.30	27.50	164.00	78.69	
120	3.00	0.13	31.50	15.12	195.50	93.81	
170	3.50	0.09	4.10	1.97	199.60	95.78	
200	3.75	0.07	0.10	0.05	199.70	95.83	
230	4.00	0.06	0.20	0.10	199.90	95.92	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.30	2.68	2.43	1.98	1.65	1.53	0.52	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.89	0.27	0.84	-2.43	12.23		

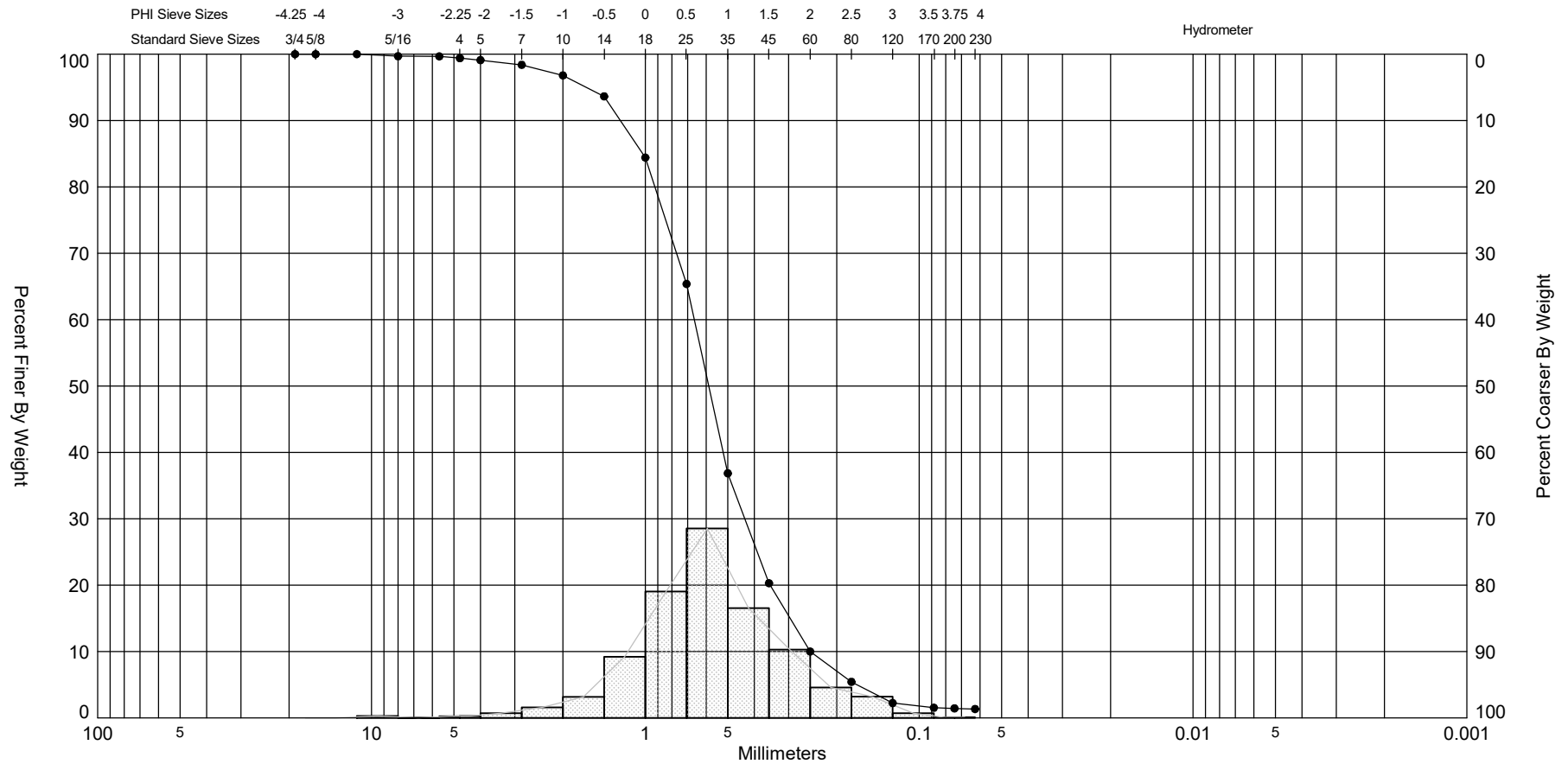


Sample Information											
Project Name:	Oak Island Multi Decadal Master Plan										
Analysis Date:	04-22-19										
Analized By:	FKJ										
Easting (X, ft):	2285603.086										
Northing (Y, ft):	46356.272										
Horizontal System:	NAD 1983										
Vertical System:	NAVD 88										



American Vibracore Services, Inc.
1215 Wallace Drive
Delray Beach, FL 33444

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-17 #S3							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2285603.086		Northing (ft): 46356.272		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -42.4 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 206.50	Wash Weight (g): 203.74	Pan Retained (g): 0.00	Sieve Loss (%): 0.00	Fines (%): #200 - 1.43 #230 - 1.34	Organics (%):	Carbonates (%): 11.00	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.65	0.31	0.65	0.31	
3.5	-2.50	5.66	0.04	0.02	0.69	0.33	
4	-2.25	4.76	0.54	0.26	1.23	0.60	
5	-2.00	4.00	0.62	0.30	1.85	0.90	
7	-1.50	2.83	1.47	0.71	3.32	1.61	
10	-1.00	2.00	3.28	1.59	6.60	3.20	
14	-0.50	1.41	6.53	3.16	13.13	6.36	
18	0.00	1.00	19.04	9.22	32.17	15.58	
25	0.50	0.71	39.31	19.04	71.48	34.62	
35	1.00	0.50	58.93	28.54	130.41	63.15	
45	1.50	0.35	34.20	16.56	164.61	79.71	
60	2.00	0.25	21.24	10.29	185.85	90.00	
80	2.50	0.18	9.44	4.57	195.29	94.57	
120	3.00	0.13	6.58	3.19	201.87	97.76	
170	3.50	0.09	1.47	0.71	203.34	98.47	
200	3.75	0.07	0.20	0.10	203.54	98.57	
230	4.00	0.06	0.20	0.10	203.74	98.66	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
2.57	1.71	1.36	0.77	0.25	0.01	-0.72	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	0.78	0.58	0.93	-0.25	4.55		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-17 #S3	—●—	-42.4	SW	#200 - 1.43 #230 - 1.34		11.00	0.77	0.78	-0.25	4.55	0.93	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-22-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2285603.086
												Northing (Y, ft):	46356.272
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-18		LOCATION COORDINATES X = 2285602.667 Y = 47361.472		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200	HORIZONTAL NAD 1983	VERTICAL NAVD 88
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER AVS 80 Pneumatic Sampler ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)		
8. TOTAL DEPTH OF BORING 16.8 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING STARTED COMPLETED 03-14-19 16:35 03-14-19 16:39		
		16. ELEVATION TOP OF BORING -26.7 Ft.		
		17. TOTAL RECOVERY FOR BORING 16.6 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-26.7	0.0					
-27.2	0.5		Poorly graded silty sand (f-m), trace to few shell fragments (up to 0.02' in size), dark gray (10YR-4/1), (SP-SM).		S1	Sample #S1, Depth = 0.5' Sample #C1, Depth = 0.0' - 6.0'
			Well graded sand (f-c), few shell fragments (up to 0.04' in size), silt nodules from 4.4' - 4.6', light gray (10YR-7/1), (SW).	C1	S2	Sample #S2, Depth = 6.0'
-32.7	6.0					
-32.9	6.2		Sandy silt, dark gray (10YR-4/1), (ML).			
			Poorly graded sand (f-m), very dark gray (10YR 3/1) silt nodules from 6.7' - 6.9' ; 7.3' - 7.4' ; 8.4' - 8.5' ; and 10.4' - 10.6', light gray (10YR-7/1), (SP).		S3	Sample #S3, Depth = 11.0' Sample #C2, Depth = 6.0' - 16.6'
-37.7	11.0			C2		
			Well graded sand (f-c), few to some shell (up to 0.08' in size) increasing with depth, gray (10YR-6/1), (SW).		S4	Sample #S4, Depth = 16.6'
-41.3	14.6					
			Well graded sand (f-c), few shell (up to 0.08' in size), gray (10YR-6/1), (SW).			
-43.3	16.6					
			End of Boring			

FLORIDA DEP ROSS OAK ISLAND MULTI DECADEAL MASTER PLAN GPJ FL DEP ROSS GDT 8/2/19



Oak Island
Multi Decadal Master
Plan
2019

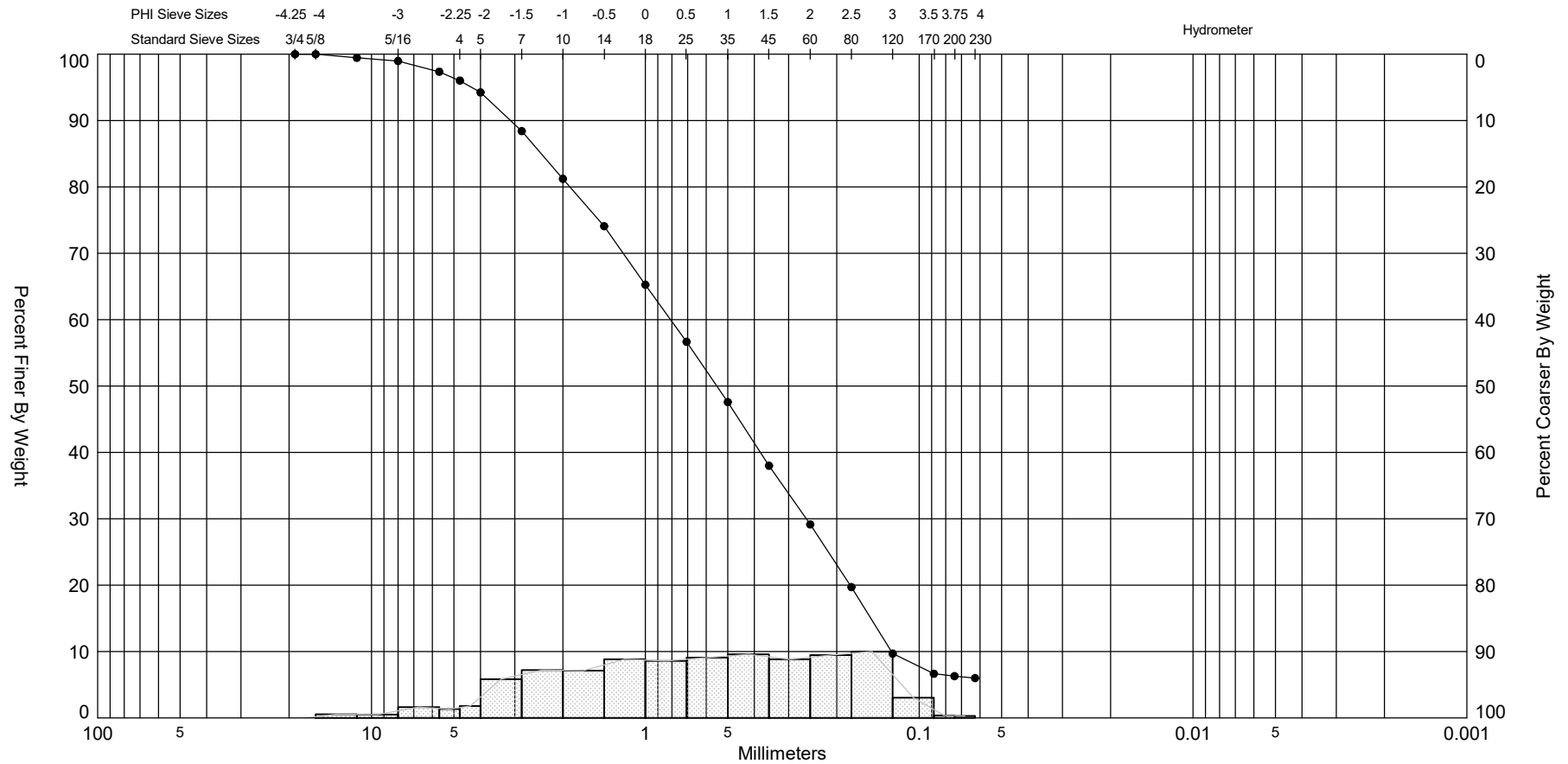
2019-JB-18

Top of Core
Elevation
NAVD 88
-26.7 Ft

Scale in Tenths of Feet

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-18 #S1							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2285602.667		Northing (ft): 47361.472		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -27.2 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 209.77	Wash Weight (g): 197.63	Pan Retained (g): 0.45	Sieve Loss (%): 0.00	Fines (%): #200 - 6.29 #230 - 6.00	Organics (%):	Carbonates (%): 21.20	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.16	0.55	1.16	0.55	
5/16"	-3.00	8.00	1.00	0.48	2.16	1.03	
3.5	-2.50	5.66	3.39	1.62	5.55	2.65	
4	-2.25	4.76	2.79	1.33	8.34	3.98	
5	-2.00	4.00	3.75	1.79	12.09	5.76	
7	-1.50	2.83	12.22	5.83	24.31	11.59	
10	-1.00	2.00	15.09	7.19	39.40	18.78	
14	-0.50	1.41	14.98	7.14	54.38	25.92	
18	0.00	1.00	18.50	8.82	72.88	34.74	
25	0.50	0.71	18.03	8.60	90.91	43.34	
35	1.00	0.50	19.06	9.09	109.97	52.42	
45	1.50	0.35	20.10	9.58	130.07	62.01	
60	2.00	0.25	18.55	8.84	148.62	70.85	
80	2.50	0.18	19.83	9.45	168.45	80.30	
120	3.00	0.13	20.99	10.01	189.44	90.31	
170	3.50	0.09	6.38	3.04	195.82	93.35	
200	3.75	0.07	0.75	0.36	196.57	93.71	
230	4.00	0.06	0.61	0.29	197.18	94.00	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.68	2.22	0.87	-0.56	-1.19	-2.11	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	0.59	0.66	1.64	-0.26	2.21		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19

