Appendix E- Geotechnical Investigation Report

GEOTECHNICAL INVESTIGATION OF OCEAN ISLE BEACH & SHALLOTTE INLET BORROW AREA
OCEAN ISLE BEACH SHORELINE MANAGEMENT PROJECT

Prepared For:

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Executive Summary

In 2012, Coastal Planning & Engineering of North Carolina, Inc. (CPE-NC) was authorized to provide services in support of the effort by the Town of Ocean Isle Beach (TOWN) to evaluate the feasibility of constructing a terminal groin on the east end of the TOWN's shoreline near Shallotte Inlet. The terminal groin is designed to mitigate the chronic erosion problem caused by Shallotte Inlet's influence on the movement of littoral sediment in this area.

During the Ocean Isle Beach geotechnical investigations, CPE-NC researchers utilized existing U.S. Army Corps of Engineers (USACE) vibracore data from 1994, 1998, 2005, and 2009 to assess the proposed beach fill sediment characteristics. On April 5, April 9, 2013, and January 23, 2014, CPE-NC collected beach samples and nearshore sediment samples along four (4) profiles, extending from the dune out to -20 ft. NAVD, to facilitate an evaluation of the borrow area's compatibility with the existing beach. The beach and nearshore samples analyzed by CPE-NC were obtained from the east end of Ocean Isle Beach between stations 0+00 and 60+00 and incorporated with USACE data from native beach samples collected along profile station 40+00, extending from the dune out to -20 ft. NAVD.

CPE-NC concentrated their investigation on the federally approved borrow area used for the Ocean Isle Beach storm damage reduction project. The federal borrow area extends from the Atlantic Intracoastal Waterway (AIWW) through the throat of the channel and turns south over the ocean bar, realigning the channel perpendicular to the adjacent shorelines. The original USACE borrow area was designed to have a maximum dredging depth of 15 ft. below MLW (-17.97 ft. NAVD) (USACE, 2002); creating a channel with 3H:1V sides slopes measuring approximately 950 ft. wide at the AIWW and 1,400 ft. wide at the bar channel. The footprint of the borrow area covers approximately 4.8 million sq. ft. (110 ac) and was divided into eight (8) sub areas.

CPE-NC conducted an independent review of the borrow area using multiple historic vibracore data sets obtained by the USACE, as well as considering the state sediment criteria rules (15A NCAC 07H .0312) and environmental concerns voiced by resource agencies through the Project Review Team (PRT) process. This independent analysis resulted in the identification of a sub portion of the federally approved borrow area which is limited to the area dredged during the initial construction of the project in 2001. The recommended borrow area has an estimated dredgeable volume of approximately 1,312,000 cy based on pre-construction surveys conducted in 2013. The compatibility of this borrow area with the existing beach was evaluated according to wet Munsell color, silt content, carbonate content and grain size. The compatibility analysis verified that the borrow area material met the allowable limits defined by Rule 15A NCAC 07H .0312.

GEOTECHNICAL INVESTIGATION OF OCEAN ISLE BEACH & SHALLOTTE INLET BORROW AREA, BRUNSWICK COUNTY, NORTH CAROLINA

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INTRODUCTION

Ocean Isle Beach is approximately 29,200 feet (5.5 miles) long and is located on the Atlantic Coast of southeastern North Carolina, in Brunswick County, 44 miles from Wilmington, North Carolina. It is situated between Shallotte Inlet on the east and Tubbs Inlet on the west and bound to the north by the Atlantic Intracoastal Waterway. To the south the Town is bound by the Atlantic Ocean (Figure 1).