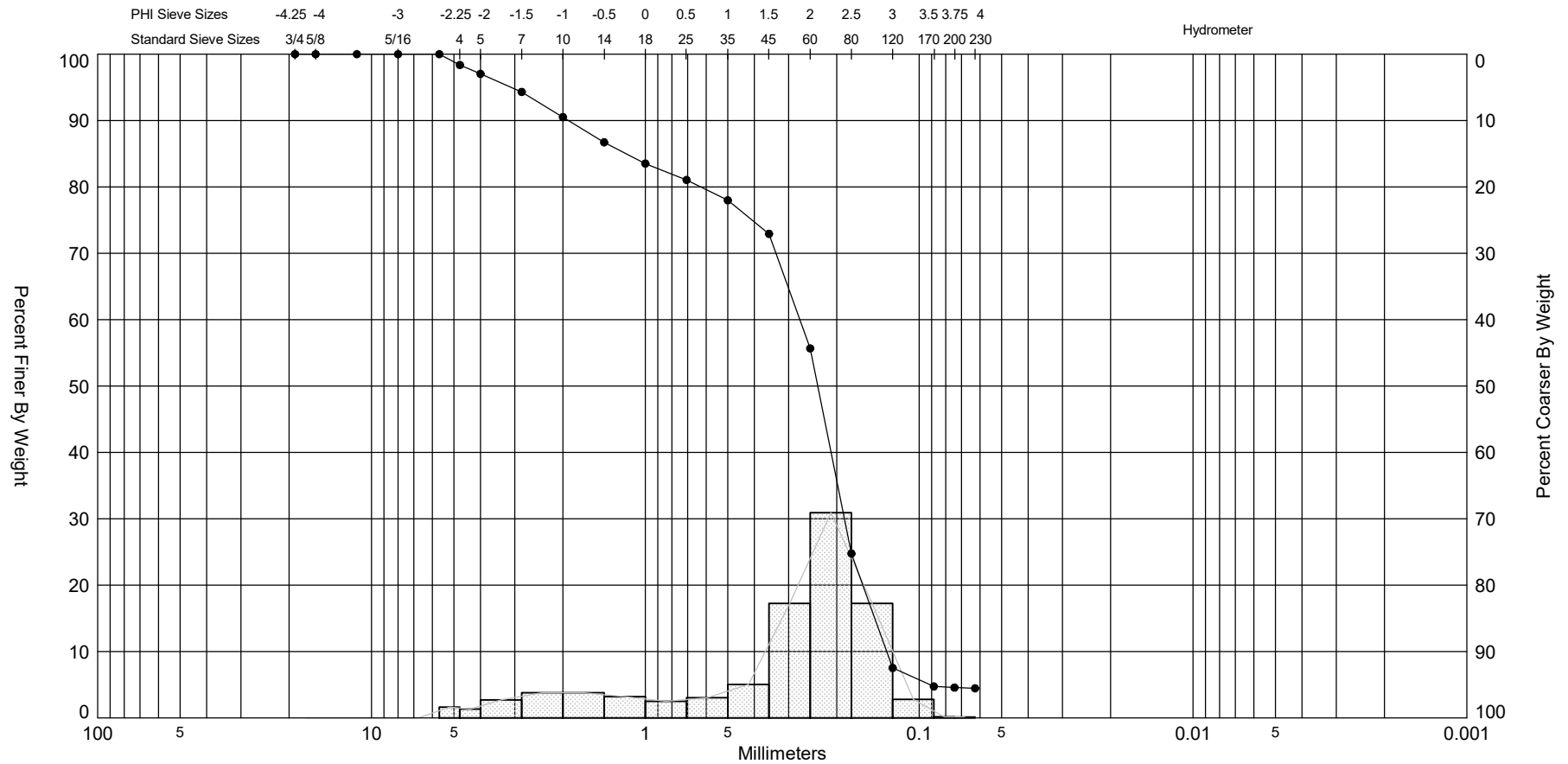


Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-18 #S1		-27.2	SP-SM	#200 - 6.29 #230 - 6.00		21.20	0.87	0.59	-0.26	2.21	1.64	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2285602.667
												Northing (Y, ft):	47361.472
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-18 #S2							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2285602.667		Northing (ft): 47361.472		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -32.7 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 206.10	Wash Weight (g): 197.09	Pan Retained (g): 0.12	Sieve Loss (%): 0.03	Fines (%): #200 - 4.57 #230 - 4.46	Organics (%):	Carbonates (%): 21.20	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	3.36	1.63	3.36	1.63	
5	-2.00	4.00	2.77	1.34	6.13	2.97	
7	-1.50	2.83	5.60	2.72	11.73	5.69	
10	-1.00	2.00	7.80	3.78	19.53	9.48	
14	-0.50	1.41	7.85	3.81	27.38	13.28	
18	0.00	1.00	6.59	3.20	33.97	16.48	
25	0.50	0.71	5.11	2.48	39.08	18.96	
35	1.00	0.50	6.30	3.06	45.38	22.02	
45	1.50	0.35	10.41	5.05	55.79	27.07	
60	2.00	0.25	35.57	17.26	91.36	44.33	
80	2.50	0.18	63.70	30.91	155.06	75.24	
120	3.00	0.13	35.52	17.23	190.58	92.47	
170	3.50	0.09	5.76	2.79	196.34	95.26	
200	3.75	0.07	0.34	0.16	196.68	95.43	
230	4.00	0.06	0.23	0.11	196.91	95.54	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.45	2.75	2.50	2.09	1.30	-0.08	-1.63	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.53	0.35	1.41	-1.32	3.68		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19

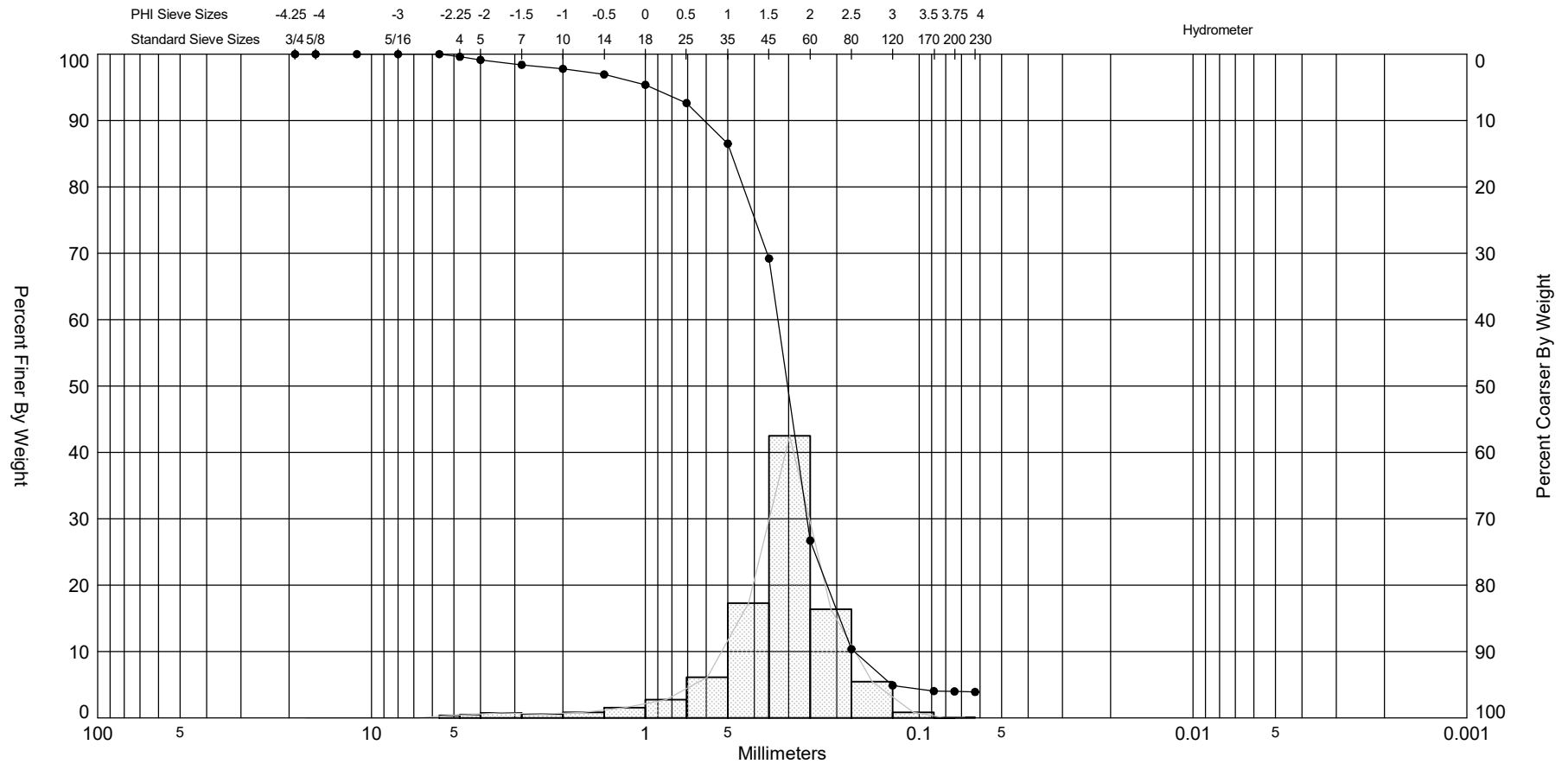


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-18 #S2	—●—	-32.7	SW	#200 - 4.57 #230 - 4.46		21.20	2.09	1.53	-1.32	3.68	1.41	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2285602.667
												Northing (Y, ft):	47361.472
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-18 #S3							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2285602.667		Northing (ft): 47361.472		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -37.7 NAVD 88	
USCS: SP		Munsell:		Comments:			
Dry Weight (g): 203.50	Wash Weight (g): 195.71	Pan Retained (g): 0.15	Sieve Loss (%): 0.00	Fines (%): #200 - 3.99 #230 - 3.91	Organics (%):	Carbonates (%): 27.30	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	0.80	0.39	0.80	0.39	
5	-2.00	4.00	0.98	0.48	1.78	0.87	
7	-1.50	2.83	1.50	0.74	3.28	1.61	
10	-1.00	2.00	1.22	0.60	4.50	2.21	
14	-0.50	1.41	1.73	0.85	6.23	3.06	
18	0.00	1.00	3.17	1.56	9.40	4.62	
25	0.50	0.71	5.59	2.75	14.99	7.37	
35	1.00	0.50	12.47	6.13	27.46	13.49	
45	1.50	0.35	35.20	17.30	62.66	30.79	
60	2.00	0.25	86.47	42.49	149.13	73.28	
80	2.50	0.18	33.28	16.35	182.41	89.64	
120	3.00	0.13	11.13	5.47	193.54	95.11	
170	3.50	0.09	1.74	0.86	195.28	95.96	
200	3.75	0.07	0.11	0.05	195.39	96.01	
230	4.00	0.06	0.16	0.08	195.55	96.09	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
2.99	2.33	2.05	1.73	1.33	1.07	0.07	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.58	0.33	0.83	-1.85	8.74		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19

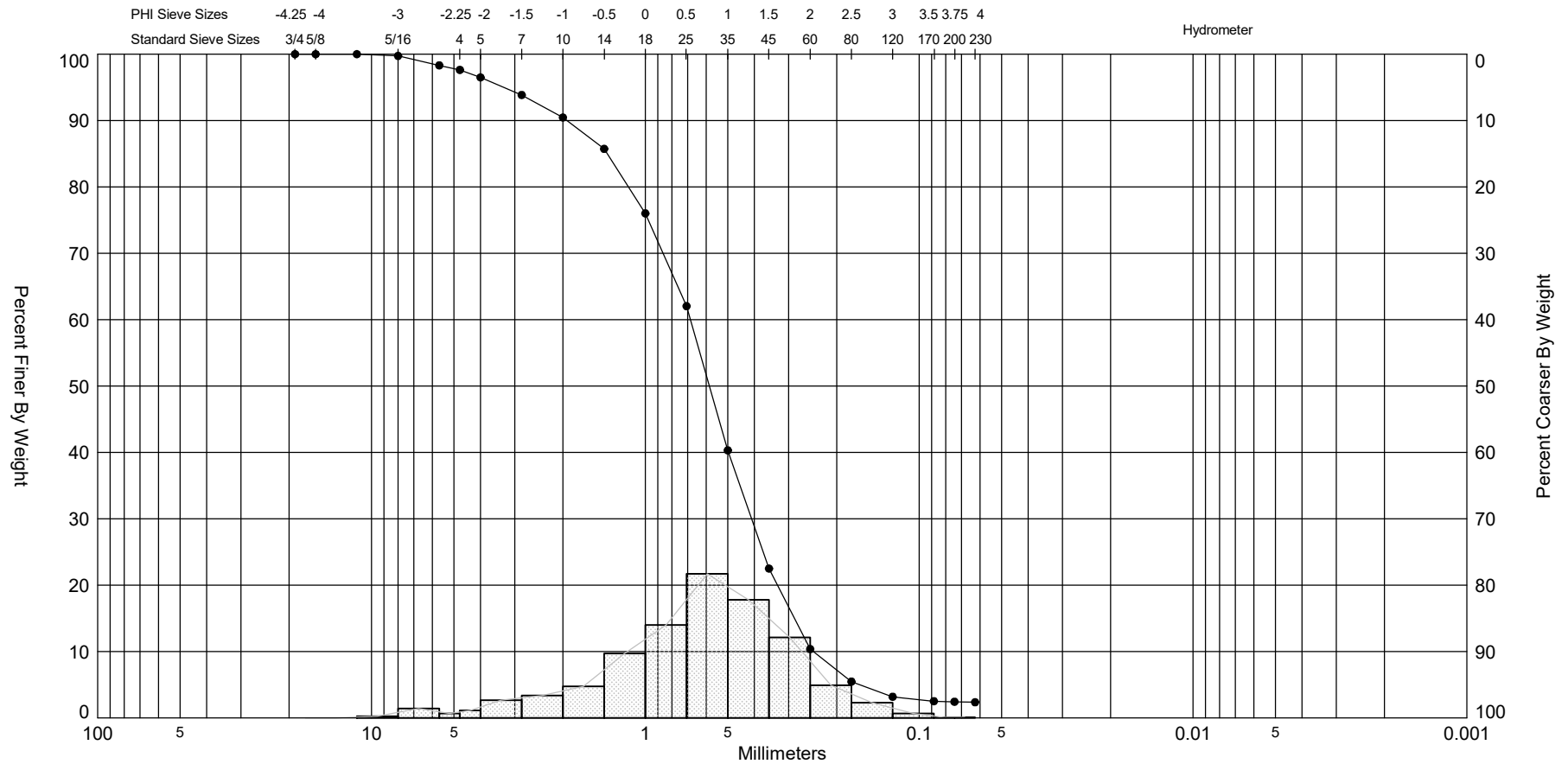


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-18 #S3	—●—	-37.7	SP	#200 - 3.99 #230 - 3.91		27.30	1.73	1.58	-1.85	8.74	0.83	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2285602.667
												Northing (Y, ft):	47361.472
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-18 #S4							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2285602.667		Northing (ft): 47361.472		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -43.3 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 215.26	Wash Weight (g): 210.31	Pan Retained (g): 0.10	Sieve Loss (%): 0.01	Fines (%): #200 - 2.43 #230 - 2.36	Organics (%):	Carbonates (%): 27.30	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.56	0.26	0.56	0.26	
3.5	-2.50	5.66	3.07	1.43	3.63	1.69	
4	-2.25	4.76	1.48	0.69	5.11	2.37	
5	-2.00	4.00	2.42	1.12	7.53	3.50	
7	-1.50	2.83	5.71	2.65	13.24	6.15	
10	-1.00	2.00	7.30	3.39	20.54	9.54	
14	-0.50	1.41	10.18	4.73	30.72	14.27	
18	0.00	1.00	20.93	9.72	51.65	23.99	
25	0.50	0.71	30.08	13.97	81.73	37.97	
35	1.00	0.50	46.76	21.72	128.49	59.69	
45	1.50	0.35	38.34	17.81	166.83	77.50	
60	2.00	0.25	26.11	12.13	192.94	89.63	
80	2.50	0.18	10.55	4.90	203.49	94.53	
120	3.00	0.13	4.92	2.29	208.41	96.82	
170	3.50	0.09	1.42	0.66	209.83	97.48	
200	3.75	0.07	0.19	0.09	210.02	97.57	
230	4.00	0.06	0.17	0.08	210.19	97.64	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
2.60	1.77	1.43	0.78	0.04	-0.41	-1.72	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	0.61	0.66	1.16	-0.67	3.68		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-18 #S4	—●—	-43.3	SW	#200 - 2.43 #230 - 2.36		27.30	0.78	0.61	-0.67	3.68	1.16	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2285602.667
												Northing (Y, ft):	47361.472
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-20		LOCATION COORDINATES X = 2286596.556 Y = 48360.945		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM HORIZONTAL VERTICAL State Plane North Carolina FIPS 3200 NAD 1983 NAVD 88		
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER AVS 80 Pneumatic Sampler ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)		
8. TOTAL DEPTH OF BORING 19.9 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING STARTED COMPLETED 03-14-19 17:03 03-14-19 17:05		
		16. ELEVATION TOP OF BORING -24.1 Ft.		
		17. TOTAL RECOVERY FOR BORING 18 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-24.1	0.0					
-28.1	4.0		Poorly graded silty sand (f-m), trace to few shell fragments (up to 0.04' in size), silt increasing with depth, gray (10YR 5/1) to, dark gray (10YR-4/1), (SP-SM).	C1	S1	Sample #S1, Depth = 4.0' Sample #C1, Depth = 0.0' - 4.0'
-39.5	15.4		Poorly graded sand (f-m), trace silt, dark gray (10YR 4/1) silt nodules from 8.8' - 8.9' ; 9.5' - 9.6' ; 10.8' - 10.9' ; 11.2' - 11.3' ; 11.4' - 11.5' ; 11.8' - 11.9' ; 12.2' - 12.3' ; 12.9' - 13.2' ; and 14.5' - 14.8', gray (10YR 6/1) to, light gray (10YR-7/1), (SP).	C2	S2	Sample #S2, Depth = 15.4' Sample #C2, Depth = 4.0' - 15.4'
-40.0	15.9		Silty shell hash, shell fragments up to 0.06' in size, gray (10YR-5/1), (ML).	C3	S3	Sample #S3, Depth = 15.9' Sample #C3, Depth = 15.4' - 15.9'
-42.1	18.0		Well graded sand (f-c), banded with dark gray (10YR 4/1) silt (ML), few shell fragments (up to 0.10' in size), gray (10YR-6/1), (SW).		S4	Sample #S4, Depth = 18.0'
			End of Boring			