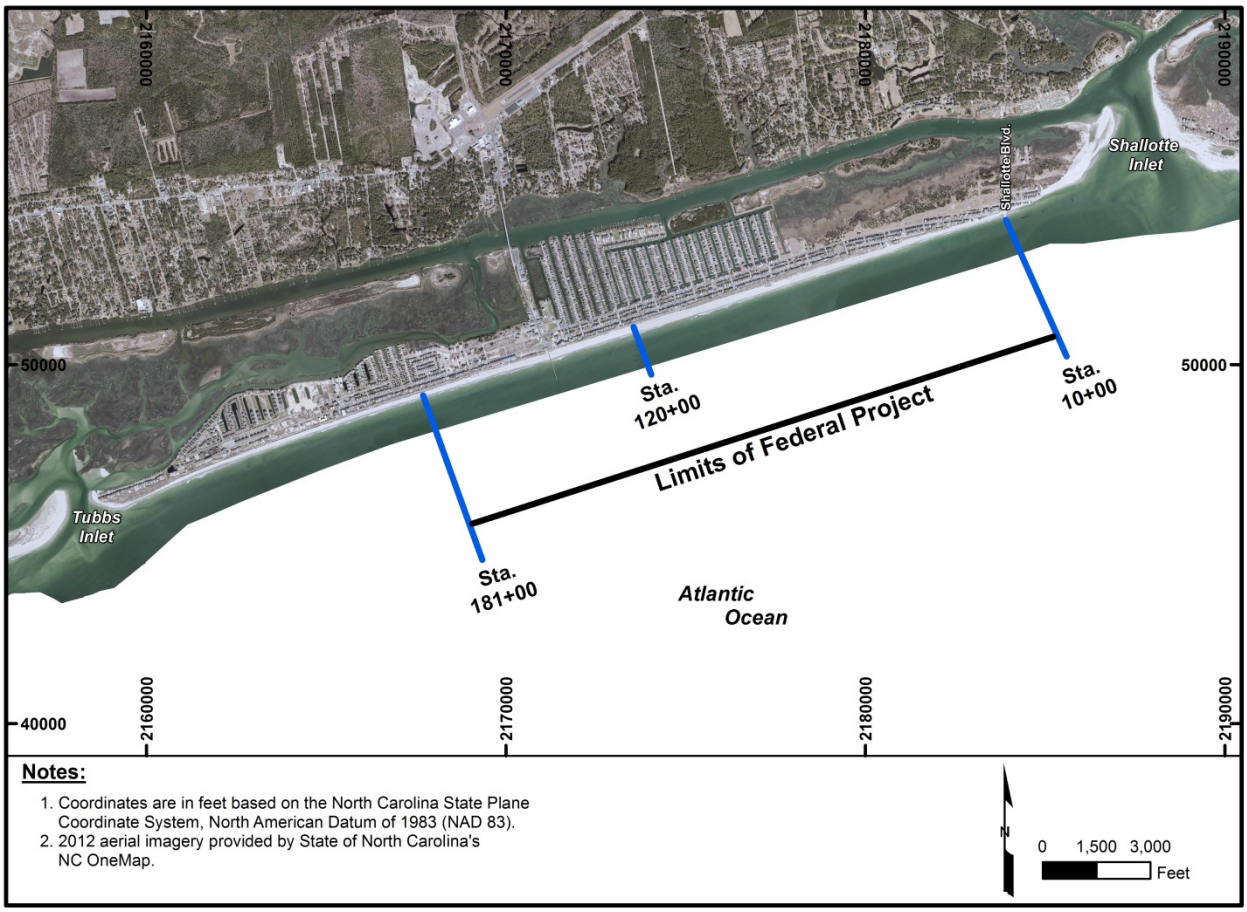


Figure 1. Location map showing Ocean Isle Beach and the limits of the federal project.

Brunswick County's beaches are a major economic engine to the tourist based economies of the local Towns, the County, and the entire southeastern North Carolina region. In 2001, the U.S. Army Corps of Engineers (USACE) constructed a federal beach fill project for storm damage reduction that covered 17,100 feet (3.25 miles) of the Town of Ocean Isle. The Ocean Isle Beach project is part of a larger project - the Brunswick County Beaches, North Carolina. The project was authorized by Public Law 89-789 (House Document 511/89/2) dated November 6, 1966 (Flood Control Act of 1966). The Town of Ocean Isle Beach is the project sponsor. As originally authorized, the project consisted of a main fill area with a 25-foot wide dune with a crest elevation of 9.5 ft. NGVD and a 50-foot wide berm constructed to 7 ft. NGVD with transition zones on either end. The authorization also included periodic nourishment of the project with the nourishment interval of approximately three (3) years. Fill material for the proposed project was identified within Shallotte Inlet. Figure 2 shows a map of the approved

borrow area for the federal project. Initial construction of the project in 2001 dredged 1.6 million cubic yards of sand from the inlet borrow area. Maintenance events constructed since the 2001 initial construction have also utilized the inlet borrow area.

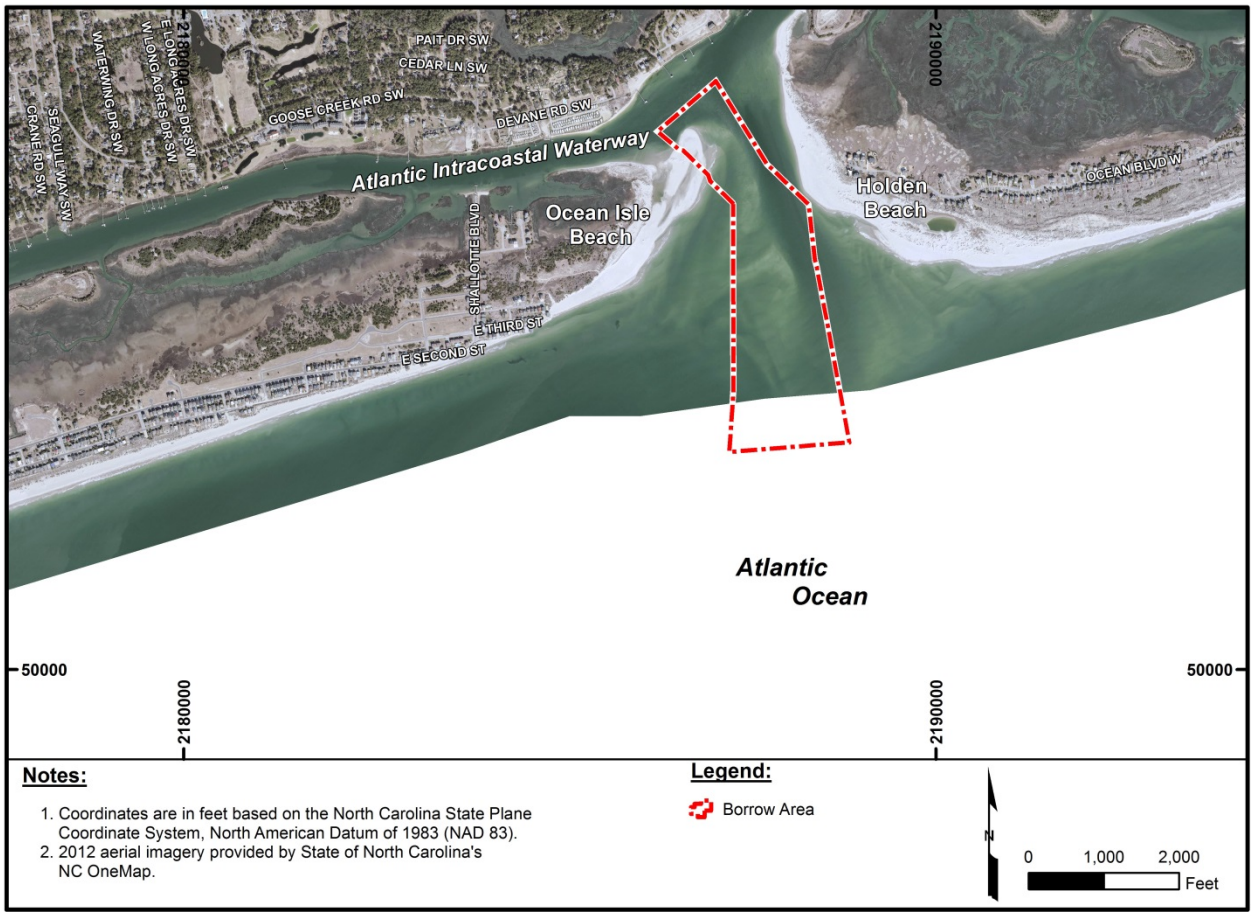


Figure 2. Map of approved borrow area for the federal project at Shallotte Inlet.

The eastern end of Ocean Isle Beach between Shallotte Boulevard (Station 10+00) and Shallotte Inlet was not included in the federal project due to the predicted high rates of loss that would occur from beach fill placed in this area. Based on the USACE economic evaluation, the cost of protecting the extreme east end of the island exceeded the value of the development and infrastructure it would protect, and was therefore excluded from the federal project. Although the western and central portion of the federal storm damage reduction project has performed very well, the eastern end of the island has seen continued erosion since initial construction in 2001 despite substantial beach nourishment efforts. The federal beach nourishment project was unable to provide adequate and dependable protection against the chronic erosion and the damage caused by coastal storms. The Town and affected property owners have undertaken a concerted effort to lessen the erosional impacts by installing sandbag revetments along approximately 1,400 feet of shoreline, beginning at a point west of Shallotte Boulevard and extending to the east end of the development.

An evaluation of the shoreline and volume changes along Ocean Isle Beach conducted by Coastal Planning & Engineering of North Carolina (CPE-NC) indicated that effects associated with Shallotte Inlet are the primary cause of the high rates of erosion along the eastern end of Ocean Isle Beach (Raleigh Street and east) (CPE-NC, 2012). The Shallotte Inlet and associated ebb tide delta contribute to the high erosion rates on the eastern end of Ocean Isle Beach via higher levels of wave energy striking the shore just west of Shallotte Inlet, flood tidal currents concentrated close to shore, and wave refraction patterns around the ebb tide delta.

Given the failure of past efforts to address the erosion problem on the east end of the island with beach nourishment and temporary sandbag revetments, construction of a terminal groin has been proposed as an effective way to slow the rate of erosion. During the 2011 legislation session, the North Carolina Legislature passed Session Law 2011-387, Senate Bill 110, which allows consideration of terminal groins adjacent to tidal inlets. This legislation included a number of provisions and conditions that must be met in order for the terminal groin to be approved and permitted by both the Federal and State government. One such requirement is that the "fillet" that would result on the up-drift side of the terminal groin be pre-filled with beach compatible material.

The State of North Carolina has adopted specific sediment criteria for the emplacement of beach fill along the oceanfront shoreline (15A NCAC 07H.0312). These rules were adopted by the North Carolina Coastal Resource Commission (CRC), in February 2007, and later amended in April 2008 and September 2013. The material used to pre-fill the terminal groin fillet must adhere to these standards in order to obtain a Major CAMA Permit for the project.

The proposed source of sand for the terminal groin project is the existing authorized borrow source within Shallotte Inlet that was used by the USACE for the Federal Storm Damage Reduction Project for Ocean Isle Beach (Figure 2). Recent changes to the State Technical Standards for Beach Fill Projects (15A NCAC 07H.0312) allow for an applicant to use two sets of sampling data (with at least one dredging event in between) from maintained navigation channels or sediment deposition basins within the active nearshore, beach or inlet shoal system to characterize material for subsequent nourishment events from those areas. This report examines two sets of sampling data collected by the USACE within the Shallotte Inlet Borrow Area, and compares sediment characterization data from the borrow area with the existing beach sediment characteristics to verify that the proposed source of sand meets the State Technical Standards.

INVESTIGATION SEQUENCING

A systematic approach to marine sand searches has been developed over the years by the CPE-NC Coastal Geology and Geomatics team (*e.g.* Finkl, Khalil and Andrews, 1997; Finkl, Andrews and Benedet, 2003; Finkl, Benedet and Andrews, 2005; Finkl and Khalil, 2005). In a comprehensive marine sand search, the investigation is typically divided into three (3) sequential phases. This phased approach can be modified to meet the scope of the investigation and accommodate the level of work previously performed. Regardless of the phases executed during

a sand search, this investigation sequence is preserved in order to maintain efficiency and completeness to provide confident results.

Phase I investigations typically consist of a comprehensive review of the project area and sediment resources in the vicinity of the project area. This desktop study examines previously collected information within the geologic context of the investigation area in order to identify features having the highest potential of containing project-compatible sand. The geological background of the area is assessed to identify the geomorphic features that may contain material suitable for the project. Information related to previously investigated areas, potential sand resources and borrow areas, is compiled and related back to the geomorphic features. Geophysical and geotechnical data previously collected within these areas, as well as any reports discussing the findings, are then reviewed. Based on this analysis, deposits potentially containing project-compatible material are identified. Due to the amount of existing data on the proposed sand resource for this project, no additional geophysical or geotechnical data has been collected to characterize the borrow source.

Phase II investigations usually consist of reconnaissance level geophysical and geotechnical surveys; however, as previously stated, additional data collection was not required for this investigation. Samples are also collected from the project area during this phase to characterize the project area/existing beach in terms of grain size, color and composition (*i.e.* how well the potential borrow area sediment matches the existing material in the project area).

Phase III typically consists of design level geotechnical and geophysical investigations, a cultural resource investigation, and borrow area design. No additional design level geotechnical or geophysical data collection were required for this investigation due to the pre-existing data available for the inlet borrow area. The USACE has previously conducted a cultural resource survey of the borrow area, so no additional cultural resource surveys were required (Southerly, pers. comm., 2014). For this investigation, Phase III consisted of an independent assessment of borrow area material. Sediment data and survey data provided by the USACE was evaluated, and a modified borrow area was designed based on sediment quality and environmental concerns. Proposed borrow area boundaries and excavation depths were developed from the data collected during the Phase I, II and III investigations.

PHASE I INVESTIGATIONS

During the Phase I investigation, CPE-NC researchers conducted archival literature studies of Shallotte Inlet and the inner continental shelf area offshore of Ocean Isle Beach. Previously identified investigation areas, sand sources, developed borrow areas and historic geotechnical and geophysical data were compiled for the recipient beach. Much of this information was provided by the USACE Wilmington District associated with the Ocean Isle Beach Federal

Storm Damage Reduction Project. The information and data compiled during the Phase I investigation is discussed below.