FLORIDA DEP ROSS OAK ISLAND MULTI DECADEAL MASTER PLAN GPJ FL DEP ROSS GDT 8/2/19



Oak Island Multi Decadal Master Plan 2019

2019-JB-20

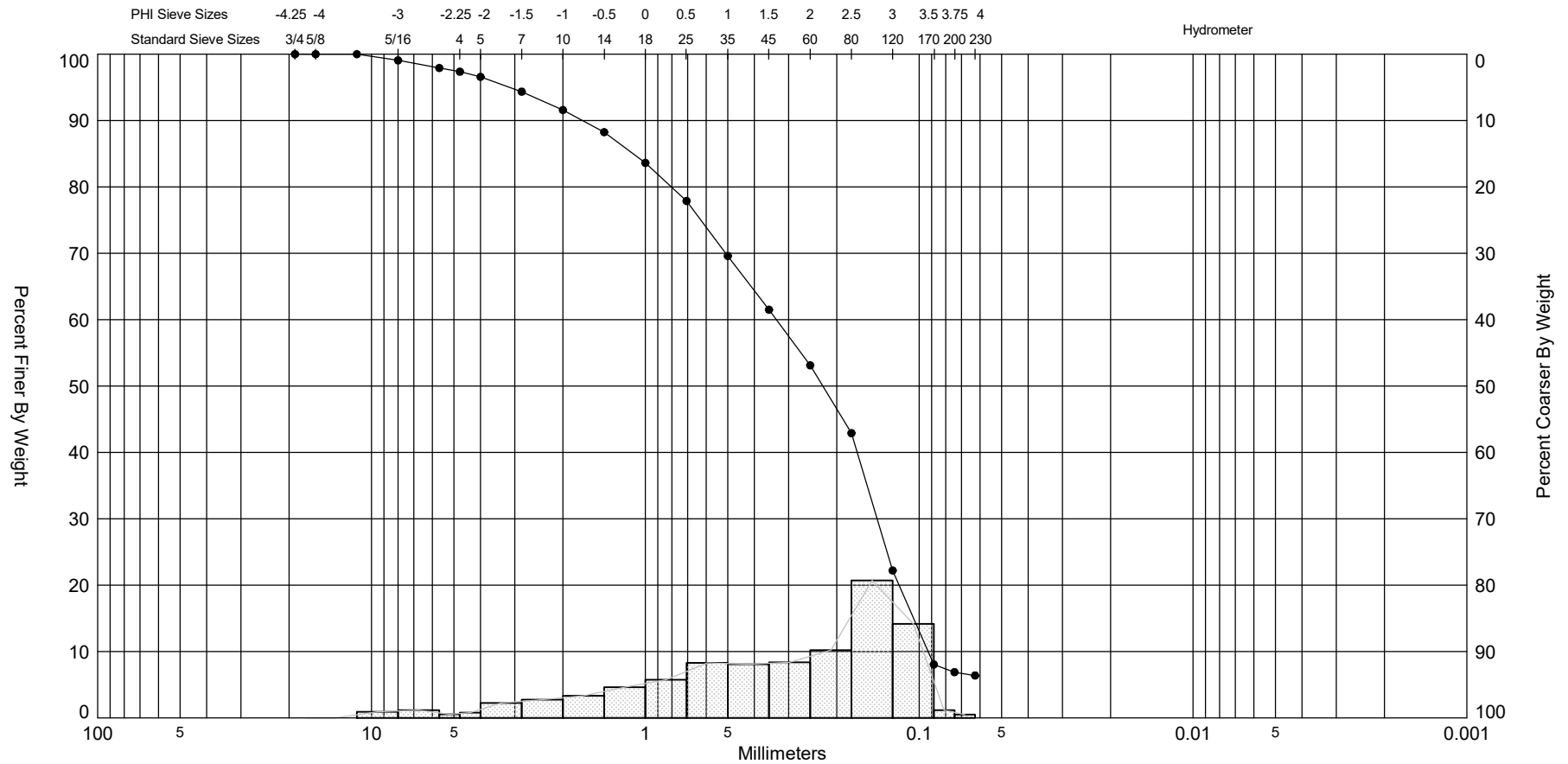
Top of Core
Elevation
NAVD 88
-24.1 Ft

Scale in Tenths of Feet

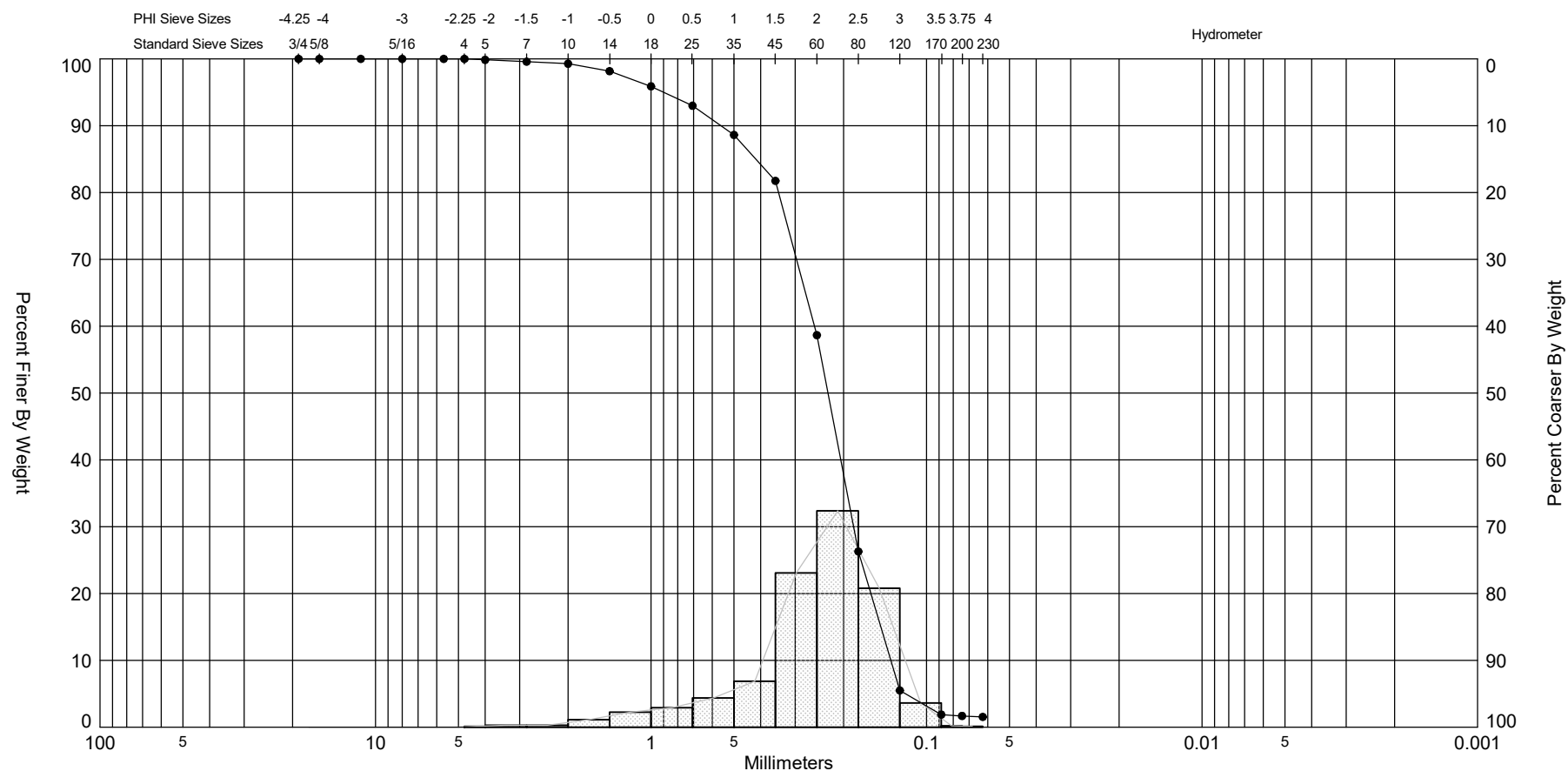
GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-20 #S1							
Analysis Date: 04-22-19							
Analyzed By: FKJ							
Easting (ft): 2286596.556		Northing (ft): 48360.945		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -28.1 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 216.10	Wash Weight (g): 202.90	Pan Retained (g): 0.60	Sieve Loss (%): 0.00	Fines (%): #200 - 6.89 #230 - 6.39	Organics (%):	Carbonates (%): 18.20	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	2.00	0.93	2.00	0.93	
3.5	-2.50	5.66	2.50	1.16	4.50	2.08	
4	-2.25	4.76	1.20	0.56	5.70	2.64	
5	-2.00	4.00	1.70	0.79	7.40	3.42	
7	-1.50	2.83	4.80	2.22	12.20	5.65	
10	-1.00	2.00	6.00	2.78	18.20	8.42	
14	-0.50	1.41	7.20	3.33	25.40	11.75	
18	0.00	1.00	10.00	4.63	35.40	16.38	
25	0.50	0.71	12.40	5.74	47.80	22.12	
35	1.00	0.50	17.90	8.28	65.70	30.40	
45	1.50	0.35	17.50	8.10	83.20	38.50	
60	2.00	0.25	18.10	8.38	101.30	46.88	
80	2.50	0.18	22.10	10.23	123.40	57.10	
120	3.00	0.13	44.70	20.68	168.10	77.79	
170	3.50	0.09	30.60	14.16	198.70	91.95	
200	3.75	0.07	2.50	1.16	201.20	93.11	
230	4.00	0.06	1.10	0.51	202.30	93.61	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.22	2.93	2.15	0.67	-0.04	-1.65	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.54	0.34	1.6	-0.94	3.16		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-20 #S2							
Analysis Date: 06-06-19							
Analyzed By: FKJ							
Easting (ft): 2286596.556		Northing (ft): 48360.945		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -39.5 NAVD 88	
USCS: SP		Munsell:		Comments:			
Dry Weight (g): 329.03	Wash Weight (g): 324.45	Pan Retained (g): 0.49	Sieve Loss (%): 0.00	Fines (%): #200 - 1.68 #230 - 1.54	Organics (%):	Carbonates (%): 7.70	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	0.00	0.00	0.00	0.00	
5	-2.00	4.00	0.47	0.14	0.47	0.14	
7	-1.50	2.83	0.92	0.28	1.39	0.42	
10	-1.00	2.00	0.97	0.29	2.36	0.72	
14	-0.50	1.41	3.69	1.12	6.05	1.84	
18	0.00	1.00	7.48	2.27	13.53	4.11	
25	0.50	0.71	9.54	2.90	23.07	7.01	
35	1.00	0.50	14.39	4.37	37.46	11.38	
45	1.50	0.35	22.59	6.87	60.05	18.25	
60	2.00	0.25	75.98	23.09	136.03	41.34	
80	2.50	0.18	106.51	32.37	242.54	73.71	
120	3.00	0.13	68.40	20.79	310.94	94.50	
170	3.50	0.09	11.90	3.62	322.84	98.12	
200	3.75	0.07	0.65	0.20	323.49	98.32	
230	4.00	0.06	0.47	0.14	323.96	98.46	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.07	2.75	2.53	2.13	1.65	1.34	0.15	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.96	0.26	0.85	-1.43	5.86		

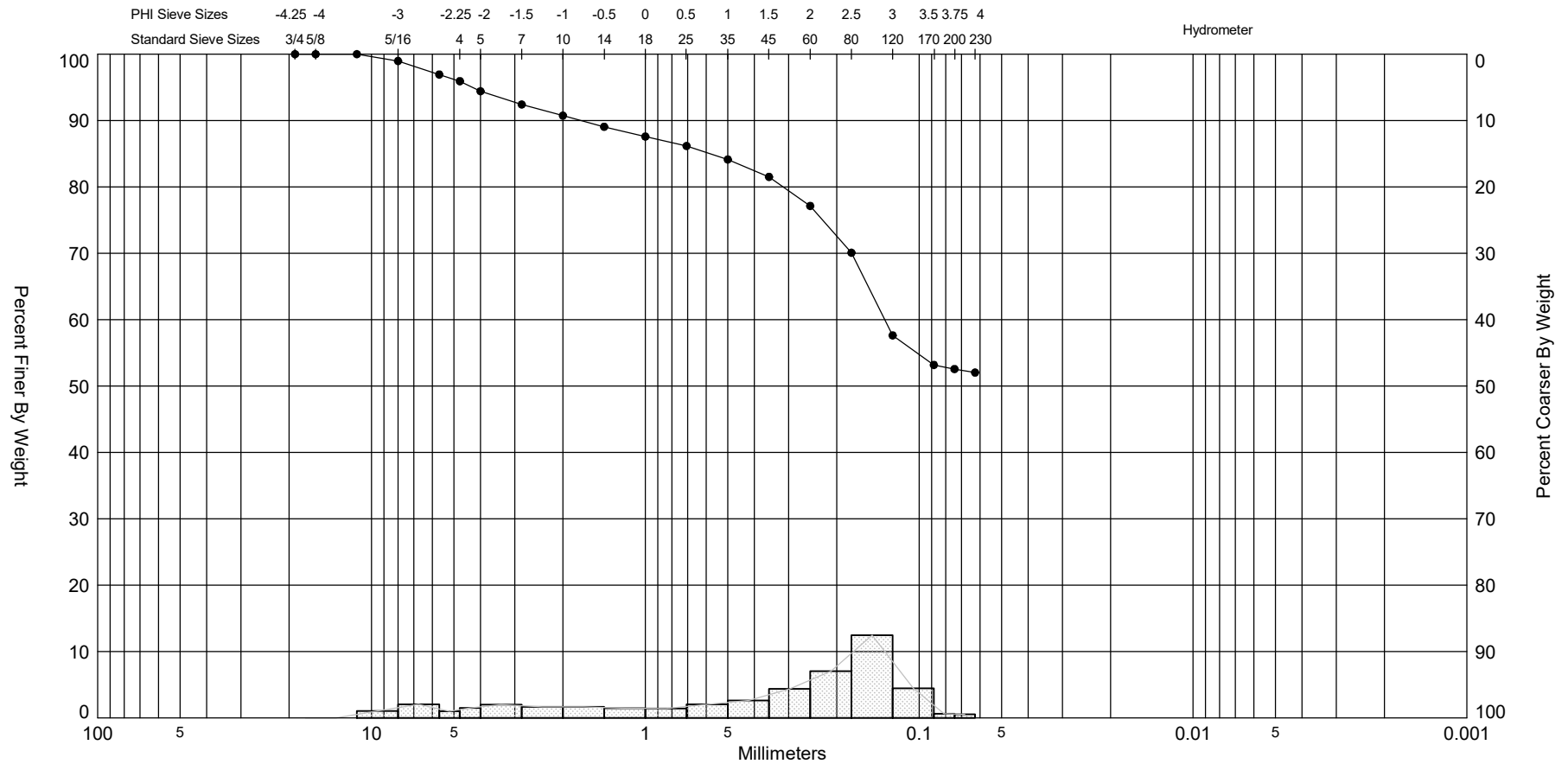


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-20 #S2		-39.5	SP	#200 - 1.68 #230 - 1.54		7.70	2.13	1.96	-1.43	5.86	0.85	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	06-06-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2286596.556
												Northing (Y, ft):	48360.945
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-20 #S3							
Analysis Date: 06-06-19							
Analyzed By: FKJ							
Easting (ft): 2286596.556		Northing (ft): 48360.945		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -40.0 NAVD 88	
USCS: ML		Munsell:		Comments:			
Dry Weight (g): 244.82	Wash Weight (g): 118.74	Pan Retained (g): 1.31	Sieve Loss (%): 0.00	Fines (%): #200 - 52.56 #230 - 52.03	Organics (%):	Carbonates (%): 21.20	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	2.52	1.03	2.52	1.03	
3.5	-2.50	5.66	4.99	2.04	7.51	3.07	
4	-2.25	4.76	2.46	1.00	9.97	4.07	
5	-2.00	4.00	3.69	1.51	13.66	5.58	
7	-1.50	2.83	4.89	2.00	18.55	7.58	
10	-1.00	2.00	4.13	1.69	22.68	9.26	
14	-0.50	1.41	4.11	1.68	26.79	10.94	
18	0.00	1.00	3.59	1.47	30.38	12.41	
25	0.50	0.71	3.47	1.42	33.85	13.83	
35	1.00	0.50	5.00	2.04	38.85	15.87	
45	1.50	0.35	6.41	2.62	45.26	18.49	
60	2.00	0.25	10.72	4.38	55.98	22.87	
80	2.50	0.18	17.26	7.05	73.24	29.92	
120	3.00	0.13	30.49	12.45	103.73	42.37	
170	3.50	0.09	10.89	4.45	114.62	46.82	
200	3.75	0.07	1.53	0.62	116.15	47.44	
230	4.00	0.06	1.28	0.52	117.43	47.97	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
				2.15	1.02	-2.10	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.25	0.42	1.97	-0.9	2.46		

SIEVE ANALYSIS: OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19

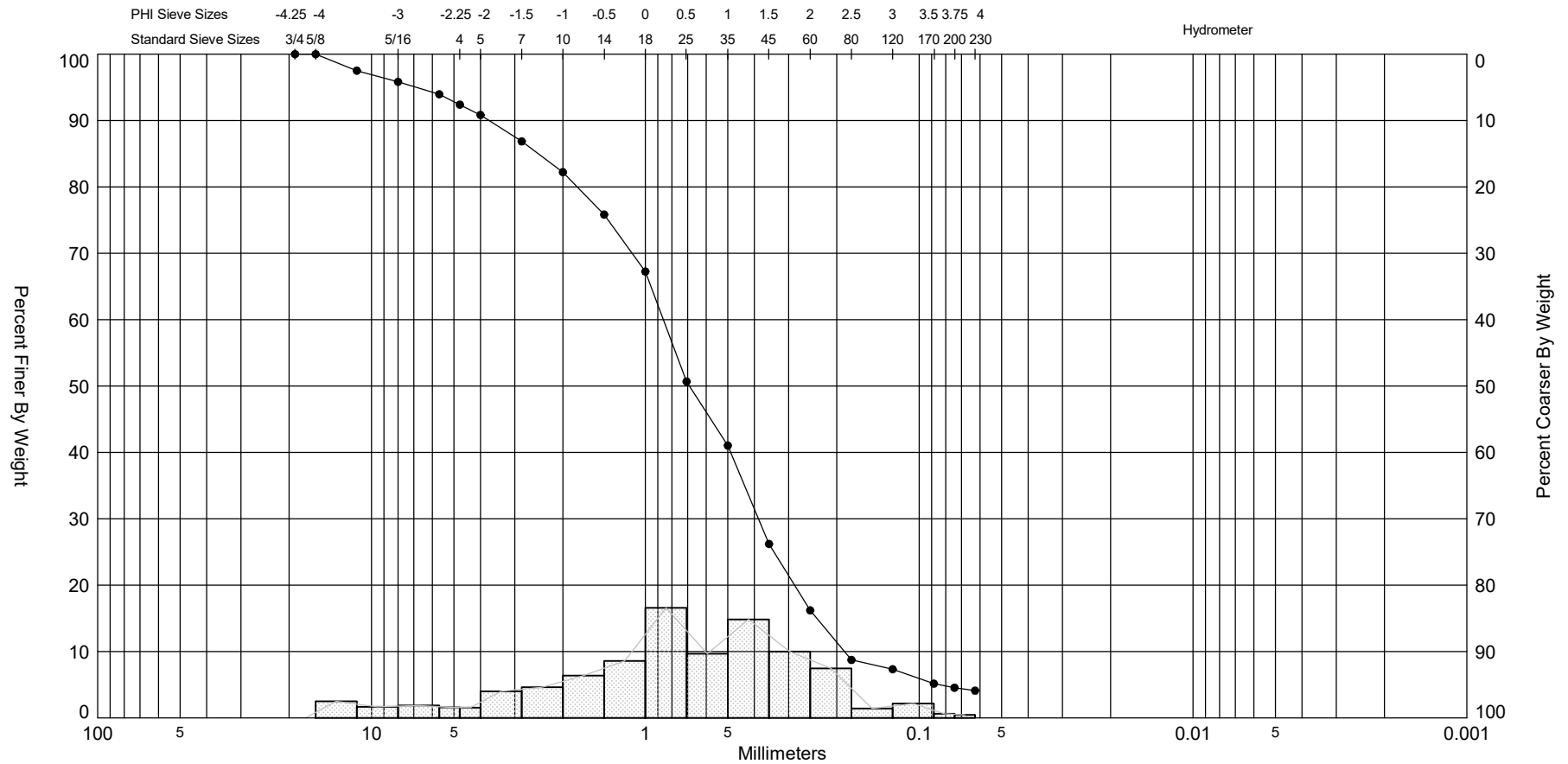


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-20 #S3	—●—	-40.0	ML	#200 - 52.56 #230 - 52.03		21.20		1.25	-0.9	2.46	1.97	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	06-06-19
Depths and elevations based on measured values												Analyzed By:	FKJ
							American Vibracore Services, Inc.						
							1215 Wallace Drive						
							Delray Beach, FL 33444						
							Easting (X, ft):		2286596.556				
							Northing (Y, ft):		48360.945				
							Horizontal System:		NAD 1983				
							Vertical System:		NAVD 88				

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-20 #S4							
Analysis Date: 06-06-19							
Analyzed By: FKJ							
Easting (ft): 2286596.556		Northing (ft): 48360.945		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -42.1 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 457.85	Wash Weight (g): 448.77	Pan Retained (g): 0.00	Sieve Loss (%): 2.13	Fines (%): #200 - 4.55 #230 - 4.11	Organics (%):	Carbonates (%):	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	11.38	2.49	11.38	2.49	
5/16"	-3.00	8.00	7.71	1.68	19.09	4.17	
3.5	-2.50	5.66	8.55	1.87	27.64	6.04	
4	-2.25	4.76	7.19	1.57	34.83	7.61	
5	-2.00	4.00	7.09	1.55	41.92	9.16	
7	-1.50	2.83	18.23	3.98	60.15	13.14	
10	-1.00	2.00	21.26	4.64	81.41	17.78	
14	-0.50	1.41	29.20	6.38	110.61	24.16	
18	0.00	1.00	39.32	8.59	149.93	32.75	
25	0.50	0.71	75.87	16.57	225.80	49.32	
35	1.00	0.50	44.19	9.65	269.99	58.97	
45	1.50	0.35	67.84	14.82	337.83	73.79	
60	2.00	0.25	45.86	10.02	383.69	83.80	
80	2.50	0.18	34.19	7.47	417.88	91.27	
120	3.00	0.13	6.41	1.40	424.29	92.67	
170	3.50	0.09	9.92	2.17	434.21	94.84	
200	3.75	0.07	2.80	0.61	437.01	95.45	
230	4.00	0.06	2.01	0.44	439.02	95.89	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.57	2.01	1.56	0.54	-0.45	-1.19	-2.78	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	0.34	0.79	1.59	-0.56	3.11		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-20 #S4	—●—	-42.1	SW	#200 - 4.55 #230 - 4.11			0.54	0.34	-0.56	3.11	1.59	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	06-06-19
Depths and elevations based on measured values												Analyzed By:	FKJ
							American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444					Easting (X, ft):	2286596.556
												Northing (Y, ft):	48360.945
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-21		LOCATION COORDINATES X = 2287600.426 Y = 48360.803		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM HORIZONTAL VERTICAL State Plane North Carolina FIPS 3200 NAD 1983 NAVD 88		
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL ☐ AUTO HAMMER AVS 80 Pneumatic Sampler ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES DISTURBED UNDISTURBED (UD)		
8. TOTAL DEPTH OF BORING 20.0 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING STARTED COMPLETED 03-14-19 17:18 03-14-19 17:22		
		16. ELEVATION TOP OF BORING -22.4 Ft.		
		17. TOTAL RECOVERY FOR BORING 19 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS	
-22.4	0.0						
			Well graded sand (f-c), trace shell fragments (up to 0.04' in size), large shells from 0.7' - 0.8' and 1.4' - 1.5', very dark gray (10YR 3/1) to, gray (10YR-5/1), (SW).	C1	S1	Sample #S1, Depth = 4.5' Sample #C1, Depth = 0.0' - 5.9'	0
-26.9	4.5						
			Poorly graded silty sand (f-m), trace to few shell fragments (up to 0.04' in size) increasing with depth, dark gray (10YR-4/1), (SP-SM).		S2	Sample #S2, Depth = 5.9'	5
-28.3	5.9						
			Well graded silty sand (f-c), gray (10YR-5/1), (SW-SM).		S3	Sample #S3, Depth = 11.0' Sample #C2, Depth = 5.9 - 19.0'	10
-33.4	11.0						
				C2			
			Poorly graded sand (f-m), silt nodules from 15.2' - 15.3' and 16.7' - 16.8', light gray (10YR-7/1), (SP).		S4	Sample #S4, Depth = 19.0'	15
-41.4	19.0						
			End of Boring				20