Geological Background

The southeastern coast of North Carolina is characterized by short barrier islands with an average length of five (5) miles. The islands are separated by wave-dominated, mixed tidal inlets (Hayes, 1979) that have moderately well-developed ebb-tidal deltas. The barrier islands are migrating landward in response to rising sea level and a limited sediment supply. Barrier ends adjacent to tidal inlets typically exhibit pronounced shoreline changes (repositioning of shorelines) associated with tidal inlet processes (migration, channel switching, sediment bypassing and opening/closing) (FitzGerald, 1984). Morphosedimentary patterns and geographic location of coastal barriers and inlets, along the North Carolina coast, are influenced by the inherited geologic framework (*e.g*. Macintyre and Pilkey, 1969; Riggs *et al*., 1995). Underlying rock structure tends to influence the geomorphology of coastal barriers as does composition of the bedrock in relation to offshore sediment sources.

Ocean Isle Beach is an east west trending (south facing ocean shoreline) barrier island located along the low energy flank of Cape Fear in Brunswick County, North Carolina. It is a mid-compartment barrier island located between the two subaerial headlands of Oak Island, North Carolina and Myrtle Beach, South Carolina. The shelf directly seaward of Ocean Isle Beach is primarily composed of Cretaceous aged (Meisburger, 1979) consolidated rock units partially covered by a thin veneer of mobile fine sand and muddy sand. Marden et al. (1999) described the outcropping hardbottom as the Rocky Point Member of the PeeDee Formation

Presently, twenty (20) inlets occur along the North Carolina coast. Five (5) of these are located north of Cape Lookout, which includes an inlet that opened during Hurricane Irene in August of 2011 between Oregon Inlet and Rodanthe, North Carolina, which has closed and re-opened on several occasions since 2011. Eleven (11) are located in Onslow Bay. The remaining four (4), including Shallotte Inlet, are located in Long Bay. Shallotte Inlet is an ebb-dominated system, having a much larger ebb tide delta than flood tide delta (Marden, 1999). Low energy and relatively higher tidal ranges have been identified as the primary factors in establishing large ebb tide deltas and small flood tide deltas (Dean and Walton, 1973). A lack of accommodation space for a flood tide delta at Shallotte Inlet also restricts the size (Marden, 1999).

Previous Investigations

In 1994, offshore vibracore samples were taken 1-3 miles off the shoreline of Ocean Isle Beach, immediately west of the present project area (USACE 1997a, p. A-14; pp. B11/12). The investigation area was selected to be near enough to the project site for dredging to be practical, but distant enough so that removal of material would not affect beach sediment transport processes. Most of the sediment in these samples were silty sand, clayey sand, or sandy clay. The USACE determined the material would be unsuitable for use as beach fill due to high turbidities resulting from the placement of silty or clayey materials (USACE 1997a, p. B-11). This work determined that ". . . suitable borrow material seemed to occur only in erratic pockets, and the search for offshore borrow areas was abandoned without success."

The USACE eventually identified Shallotte Inlet as the most promising source of sand for the Ocean Isle Beach federal project. Since 1994, the USACE has collected at least four (4) sets of vibracore data within Shallotte Inlet. Table 1 provides a summary of these investigations.

Table 1. Summary of Shallotte Inlet Vibracores

Number of Vibracores collected 1994	11
Number of Vibracores collected 1998	13
Number of Vibracores collected 2005	10
Number of Vibracores collected 2009	17

Current estimates suggest that approximately 264,000 cubic yards of sand may be required to fill the fillet associated with a terminal groin on the east end of Ocean Isle Beach. Independent analysis conducted by CPE-NC (2012), as well as discussions between CPE-NC and the USACE Wilmington District (Wutkowski, pers. comm., 2012), suggest the current borrow area could support both routine maintenance of the Federal Project and the construction and maintenance of the proposed terminal groin project. Actual volume calculations supporting this suggestion were conducted by CPE-NC and are discussed in the Phase III description below.

Targeted Sand Source

The borrow area targeted as a sand source for the proposed terminal groin project at the east end of Ocean Isle Beach is a portion of the approved borrow area for the federal storm damage reduction project. The borrow area, which was used for the initial construction and subsequent maintenance of the federal project, is contained within the Shallotte Inlet complex as shown in Figure 2. The borrow area extends from the Atlantic Intracoastal Waterway through the inlet gorge and out across the ebb tide delta to a depth of -15.0 ft. MLW. The entire area was designed to be dredged to a depth of -15.0 ft. MLW (-17.97 NAVD88) (USACE, 2002).

Cultural Resources

During the process of designing the federal storm damage reduction project at Ocean Isle Beach, the USACE coordinated a submerged cultural resource investigation of the Shallotte Inlet borrow area in 1992 and 1995. The two separate cultural resource surveys were conducted in Shallotte Inlet by Tidewater Atlantic Research, Inc. (TAR). Both surveys deployed magnetometer and high resolution side scan sonar units in an effort to identify submerged artifacts of cultural or historical significance. Although, several ships were identified as potentially wrecked/lost in Shallotte Inlet during the historical review, no targets were located during the course of either survey. TAR concluded that no additional cultural resource investigations were necessary to perform dredging operations within the surveyed areas in 1992 and 1995 (Watts 1992, 1995).

PHASE II INVESTIGATIONS

Beach Assessment

The suitability of a sand source for beach nourishment is directly linked to the characteristics of the recipient beach. State and federal regulatory agencies require that sand resources used for nourishment be "beach compatible", that is, "similar" to sand existing in the project area. Qualities such as grain size, silt content, granular content, gravel content, color, and mineralogical composition are taken into account. It is, therefore, important to accurately characterize existing beach sediments during a sand search investigation. This procedure allows researchers to target potential sand resources that are most similar to the recipient beach. The compatibility of material to be placed on North Carolina's beaches is governed by Rule 15A NCAC 07H .0312. Section 1 of the rule describes how the recipient beach is to be sampled and evaluated. This evaluation included beach profiles (Sub-Section c), sand sampling and assessment of percent by weight fines, granular, and gravel (Sub-Sections d, e, and f), an assessment of the percent by weight calcium carbonate (Sub-Section g).

Beach Profiles: The Town of Ocean Isle Beach contracted with McKim and Creed, Inc. to conduct beach profile surveys along the eastern end of the Town. On June 10, 2013, McKim and Creed surveyors conducted beach profile surveys along 13 profiles from Shallotte Inlet to USACE baseline station 20+00 (approximately 1,000 ft. west of Shallotte Blvd.) (Figure 3).

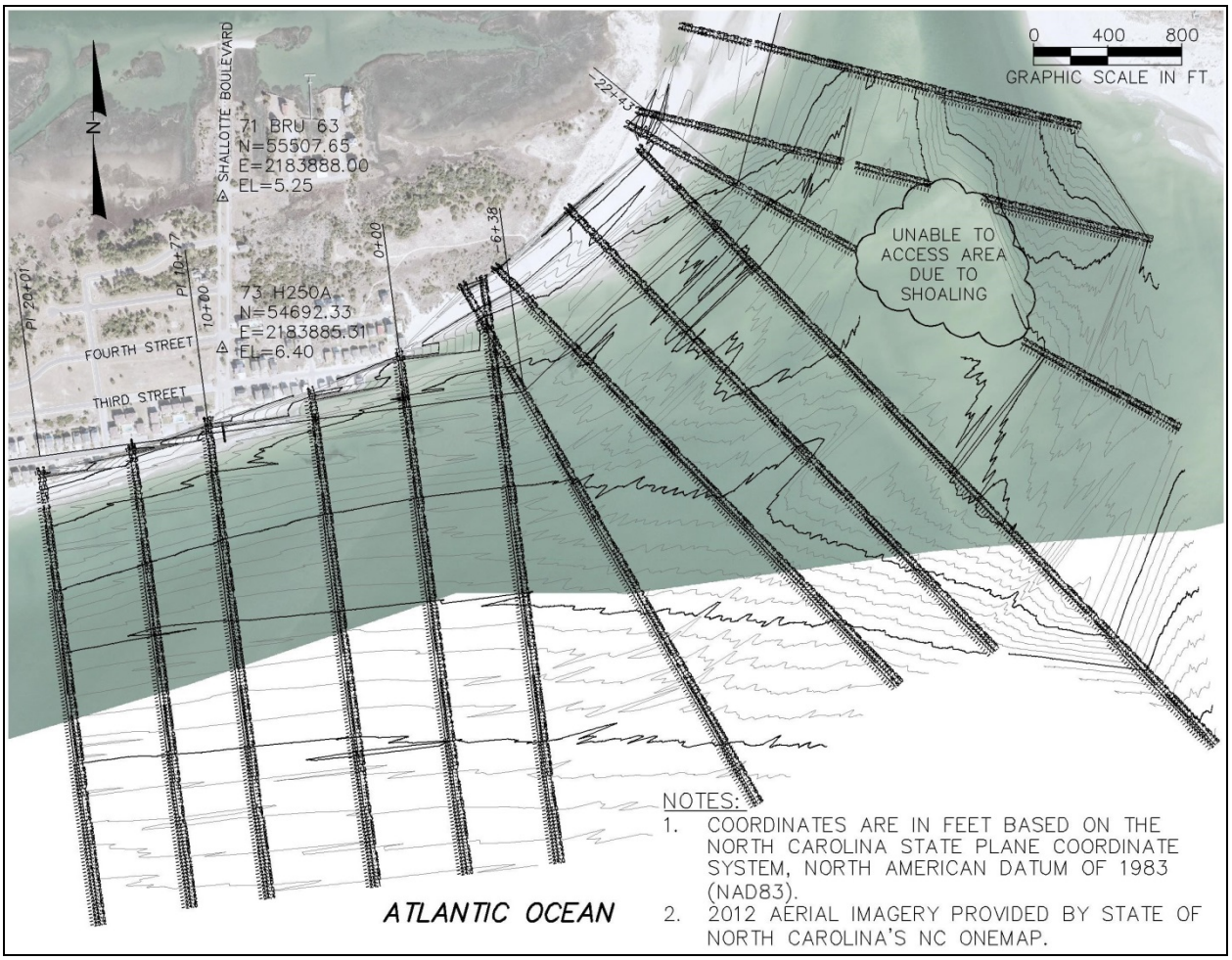


Figure 3. Map depicting the location of beach profile surveys conducted by McKim and Creed in June, 2013 (Modified from Plan drawing VT101-005160006 by McKim and Creed)

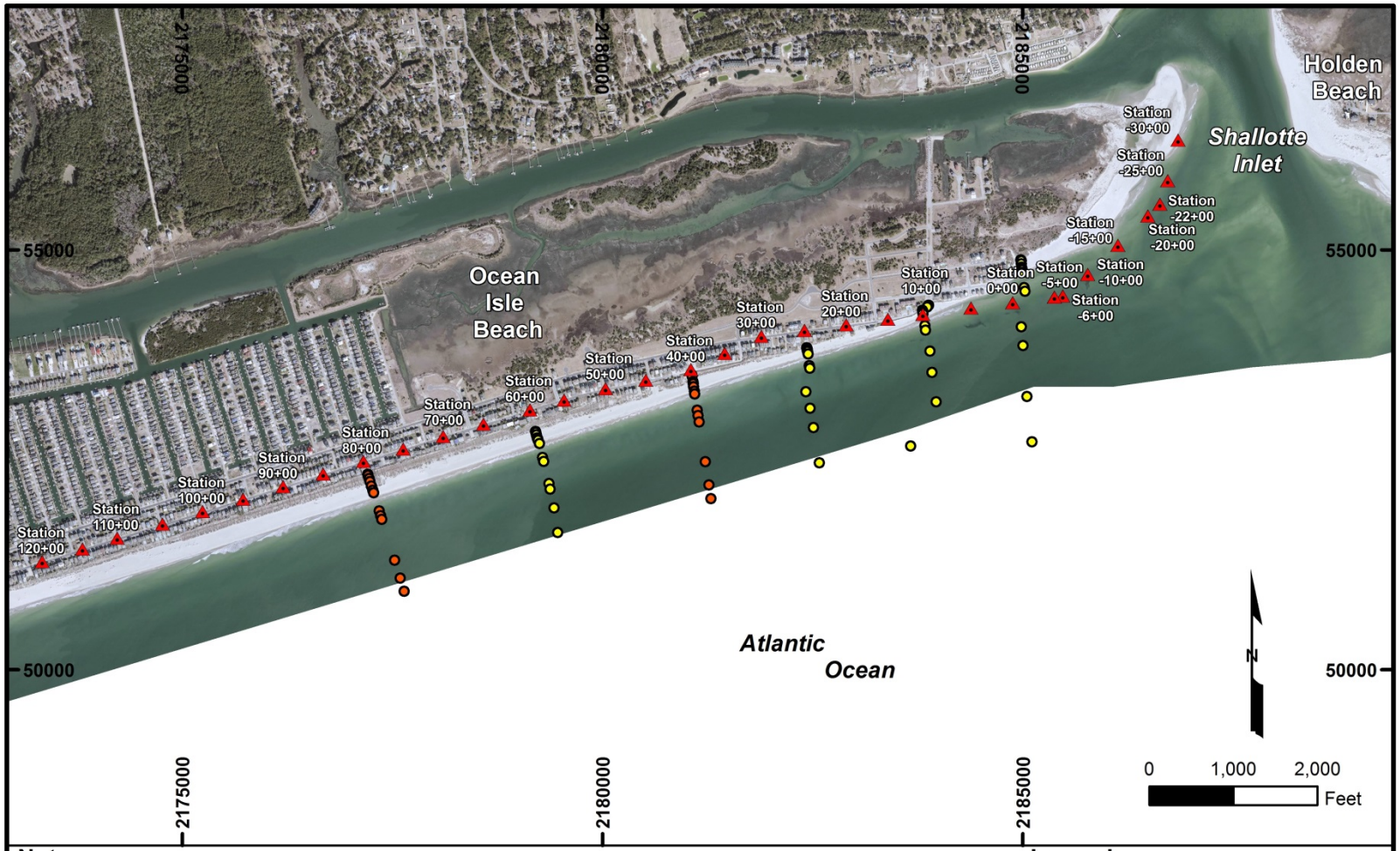
Sand Sampling and Grain Size Analysis: During preparation of the General Reevaluation Report for the Ocean Isle Beach project, completed in 1994, the USACE collected beach samples along three (3) profiles within the federal project area. Samples were collected from the dune out to a depth of -30 ft NGVD29. The state sediment standards dictate a specific number of samples along at least five (5) profiles within the project area (15A NCAC 07H.0312)(1)(c and d). However, 15A NCAC 07H.0312 (1)(i) provides language that would allow special consideration of projects which were constructed prior to the adoption of the rules.