FLORIDA DEP ROSS OAK ISLAND MULTI DECADEAL MASTER PLAN GPJ FL DEP ROSS GDT 8/2/19



Oak Island
Multi Decadal Master
Plan
2019

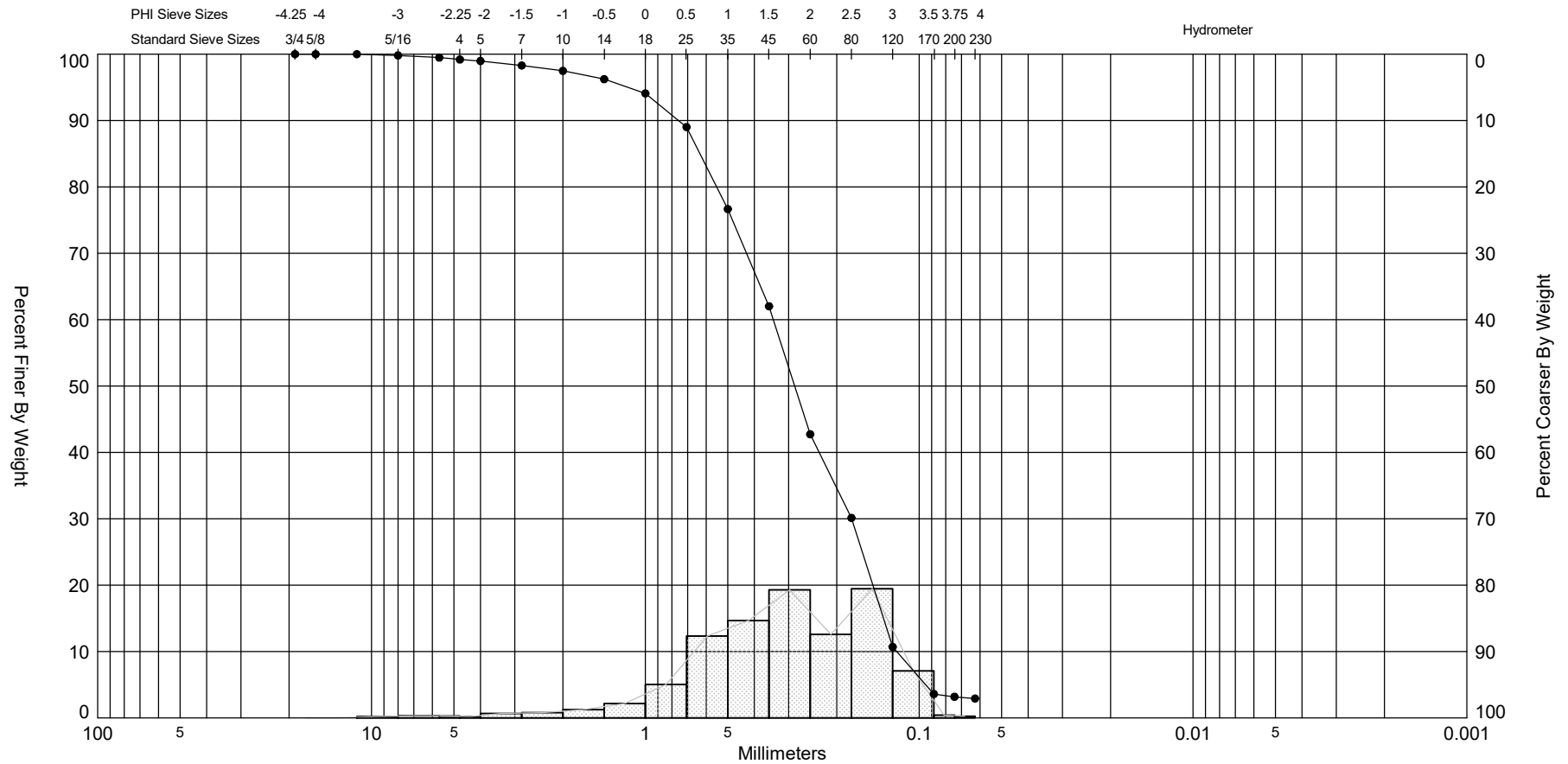
2019-JB-21

Top of Core
Elevation
NAVD 88
-22.4 Ft

Scale in Tenths of Feet

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

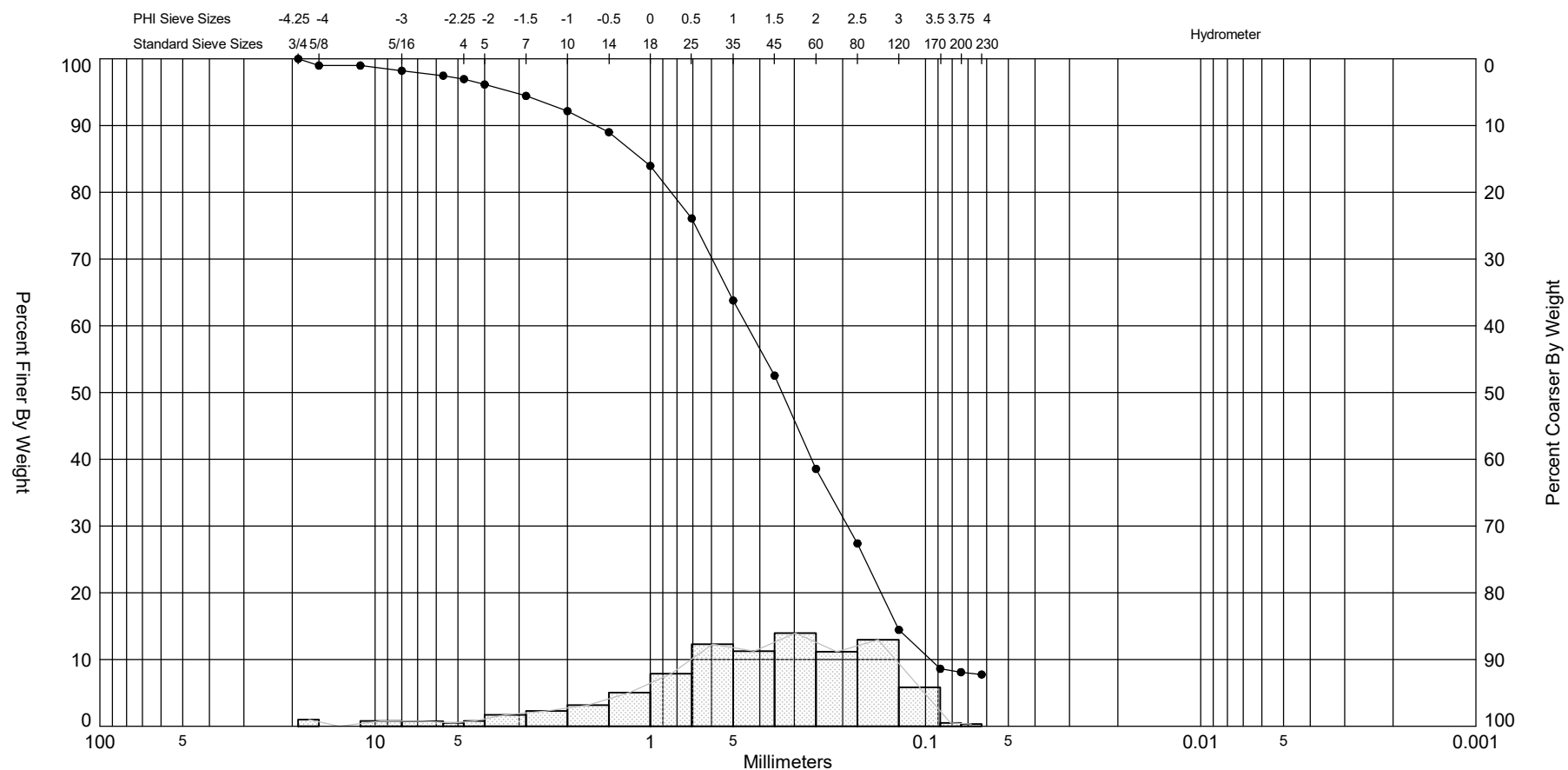
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-21 #S1							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2287600.426		Northing (ft): 48360.803		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -26.9 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 252.37	Wash Weight (g): 245.26	Pan Retained (g): 0.26	Sieve Loss (%): 0.00	Fines (%): #200 - 3.18 #230 - 2.92	Organics (%):	Carbonates (%): 19.30	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.47	0.19	0.47	0.19	
3.5	-2.50	5.66	0.85	0.34	1.32	0.52	
4	-2.25	4.76	0.72	0.29	2.04	0.81	
5	-2.00	4.00	0.57	0.23	2.61	1.03	
7	-1.50	2.83	1.71	0.68	4.32	1.71	
10	-1.00	2.00	2.04	0.81	6.36	2.52	
14	-0.50	1.41	3.15	1.25	9.51	3.77	
18	0.00	1.00	5.43	2.15	14.94	5.92	
25	0.50	0.71	12.76	5.06	27.70	10.98	
35	1.00	0.50	31.17	12.35	58.87	23.33	
45	1.50	0.35	36.99	14.66	95.86	37.98	
60	2.00	0.25	48.67	19.29	144.53	57.27	
80	2.50	0.18	31.79	12.60	176.32	69.87	
120	3.00	0.13	49.07	19.44	225.39	89.31	
170	3.50	0.09	17.90	7.09	243.29	96.40	
200	3.75	0.07	1.05	0.42	244.34	96.82	
230	4.00	0.06	0.66	0.26	245.00	97.08	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.40	2.86	2.63	1.81	1.06	0.70	-0.21	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.69	0.31	1.11	-0.99	4.77		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-21 #S1		-26.9	SW	#200 - 3.18 #230 - 2.92		19.30	1.81	1.69	-0.99	4.77	1.11	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2287600.426
												Northing (Y, ft):	48360.803
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

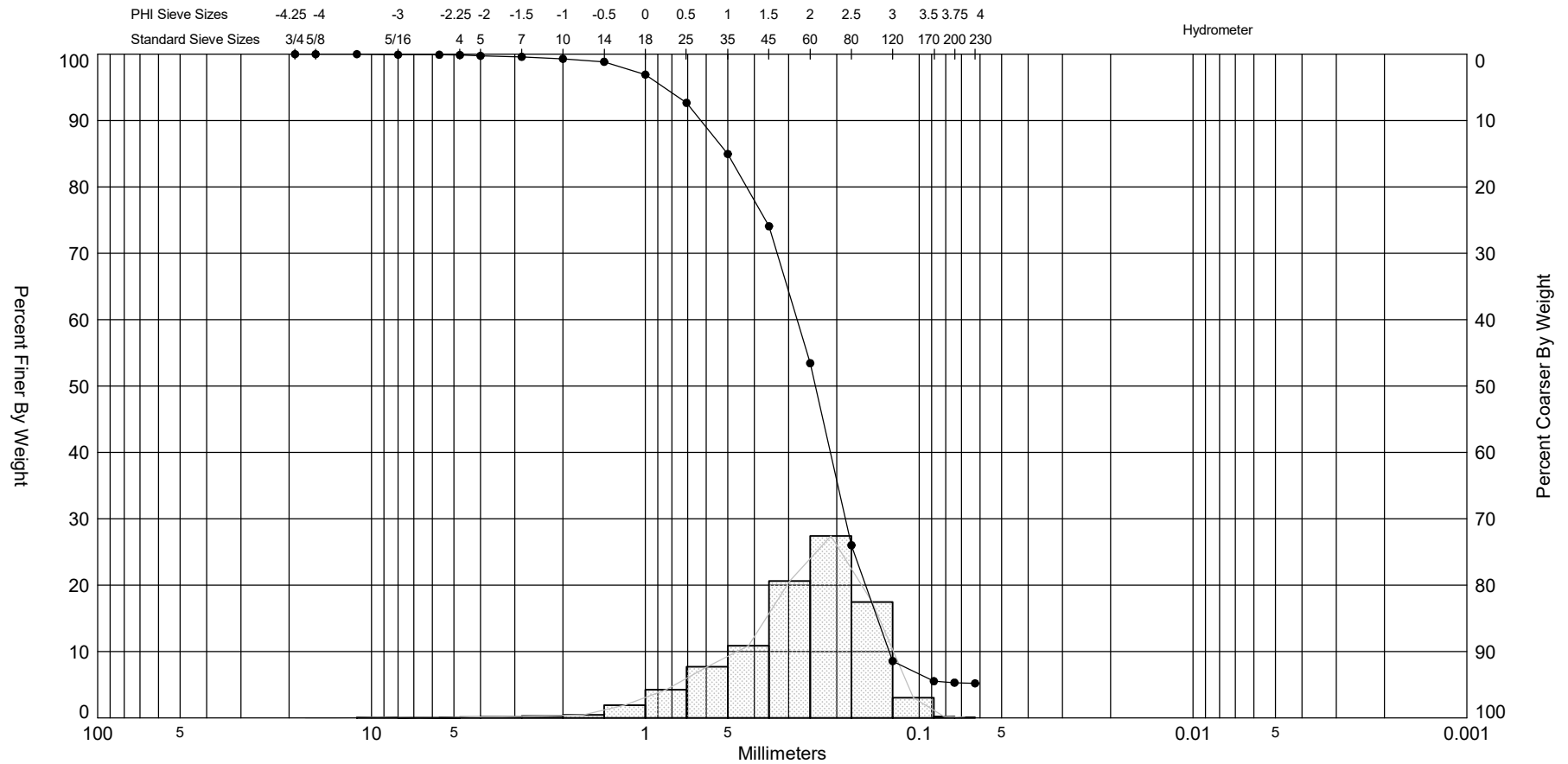
Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-21 #S2							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2287600.426		Northing (ft): 48360.803		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -28.3 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 249.78	Wash Weight (g): 230.92	Pan Retained (g): 0.55	Sieve Loss (%): -0.02	Fines (%): #200 - 8.10 #230 - 7.75	Organics (%):	Carbonates (%): 19.30	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00	
5/8"	-4.00	16.00	2.53	1.01	2.53	1.01	
7/16"	-3.50	11.31	0.00	0.00	2.53	1.01	
5/16"	-3.00	8.00	1.94	0.78	4.47	1.79	
3.5	-2.50	5.66	1.84	0.74	6.31	2.53	
4	-2.25	4.76	1.28	0.51	7.59	3.04	
5	-2.00	4.00	2.02	0.81	9.61	3.85	
7	-1.50	2.83	4.27	1.71	13.88	5.56	
10	-1.00	2.00	5.71	2.29	19.59	7.84	
14	-0.50	1.41	7.88	3.15	27.47	11.00	
18	0.00	1.00	12.61	5.05	40.08	16.05	
25	0.50	0.71	19.65	7.87	59.73	23.91	
35	1.00	0.50	30.72	12.30	90.45	36.21	
45	1.50	0.35	28.13	11.26	118.58	47.47	
60	2.00	0.25	34.88	13.96	153.46	61.44	
80	2.50	0.18	27.91	11.17	181.37	72.61	
120	3.00	0.13	32.35	12.95	213.72	85.56	
170	3.50	0.09	14.55	5.83	228.27	91.39	
200	3.75	0.07	1.29	0.52	229.56	91.90	
230	4.00	0.06	0.85	0.34	230.41	92.25	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.94	2.59	1.59	0.54	0.00	-1.66	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.21	0.43	1.51	-1.02	4.21		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

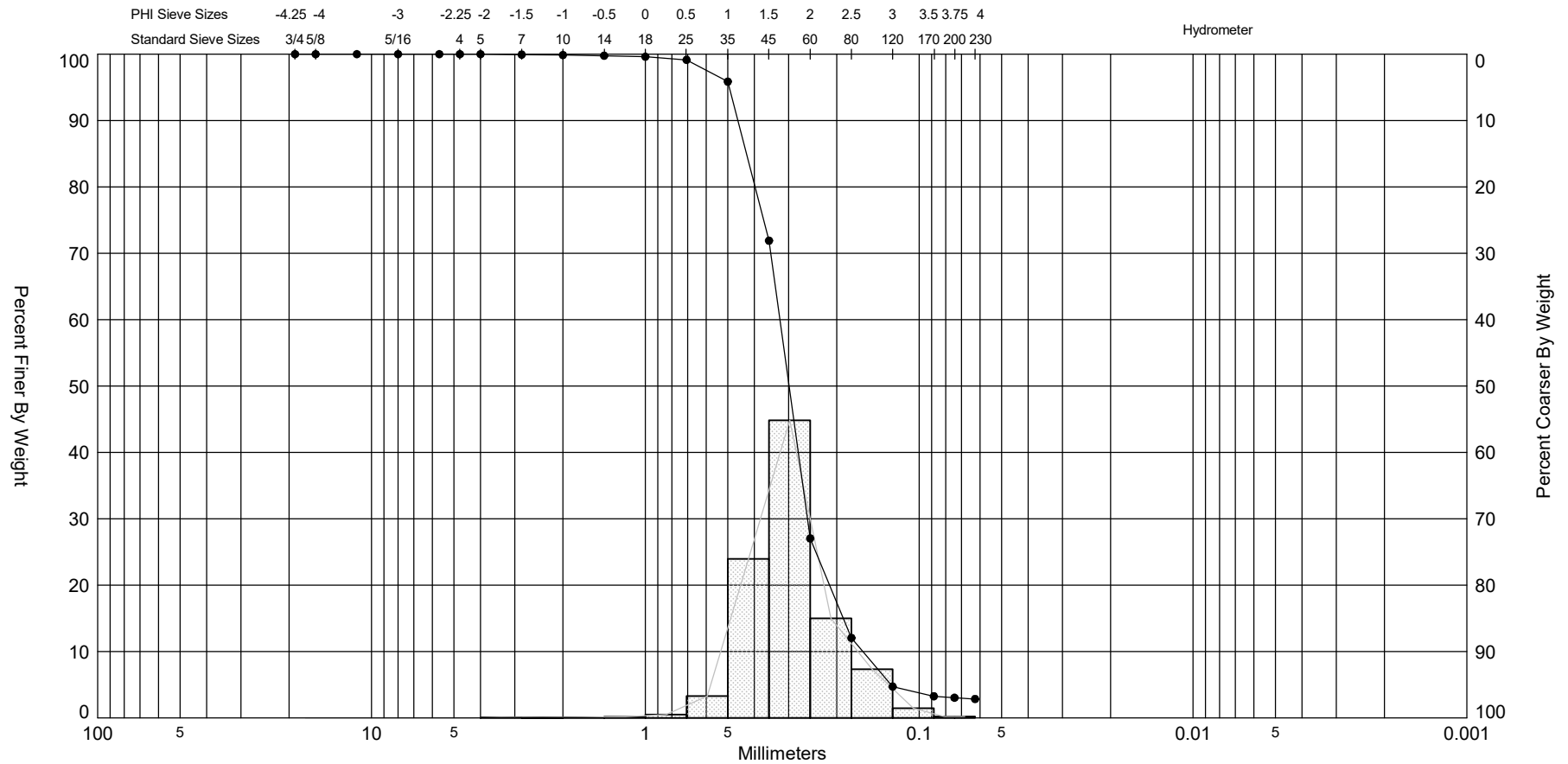
Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-21 #S2		-28.3	SP-SM	#200 - 8.10 #230 - 7.75		19.30	1.59	1.21	-1.02	4.21	1.51	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2287600.426
												Northing (Y, ft):	48360.803
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-21 #S3							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft):		Northing (ft):		Coordinate System:		Elevation (ft):	
2287600.426		48360.803		State Plane North Carolina FIPS 3200 Feet		-33.4 NAVD 88	
USCS:		Munsell:		Comments:			
SW-SM							
Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shells (%):
240.11	227.65	0.03	0.00	#200 - 5.31 #230 - 5.21		8.00	
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.20	0.08	0.20	0.08	
3.5	-2.50	5.66	0.02	0.01	0.22	0.09	
4	-2.25	4.76	0.10	0.04	0.32	0.13	
5	-2.00	4.00	0.28	0.12	0.60	0.25	
7	-1.50	2.83	0.35	0.15	0.95	0.40	
10	-1.00	2.00	0.74	0.31	1.69	0.70	
14	-0.50	1.41	1.06	0.44	2.75	1.15	
18	0.00	1.00	4.65	1.94	7.40	3.08	
25	0.50	0.71	10.23	4.26	17.63	7.34	
35	1.00	0.50	18.48	7.70	36.11	15.04	
45	1.50	0.35	26.15	10.89	62.26	25.93	
60	2.00	0.25	49.53	20.63	111.79	46.56	
80	2.50	0.18	65.85	27.42	177.64	73.98	
120	3.00	0.13	41.91	17.45	219.55	91.44	
170	3.50	0.09	7.29	3.04	226.84	94.47	
200	3.75	0.07	0.53	0.22	227.37	94.69	
230	4.00	0.06	0.24	0.10	227.61	94.79	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.79	2.53	2.06	1.46	1.04	0.23	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.85	0.28	0.87	-1.11	5.25		