In order to meet state requirements, CPE-NC obtained samples along four (4) additional profiles on the east end of Ocean Isle Beach. On April 5, 2013, April 17, 2013 and January 23, 2014 CPE-NC collected beach samples and nearshore sediment samples along four (4) profiles (0+00 (OIB000), 10+00 (OIB010), 25+00 (OIB025), and 60+00 (OIB060) (Figure 4). Along these profiles, samples were collected from the Dune, Toe of Dune, Midberm, Berm Crest, Mean High Water (MHW), Mean Tide Level (MTL), Mean Low Water (MLW), Trough, Bar Crest, and four (4) additional depths evenly spaced between the Bar Crest and -20 ft. NAVD. Sediment characteristic data obtained by the USACE along baseline station 40+00 were also used to determine composite beach characteristics.

During sieve analysis, dry and washed Munsell colors were noted. Sieve analyses were conducted on all sediment samples in accordance with American Society for Testing and Materials (ASTM) Standard Materials Designation D422-63 for particle size analysis of soils (ASTM, 2007). This method covered the quantitative determination of the distribution of sand size particles. For sediment finer than the No. 230 sieve (4.0 phi), the ASTM Standard Materials Designation D1140-00 was followed (ASTM, 2006). Mechanical sieving was accomplished using calibrated sieves with a gradation of half phi intervals. Additional sieves representing key ASTM sediment classification boundaries were included to meet North Carolina Division of Coastal Management standards (Table 2). Weights retained on each sieve were recorded cumulatively.

Grain size data were entered into the gINT® software program, which computes the mean and median grain size, sorting, and fine (< 0.0625 mm) percentages for each sample using the moment method (Folk, 1974).

When combined with the historic USACE samples collected along profile OIB040, analysis of the beach samples capture the three-dimensional spatial variability of the sediment characteristics including grain size, sorting and mineralogy within the natural system. Appendices 2 and 3 contain granularmetric reports and grain size curves/histograms. Composites were created for each profile line as well as for each position along the beach profile. Composites are presented in Appendices 4, 5 and 6.



Notes:

1. Coordinates are in feet based on the North Carolina State Plane Coordinate System, North American Datum of 1983 (NAD 83).
2. 2012 imagery background is from the United States Department of Agriculture's National Agriculture Imagery Program.
3. Beach samples for stations 0+00, 10+00, 25+00, and 60+00 were collected by CPE-NC on April 5, 2013 (onshore) and April 17, 2013 (offshore). Additional beach samples for stations 0+00, 10+00, 25+00 and 60+00 were collected on January 23, 2014.
4. Beach samples for stations 40+00 and 80+00 were collected by USACE in May 1994 .

Legend:

- Profile Station
- CPE-NC Beach Sample Collection
- USACE Beach Sample Collection

Figure 4. Map showing locations of the beach sand samples collected and used to determine existing beach characteristics.

Table 2. *Sieve sizes used for grain size analysis. Classifications are based on percent retained in each sieve.*

Classification	Sieve Size (number)	Sieve Size (phi)	Sieve Size (mm)
gravel	3/4"	-4.25	19.00
	5/8"	-4	16.00
	7/16"	-3.5	11.20
	5/16"	-3	8.00
	3 1/2"	-2.5	5.60
	4	-2.25	4.75
granular	5	-2	4.00
	7	-1.5	2.80
	10	-1	2.00
sand	14	-0.5	1.40
	18	0	1.00
	25	0.5	0.71
	35	1	0.50
	45	1.5	0.36
	60	2	0.25
	80	2.5	0.18
	120	3	0.13
	170	3.5	0.09
	200	3.75	0.08
	230	4	0.06
fine	pan	-	-

Analyses of the samples collected from the existing beach by CPE-NC and the USACE indicate that sediment along the eastern end of Ocean Isle Beach has a mean grain size of 0.23mm. The percent by weight of fines (less than 0.0625 millimeters) for the sampled area is 1.34%. The percent by weight of granular (greater than or equal to 2 millimeters and <less than 4.76 millimeters) and gravel (greater than or equal to 4.76 millimeters) for the sampled area is 0.43% and 0.40%, respectively. The wet Munsell Color value ranges from 4 to 7, with a typical value of 5. The dry Munsell Color value ranges from 6 to 8, with a typical value of 7. These characteristics represent the existing beach, which is a composite of the characteristics of material that has been placed on the beach during past nourishment projects and native beach sediment.