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-21 #S3	—●—	-33.4	SW-SM	#200 - 5.31 #230 - 5.21		8.00	2.06	1.85	-1.11	5.25	0.87	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444												Easting (X, ft):	2287600.426
												Northing (Y, ft):	48360.803
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-21 #S4							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2287600.426		Northing (ft): 48360.803		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -41.4 NAVD 88	
USCS: SP		Munsell:		Comments:			
Dry Weight (g): 238.29	Wash Weight (g): 231.75	Pan Retained (g): 0.23	Sieve Loss (%): 0.00	Fines (%): #200 - 3.04 #230 - 2.85	Organics (%):	Carbonates (%): 8.00	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	0.00	0.00	0.00	0.00	
5	-2.00	4.00	0.00	0.00	0.00	0.00	
7	-1.50	2.83	0.16	0.07	0.16	0.07	
10	-1.00	2.00	0.15	0.06	0.31	0.13	
14	-0.50	1.41	0.24	0.10	0.55	0.23	
18	0.00	1.00	0.35	0.15	0.90	0.38	
25	0.50	0.71	1.16	0.49	2.06	0.86	
35	1.00	0.50	7.80	3.27	9.86	4.14	
45	1.50	0.35	57.10	23.96	66.96	28.10	
60	2.00	0.25	106.87	44.85	173.83	72.95	
80	2.50	0.18	35.75	15.00	209.58	87.95	
120	3.00	0.13	17.47	7.33	227.05	95.28	
170	3.50	0.09	3.46	1.45	230.51	96.74	
200	3.75	0.07	0.54	0.23	231.05	96.96	
230	4.00	0.06	0.46	0.19	231.51	97.15	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
2.98	2.37	2.07	1.74	1.44	1.25	1.02	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.76	0.30	0.55	0.09	5.9		



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-21 #S4	—●—	-41.4	SP	#200 - 3.04 #230 - 2.85		8.00	1.74	1.76	0.09	5.9	0.55	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2287600.426
												Northing (Y, ft):	48360.803
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-22		LOCATION COORDINATES X = 2288600.725 Y = 48363.693		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200 HORIZONTAL NAD 1983 VERTICAL NAVD 88		
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL AVS 80 Pneumatic Sampler ☐ AUTO HAMMER ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES		
8. TOTAL DEPTH OF BORING 15.8 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING 03-14-19 17:42 COMPLETED 03-14-19 17:44		
		16. ELEVATION TOP OF BORING -20.7 Ft.		
		17. TOTAL RECOVERY FOR BORING 13 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-20.7	0.0					
-23.7	3.0		Poorly graded silty sand (f-m), gray (10YR-5/1), (SP-SM).	C1	S1	Sample #S1, Depth = 3.0' Sample #C1, Depth = 0.0' - 3.0'
-25.7	5.0		Well graded sand (f-c), trace shell fragments (up to 0.02' in size), dark gray (10YR-4/1), (SW).	C2	S2	Sample #S2, Depth = 5.0' Sample #C2, Depth = 3.0' - 6.0'
-26.7	6.0		Poorly graded silty sand (f-m), few shell fragments (up to 0.06' in size), dark gray (10YR-4/1), (SP-SM).		S3	Sample #S3, Depth = 6.0'
-33.7	13.0		Well graded sand (f-c), trace shell fragments from 10.7' - 10.9' and 11.6' - 11.9' (up to 0.02' in size), gray (10YR-5/1), (SW).	C3	S4	Sample #S4, Depth = 13.0' Sample #C3, Depth = 6.0' - 13.0'
			End of Boring			

FLORIDA DEP ROSS OAK ISLAND MULTI DECADEAL MASTER PLAN GPJ FL DEP ROSS GDT 8/2/19



Oak Island Multi Decadal Master Plan 2019

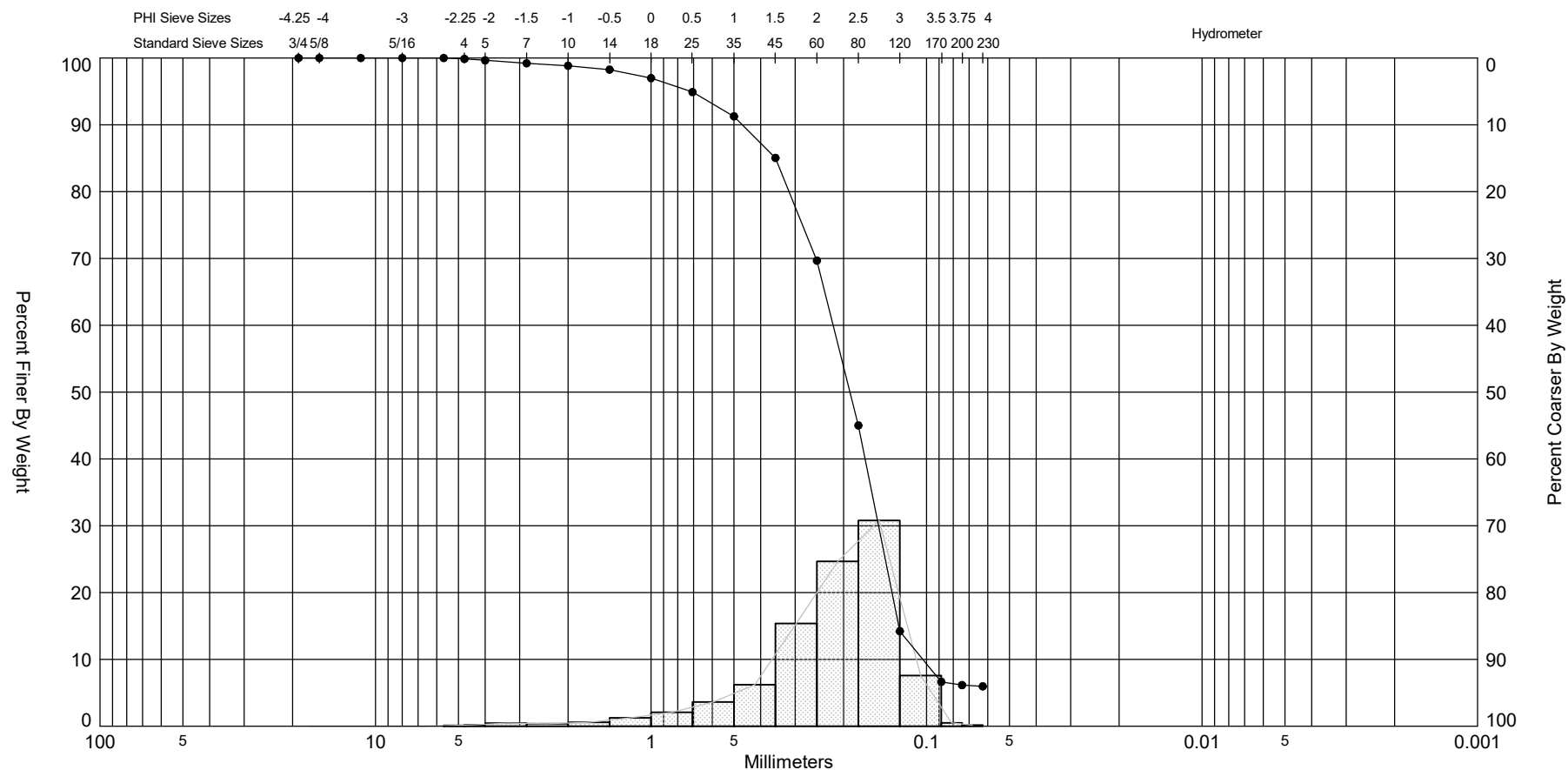
2019-JB-22

Top of Core
Elevation
NAVD 88
-20.7 Ft

Scale in Tenths of Feet

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-22 #S1							
Analysis Date: 05-25-19							
Analyzed By: FKJ							
Easting (ft): 2288600.725		Northing (ft): 48363.693		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -23.7 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 314.32	Wash Weight (g): 298.85	Pan Retained (g): 0.29	Sieve Loss (%): 0.95	Fines (%): #200 - 6.15 #230 - 5.97	Organics (%):	Carbonates (%): 6.50	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	0.41	0.13	0.41	0.13	
5	-2.00	4.00	0.68	0.22	1.09	0.35	
7	-1.50	2.83	1.39	0.44	2.48	0.79	
10	-1.00	2.00	1.16	0.37	3.64	1.16	
14	-0.50	1.41	1.83	0.58	5.47	1.74	
18	0.00	1.00	4.00	1.27	9.47	3.01	
25	0.50	0.71	6.56	2.09	16.03	5.10	
35	1.00	0.50	11.41	3.63	27.44	8.73	
45	1.50	0.35	19.54	6.22	46.98	14.95	
60	2.00	0.25	48.32	15.37	95.30	30.32	
80	2.50	0.18	77.54	24.67	172.84	54.99	
120	3.00	0.13	96.79	30.79	269.63	85.78	
170	3.50	0.09	23.83	7.58	293.46	93.36	
200	3.75	0.07	1.52	0.48	294.98	93.85	
230	4.00	0.06	0.58	0.18	295.56	94.03	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.97	2.82	2.40	1.83	1.53	0.48	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	2.15	0.23	0.89	-1.71	7.33		

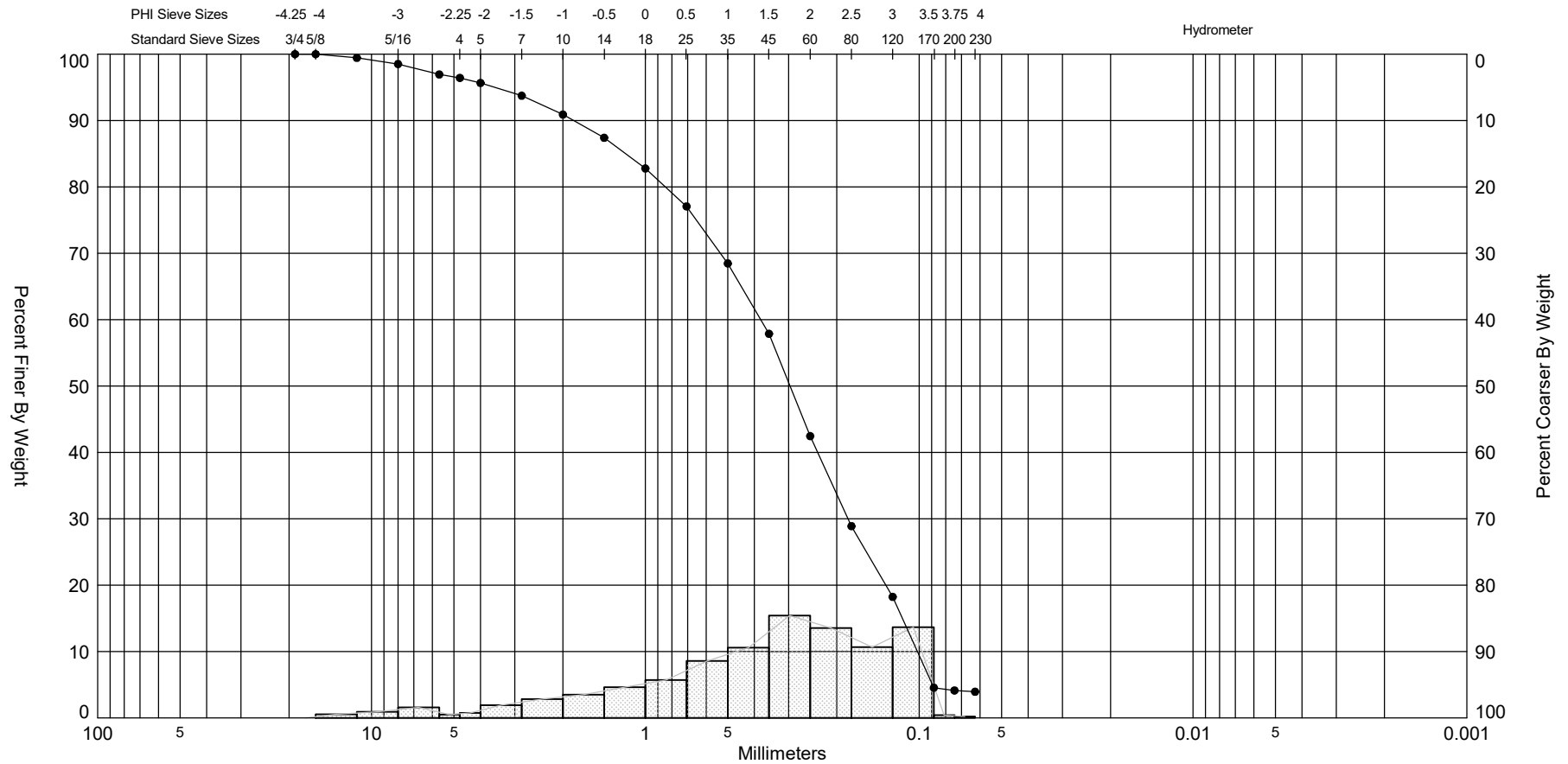


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-22 #S1		-23.7	SP-SM	#200 - 6.15 #230 - 5.97		6.50	2.4	2.15	-1.71	7.33	0.89	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	05-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2288600.725
												Northing (Y, ft):	48363.693
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-22 #S2							
Analysis Date: 05-25-19							
Analyzed By: FKJ							
Easting (ft): 2288600.725		Northing (ft): 48363.693		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -25.7 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 275.30	Wash Weight (g): 264.76	Pan Retained (g): 0.28	Sieve Loss (%): 0.01	Fines (%): #200 - 4.13 #230 - 3.94	Organics (%):	Carbonates (%): 18.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.55	0.56	1.55	0.56	
5/16"	-3.00	8.00	2.54	0.92	4.09	1.49	
3.5	-2.50	5.66	4.33	1.57	8.42	3.06	
4	-2.25	4.76	1.44	0.52	9.86	3.58	
5	-2.00	4.00	2.09	0.76	11.95	4.34	
7	-1.50	2.83	5.28	1.92	17.23	6.26	
10	-1.00	2.00	7.81	2.84	25.04	9.10	
14	-0.50	1.41	9.66	3.51	34.70	12.60	
18	0.00	1.00	12.71	4.62	47.41	17.22	
25	0.50	0.71	15.75	5.72	63.16	22.94	
35	1.00	0.50	23.65	8.59	86.81	31.53	
45	1.50	0.35	29.17	10.60	115.98	42.13	
60	2.00	0.25	42.45	15.42	158.43	57.55	
80	2.50	0.18	37.34	13.56	195.77	71.11	
120	3.00	0.13	29.33	10.65	225.10	81.77	
170	3.50	0.09	37.67	13.68	262.77	95.45	
200	3.75	0.07	1.17	0.42	263.94	95.87	
230	4.00	0.06	0.50	0.18	264.44	96.06	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.48	3.08	2.68	1.76	0.62	-0.13	-1.83	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.37	0.39	1.58	-0.99	3.6		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19

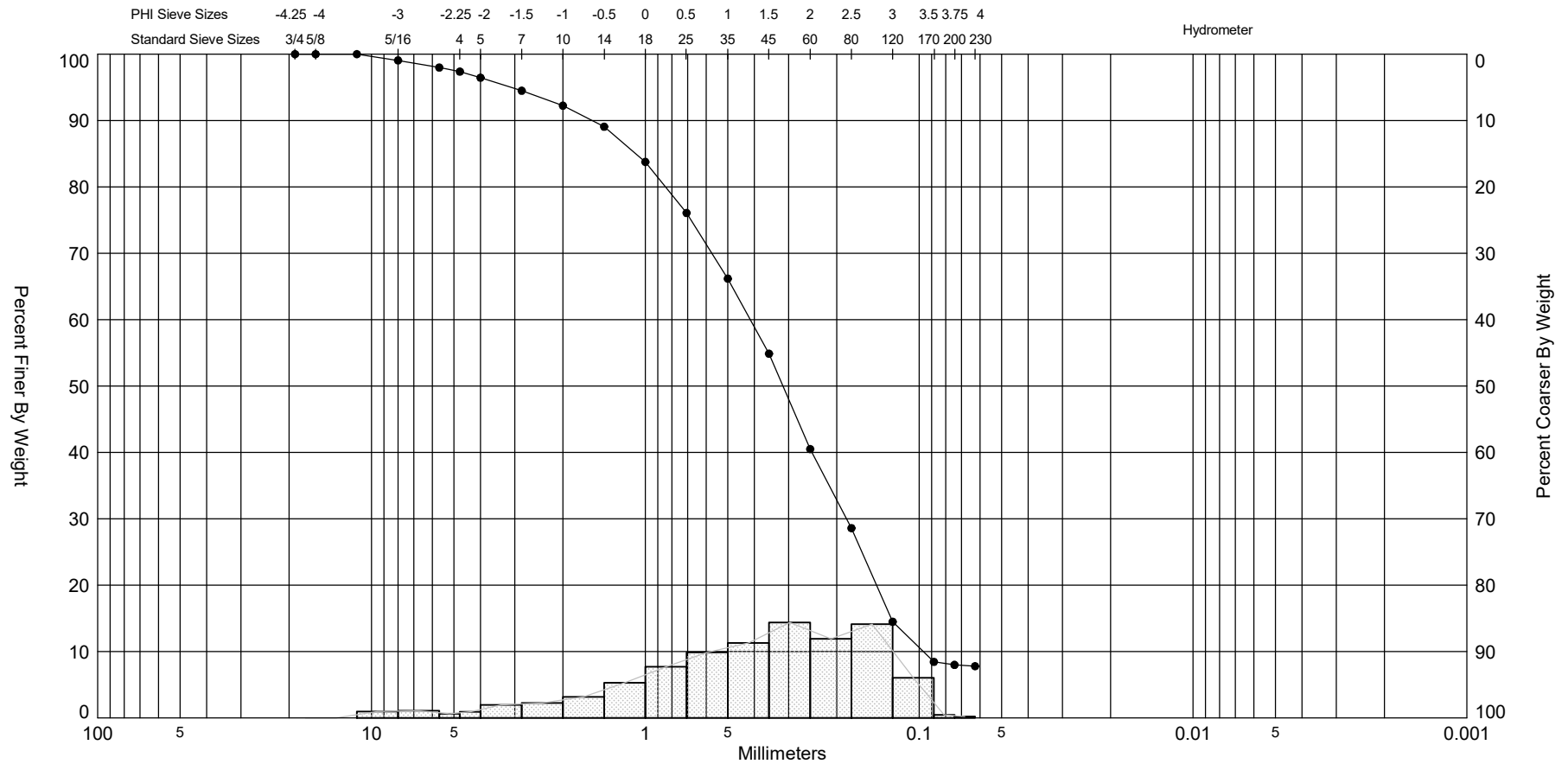


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-22 #S2	—●—	-25.7	SW	#200 - 4.13 #230 - 3.94		18.80	1.76	1.37	-0.99	3.6	1.58	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	05-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2288600.725
												Northing (Y, ft):	48363.693
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

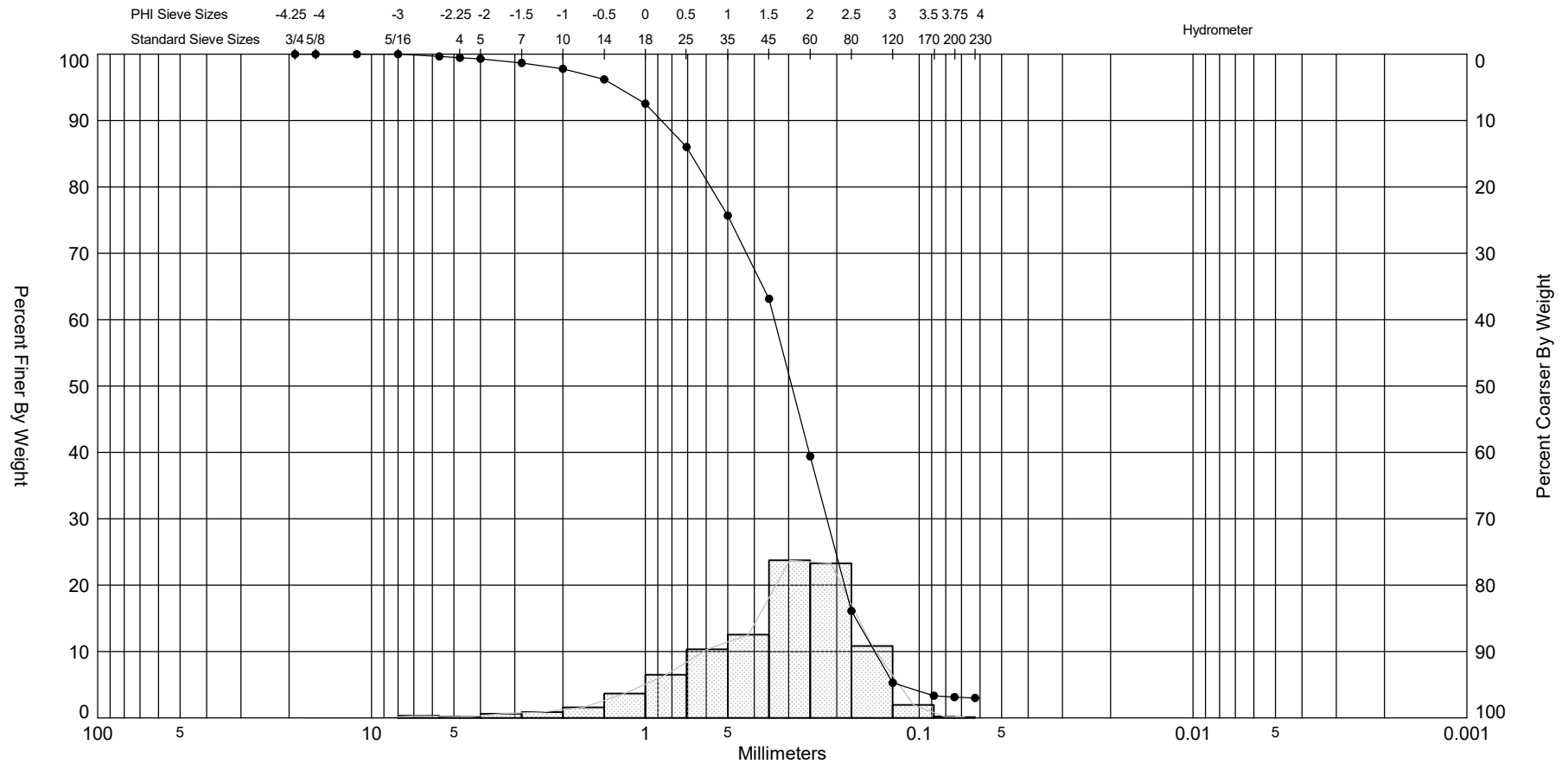
GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-22 #S3							
Analysis Date: 05-25-19							
Analyzed By: FKJ							
Easting (ft): 2288600.725		Northing (ft): 48363.693		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -26.7 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 227.04	Wash Weight (g): 209.94	Pan Retained (g): 0.59	Sieve Loss (%): 0.00	Fines (%): #200 - 7.99 #230 - 7.79	Organics (%):	Carbonates (%): 18.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	2.14	0.94	2.14	0.94	
3.5	-2.50	5.66	2.45	1.08	4.59	2.02	
4	-2.25	4.76	1.38	0.61	5.97	2.63	
5	-2.00	4.00	2.10	0.92	8.07	3.55	
7	-1.50	2.83	4.45	1.96	12.52	5.51	
10	-1.00	2.00	5.10	2.25	17.62	7.76	
14	-0.50	1.41	7.20	3.17	24.82	10.93	
18	0.00	1.00	12.05	5.31	36.87	16.24	
25	0.50	0.71	17.45	7.69	54.32	23.93	
35	1.00	0.50	22.46	9.89	76.78	33.82	
45	1.50	0.35	25.69	11.32	102.47	45.13	
60	2.00	0.25	32.62	14.37	135.09	59.50	
80	2.50	0.18	27.05	11.91	162.14	71.41	
120	3.00	0.13	32.02	14.10	194.16	85.52	
170	3.50	0.09	13.72	6.04	207.88	91.56	
200	3.75	0.07	1.03	0.45	208.91	92.01	
230	4.00	0.06	0.44	0.19	209.35	92.21	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	2.95	2.63	1.67	0.55	-0.02	-1.63	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.27	0.41	1.46	-0.87	3.44		



Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-22 #S4							
Analysis Date: 05-25-19							
Analyzed By: FKJ							
Easting (ft): 2288600.725		Northing (ft): 48363.693		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -33.7 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 310.35	Wash Weight (g): 301.27	Pan Retained (g): 0.27	Sieve Loss (%): 0.00	Fines (%): #200 - 3.13 #230 - 3.01	Organics (%):	Carbonates (%): 7.70	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.02	0.33	1.02	0.33	
4	-2.25	4.76	0.66	0.21	1.68	0.54	
5	-2.00	4.00	0.47	0.15	2.15	0.69	
7	-1.50	2.83	1.96	0.63	4.11	1.32	
10	-1.00	2.00	2.71	0.87	6.82	2.20	
14	-0.50	1.41	4.97	1.60	11.79	3.80	
18	0.00	1.00	11.40	3.67	23.19	7.47	
25	0.50	0.71	20.23	6.52	43.42	13.99	
35	1.00	0.50	32.06	10.33	75.48	24.32	
45	1.50	0.35	38.90	12.53	114.38	36.86	
60	2.00	0.25	73.67	23.74	188.05	60.59	
80	2.50	0.18	72.27	23.29	260.32	83.88	
120	3.00	0.13	33.64	10.84	293.96	94.72	
170	3.50	0.09	6.03	1.94	299.99	96.66	
200	3.75	0.07	0.65	0.21	300.64	96.87	
230	4.00	0.06	0.36	0.12	301.00	96.99	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.07	2.51	2.31	1.78	1.03	0.60	-0.34	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.55	0.34	1.01	-1.09	4.68		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-22 #S4	—●—	-33.7	SW	#200 - 3.13 #230 - 3.01		7.70	1.78	1.55	-1.09	4.68	1.01	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	05-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
						American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444						Easting (X, ft):	2288600.725
												Northing (Y, ft):	48363.693
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88

DRILLING LOG		DIVISION Moffatt Nichol	INSTALLATION Raleigh, Nc	SHEET 1 OF 1 SHEETS
1. PROJECT Oak Island Multi Decadal Master Plan Sediment Collection and Testing				
2. BORING DESIGNATION 2019-JB-23		LOCATION COORDINATES X = 2289602.577 Y = 48362.992		
3. DRILLING AGENCY American Vibracore services, Inc.		CONTRACTOR FILE NO.		
4. NAME OF DRILLER Brian McCord		9. SIZE AND TYPE OF BIT 4.0 In.		
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED		10. COORDINATE SYSTEM/DATUM State Plane North Carolina FIPS 3200 HORIZONTAL NAD 1983 VERTICAL NAVD 88		
6. THICKNESS OF OVERBURDEN 0.0 Ft.		11. MANUFACTURER'S DESIGNATION OF DRILL AVS 80 Pneumatic Sampler ☐ AUTO HAMMER ☐ MANUAL HAMMER		
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		12. TOTAL SAMPLES		
8. TOTAL DEPTH OF BORING 19.5 Ft.		13. TOTAL NUMBER CORE BOXES 1		
		14. ELEVATION GROUND WATER		
		15. DATE BORING 03-14-19 17:57 COMPLETED 03-14-19 18:01		
		16. ELEVATION TOP OF BORING -19.9 Ft.		
		17. TOTAL RECOVERY FOR BORING 16.6 Ft.		
		18. SIGNATURE AND TITLE OF INSPECTOR Finn Whiting		