Calcium Carbonate Analysis: Calcium carbonate content was determined on composite beach samples collected by CPE-NC in 2013 and 2014. Calcium carbonate content was determined by percent weight using the acid leaching methodology described in Twenhofel and Tyler (1941). Results were entered into the gINT® software and are displayed on the composite granularmetric reports (Appendix 5) and in the Carbonate Analysis Results spreadsheet (Appendix 12). The carbonate content of the existing beach ranges from 5 to 7% with a composite value of 6%.

PHASE III INVESTIGATIONS

Investigation Details

The North Carolina state standards (15A NCAC 07H.0312) (2) (e) allow an applicant to use two sets of sampling data with at least one dredging event in between to characterize material for future nourishment events. If both sets of data are shown to be compatible as stated in the Rule, subsequent projects can use the material from the same borrow area. In addition, section (3) (a) of the rule states that sediment completely confined to the permitted dredge depth of a maintained sediment deposition basin within an inlet shoal system is considered compatible if the average percentage by weight of fine-grained (less than 0.0625 millimeters) sediment is less than 10%. These changes took effect in September 2013 after beach sampling and analysis were completed. Although compatibility of the borrow area as it relates to the state sediment criteria only require sediment to contain less than 10% by weight fines, this analysis considers color, grain size, and percent calcium carbonate as well.

The USACE developed composite information for the approved borrow area within Shallotte Inlet based on vibracores collected in 1994 (USACE, 1997c). These data were used in the General Reevaluation Report (GRR) study conducted by the USACE to determine preliminary borrow areas (USACE, 1997b). The USACE later collected additional vibracores in 1998 as part of the Preliminary Engineering and Design (PED) for the initial construction of the Ocean Isle Beach project. CPE-NC used available data from those vibracores collected in 1998 to establish a pre-2001 composite for the area dredged in 2001. Likewise, vibracores collected by the USACE in 2005 and 2009 were used to establish after-dredge composites for the same area. In order to comply with the state Rule, specifically Section (2) (e), the borrow area proposed by CPE-NC as a result of this investigation is limited to the area dredged during the initial construction of the Ocean Isle Beach federal project in 2001. This area is slightly different from the approved borrow area established in the GRR as shown in Figure 5.

Borrow Area Bathymetry

The USACE has conducted numerous hydrographic surveys of the borrow area in Shallotte Inlet associated with the federal beach fill project for storm damage reduction at Ocean Isle Beach. Figure 2 shows the location of the approved borrow area for the federal project. CPE-NC used historic pre- and post-construction surveys to determine the locations in which dredging occurred in the borrow area during initial construction and two subsequent maintenance events. Initial construction of the project took place in 2001. The first maintenance event was constructed between December 2006 and January 2007. The second was constructed between April and May 2010. Figure 5 shows the outline of the areas dredged during initial construction and the maintenance events conducted in 2006/2007 and 2010.

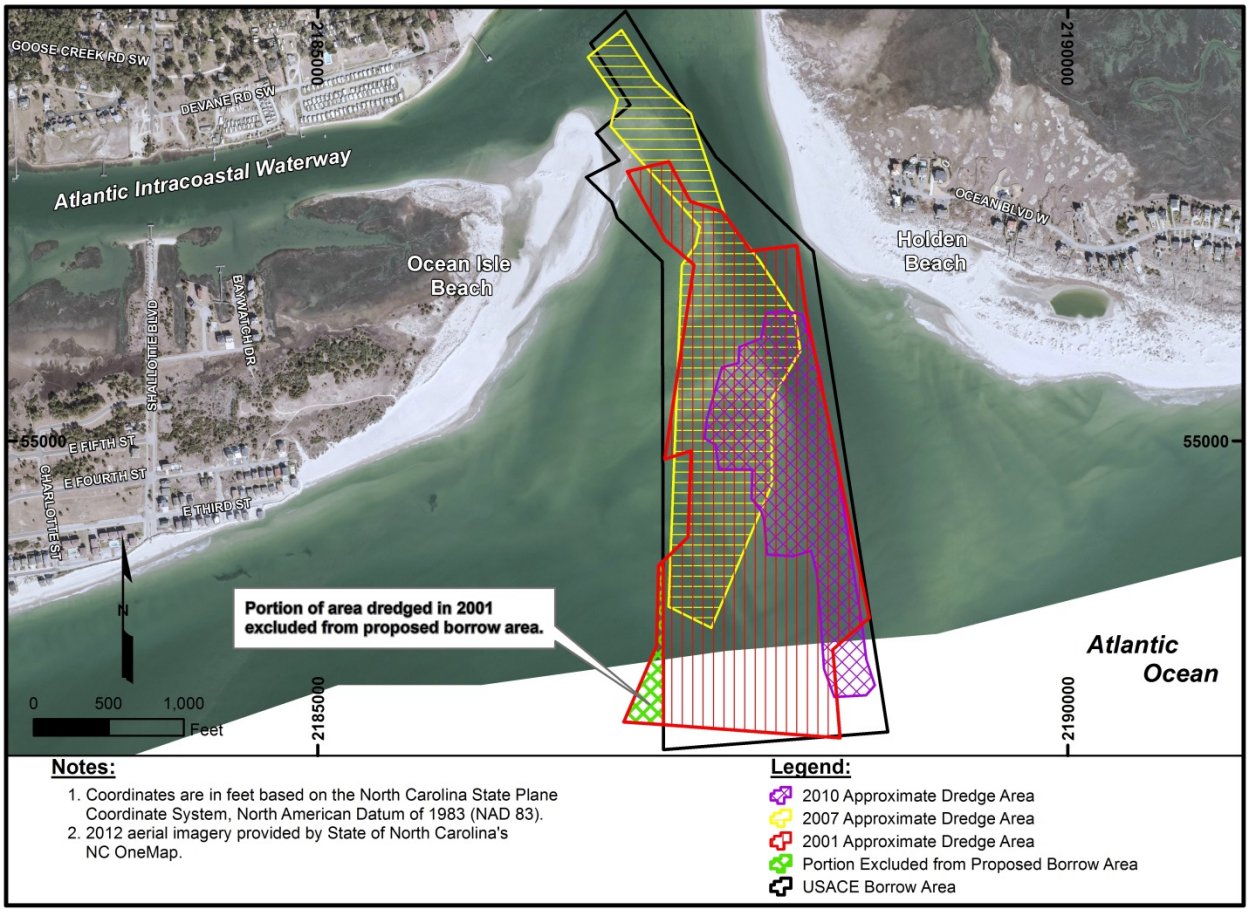


Figure 5. Map depicting the estimated location of areas dredged during initial construction (2001) and subsequent maintenance events (2006/2007 and 2010).