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	CARBONATE SAMPLE	SIEVE SAMPLE	REMARKS
-19.9	0.0					
-24.0	4.1		Poorly graded sand (f-m), light brownish gray (10YR-6/2), (SP).	C1	S1	Sample #S1, Depth = 6.5' Sample #C1, Depth = 0.0' - 6.5'
-26.4	6.5		Poorly graded sand (f-m), trace shell fragments (up to 0.02' in size) increasing with depth, gray (10YR-5/1), (SP).			
-28.4	8.5		Poorly graded silty sand (f-m), trace shell fragments (up to 0.02' in size), dark gray (10YR-4/1), (SP-SM).	C2	S2	Sample #S2, Depth = 8.3' Sample #C2, Depth = 6.5' - 8.3'
-35.5	15.6		Poorly graded sand (f-m), trace shell fragments (up to 0.04' in size), silt nodules from 12.3' - 12.4' ; 12.8' - 12.9' ; and 13.4' - 13.5', gray (10YR 6/1) to, light gray (10YR-7/1), (SW).	C3	S3	Sample #S3, Depth = 16.6' Sample #C3, Depth = 8.3' - 16.6'
-36.5	16.6		Poorly graded sand (f-m), trace to few shell (up to 0.06' in size), light gray (10YR-7/1), (SW).			
			End of Boring			



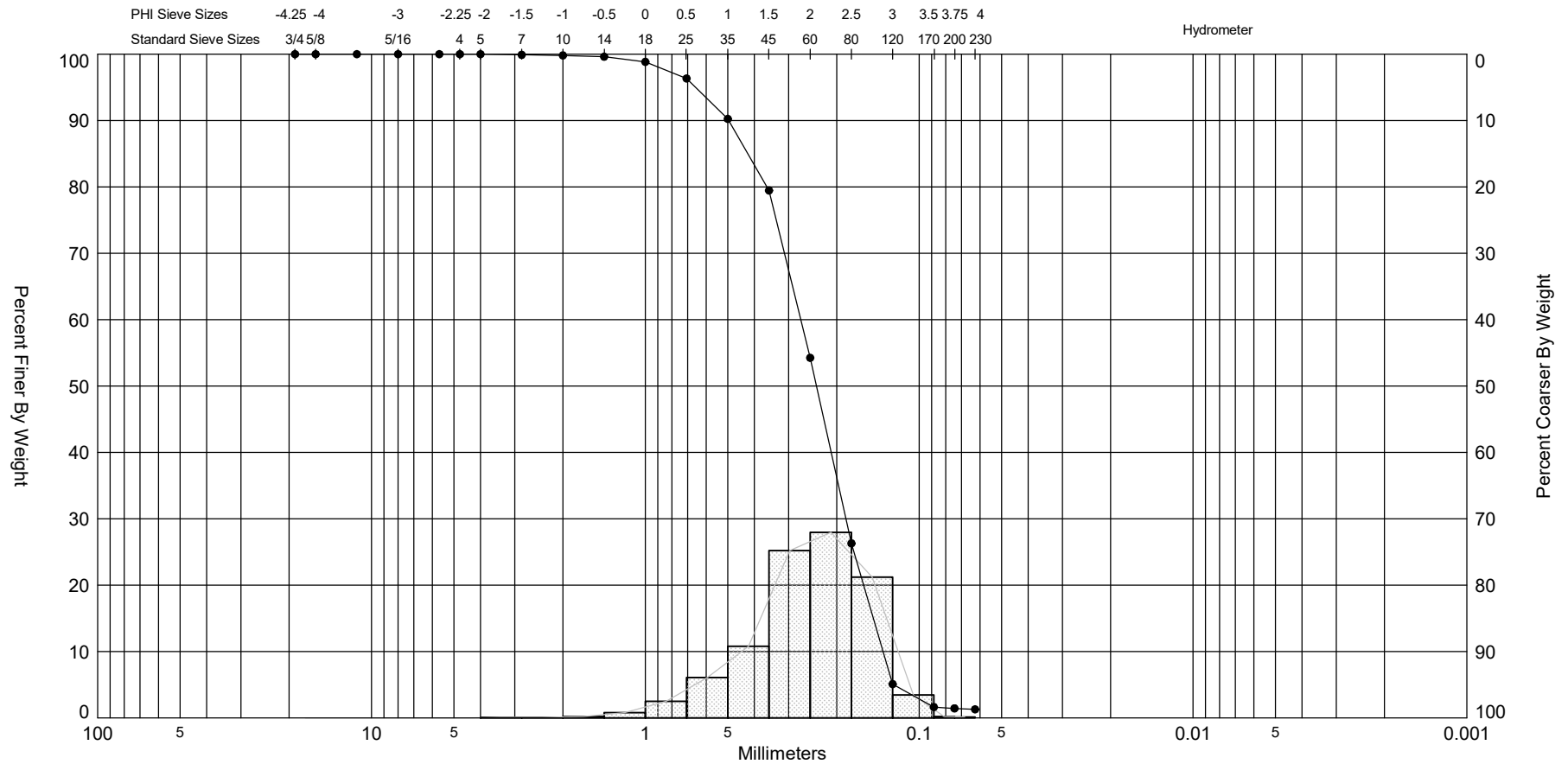
Oak Island
Multi Decadal Master
Plan
2019

2019-JB-23

Top of Core
Elevation
NAVD 88
-19.9 Ft

Scale in Tenths of Feet

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-23 #S1							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2289602.577		Northing (ft): 48362.992		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -26.4 NAVD 88	
USCS: SP		Munsell:		Comments:			
Dry Weight (g): 216.88	Wash Weight (g): 214.12	Pan Retained (g): 0.04	Sieve Loss (%): 0.00	Fines (%): #200 - 1.43 #230 - 1.29	Organics (%):	Carbonates (%): 6.20	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.00	0.00	0.00	0.00	
4	-2.25	4.76	0.00	0.00	0.00	0.00	
5	-2.00	4.00	0.00	0.00	0.00	0.00	
7	-1.50	2.83	0.22	0.10	0.22	0.10	
10	-1.00	2.00	0.19	0.09	0.41	0.19	
14	-0.50	1.41	0.41	0.19	0.82	0.38	
18	0.00	1.00	1.70	0.78	2.52	1.16	
25	0.50	0.71	5.45	2.51	7.97	3.67	
35	1.00	0.50	13.17	6.07	21.14	9.75	
45	1.50	0.35	23.39	10.78	44.53	20.53	
60	2.00	0.25	54.70	25.22	99.23	45.75	
80	2.50	0.18	60.61	27.95	159.84	73.70	
120	3.00	0.13	46.00	21.21	205.84	94.91	
170	3.50	0.09	7.50	3.46	213.34	98.37	
200	3.75	0.07	0.44	0.20	213.78	98.57	
230	4.00	0.06	0.30	0.14	214.08	98.71	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.01	2.74	2.53	2.08	1.59	1.29	0.61	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.98	0.25	0.73	-0.81	4.24		

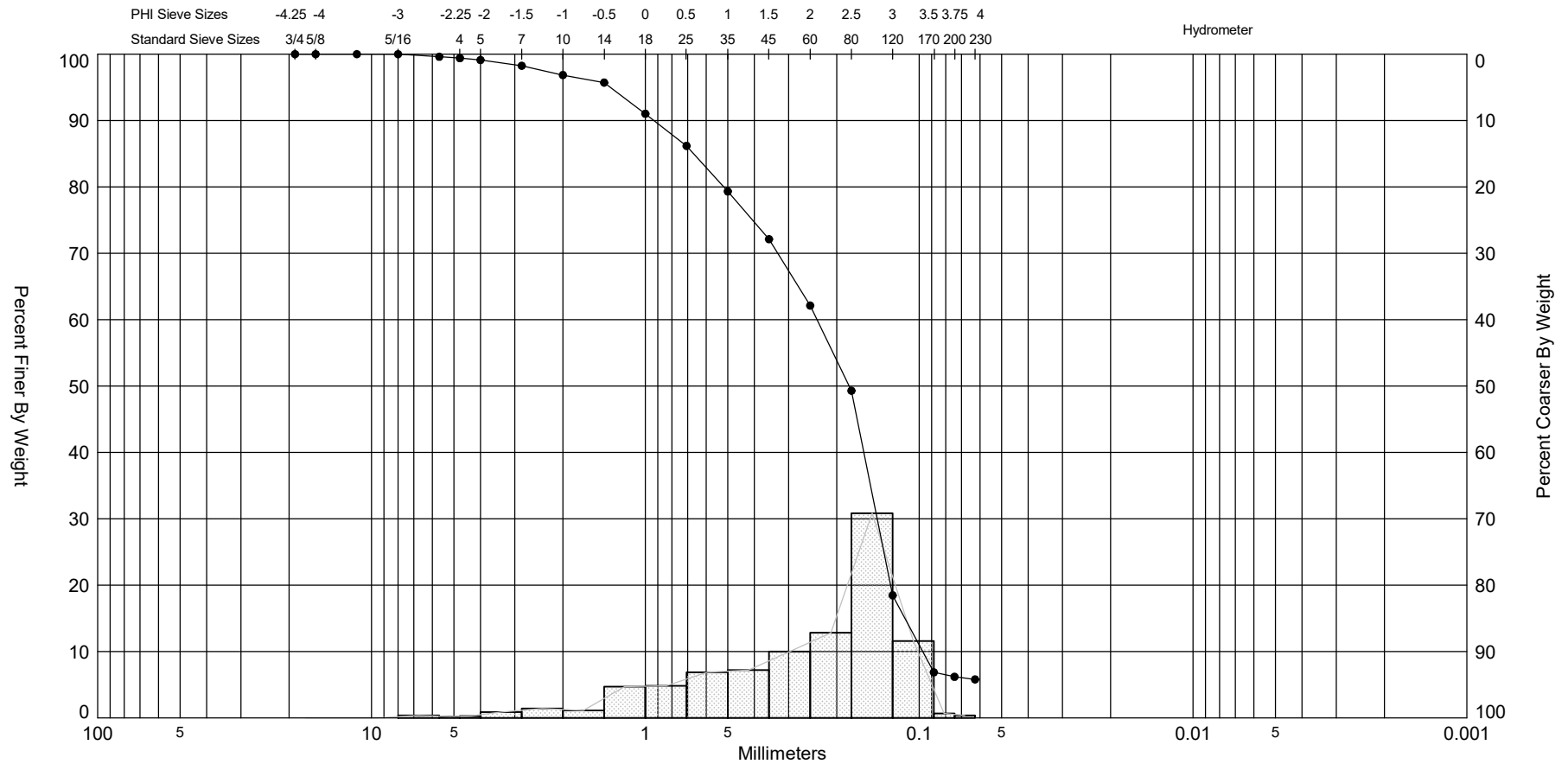


Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-23 #S1	—●—	-26.4	SP	#200 - 1.43 #230 - 1.29		6.20	2.08	1.98	-0.81	4.24	0.73	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289602.577
												Northing (Y, ft):	48362.992
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-23 #S2							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2289602.577		Northing (ft): 48362.992		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -28.2 NAVD 88	
USCS: SP-SM		Munsell:		Comments:			
Dry Weight (g): 262.31	Wash Weight (g): 247.80	Pan Retained (g): 0.70	Sieve Loss (%): 0.00	Fines (%): #200 - 6.19 #230 - 5.80	Organics (%):	Carbonates (%): 13.80	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	1.01	0.39	1.01	0.39	
4	-2.25	4.76	0.56	0.21	1.57	0.60	
5	-2.00	4.00	0.73	0.28	2.30	0.88	
7	-1.50	2.83	2.28	0.87	4.58	1.75	
10	-1.00	2.00	3.67	1.40	8.25	3.15	
14	-0.50	1.41	2.97	1.13	11.22	4.28	
18	0.00	1.00	12.33	4.70	23.55	8.98	
25	0.50	0.71	12.70	4.84	36.25	13.82	
35	1.00	0.50	18.00	6.86	54.25	20.68	
45	1.50	0.35	18.88	7.20	73.13	27.88	
60	2.00	0.25	26.22	10.00	99.35	37.88	
80	2.50	0.18	33.66	12.83	133.01	50.71	
120	3.00	0.13	80.84	30.82	213.85	81.53	
170	3.50	0.09	30.43	11.60	244.28	93.13	
200	3.75	0.07	1.78	0.68	246.06	93.81	
230	4.00	0.06	1.04	0.40	247.10	94.20	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
	3.11	2.89	2.47	1.30	0.66	-0.42	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.92	0.26	1.24	-1.18	4		

SIEVE ANALYSIS OAK ISLAND MULTI-DECADEAL MASTER PLAN.GPJ FL DEPROSS.GDT 8/1/19



Gravel		Sand			Silt and Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort	Sample Information	
2019-JB-23 #S2	—●—	-28.2	SP-SM	#200 - 6.19 #230 - 5.80		13.80	2.47	1.92	-1.18	4	1.24	Project Name:	Oak Island Multi Decadal Master Plan
Comments:												Analysis Date:	04-25-19
Depths and elevations based on measured values												Analyzed By:	FKJ
												Easting (X, ft):	2289602.577
												Northing (Y, ft):	48362.992
												Horizontal System:	NAD 1983
												Vertical System:	NAVD 88
American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444													

GRANULARMETRIC REPORT OAK ISLAND MULTI DECADEAL MASTER PLAN.GPJ FL DEP ROSS.GDT 8/1/19

Granularmetric Report Depths and elevations based on measured values				 American Vibracore Services, Inc. 1215 Wallace Drive Delray Beach, FL 33444			
Project Name: Oak Island Multi Decadal Master Plan							
Sample Name: 2019-JB-23 #S3							
Analysis Date: 04-25-19							
Analyzed By: FKJ							
Easting (ft): 2289602.577		Northing (ft): 48362.992		Coordinate System: State Plane North Carolina FIPS 3200 Feet		Elevation (ft): -36.5 NAVD 88	
USCS: SW		Munsell:		Comments:			
Dry Weight (g): 222.60	Wash Weight (g): 216.09	Pan Retained (g): 0.18	Sieve Loss (%): 0.00	Fines (%): #200 - 3.20 #230 - 3.01	Organics (%):	Carbonates (%): 20.60	Shells (%):
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained	
3/4"	-4.25	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	0.15	0.07	0.15	0.07	
3.5	-2.50	5.66	0.22	0.10	0.37	0.17	
4	-2.25	4.76	0.37	0.17	0.74	0.33	
5	-2.00	4.00	0.52	0.23	1.26	0.57	
7	-1.50	2.83	1.41	0.63	2.67	1.20	
10	-1.00	2.00	1.85	0.83	4.52	2.03	
14	-0.50	1.41	2.77	1.24	7.29	3.27	
18	0.00	1.00	6.39	2.87	13.68	6.15	
25	0.50	0.71	9.59	4.31	23.27	10.45	
35	1.00	0.50	15.53	6.98	38.80	17.43	
45	1.50	0.35	32.70	14.69	71.50	32.12	
60	2.00	0.25	82.33	36.99	153.83	69.11	
80	2.50	0.18	34.33	15.42	188.16	84.53	
120	3.00	0.13	22.56	10.13	210.72	94.66	
170	3.50	0.09	4.27	1.92	214.99	96.58	
200	3.75	0.07	0.49	0.22	215.48	96.80	
230	4.00	0.06	0.43	0.19	215.91	96.99	
Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95	
3.09	2.48	2.19	1.74	1.26	0.90	-0.20	
Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis		
Statistics	1.59	0.33	0.92	-1.28	6.06		