In preparation for a third maintenance cycle conducted by the USACE in the spring of 2014, the USACE conducted a pre-construction survey of the borrow area in July and August 2013. This data was used by CPE-NC to create a bathymetric surface to be used to calculate the current volume of material available within the borrow area.

Vibracore Analysis

Pre-2001 USACE Vibracores: The USACE collected vibracores at 11 locations within Shallotte Inlet in 1994 during their investigations to delineate borrow areas for the federal project (Figure 6). The material in the core samples was described as primarily gray or tan poorly graded sand with little silt content, underlain in some cases by layers of clay or silt. Some sand layers were described as containing pockets of clay and gravel sized shell. From these core data, the USACE developed composite values for the textural properties of the material in Shallotte Inlet. The mean grain size of the material above -15 ft. MLW (-17.97 ft. NAVD) was stated as 0.38 mm with a standard deviation of 0.97 and a silt content of 1.1% (USACE, 1997c). Appendix 7 contains vibracore logs of the 11 vibracores collected by the USACE in 1994.

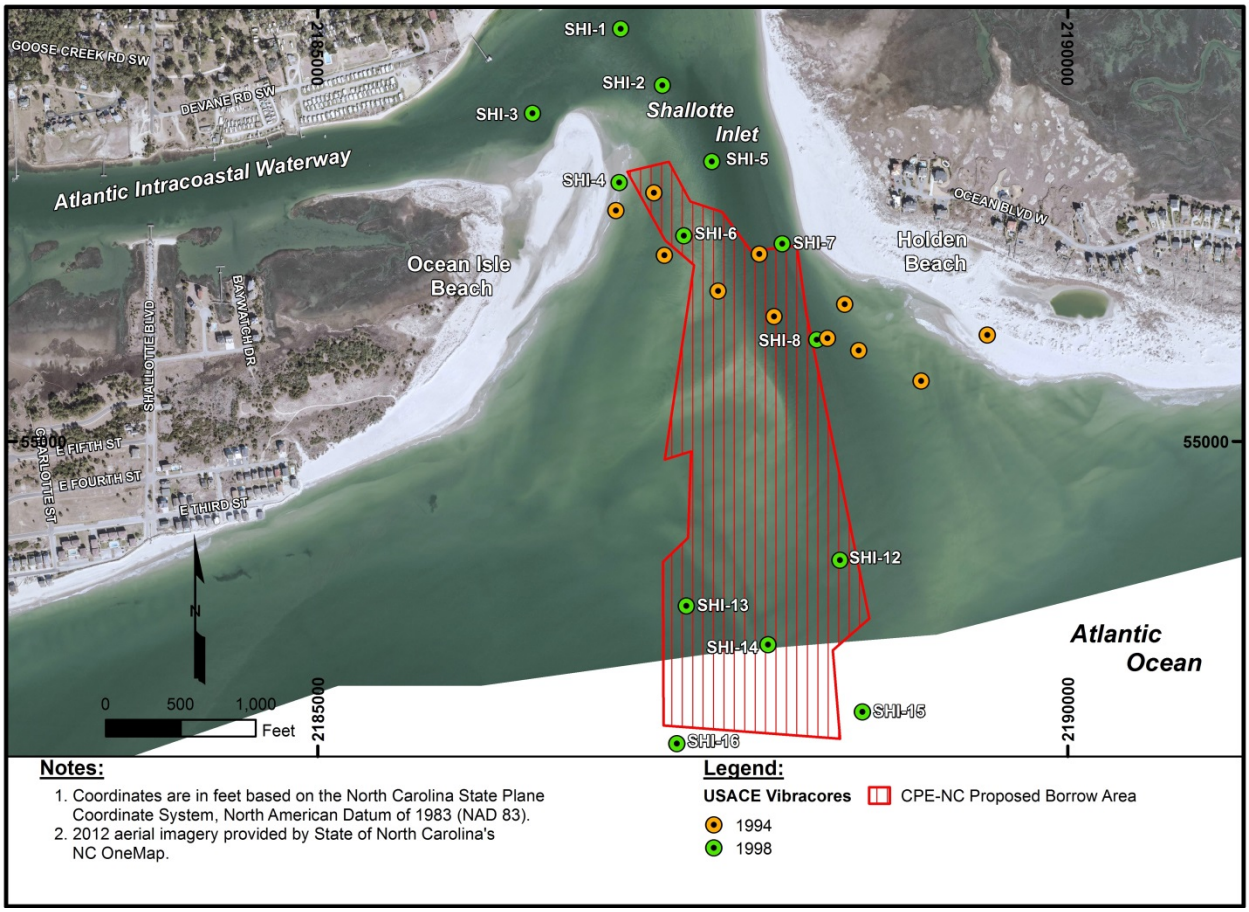


Figure 6. Map depicting the approximate area dredged in 2001 by the USACE and vibracores collected by the USACE in 1994 and 1998.

Although the 1994 USACE data provide general information on the sediment characteristics in the vicinity of the federally approved Shallotte Inlet borrow area, these data do not include samples taken from the outer portion of the ebb shoal. In order to determine sediment characteristics that better represent the entirety of the area dredged by the USACE in 2001, CPE-NC used six (6) of the 13 vibracores collected by the USACE in 1998 to determine the percent silt by weight (Figure 6). The six (6) vibracores are SHI-6, SHI-7, SHI-8, SHI-12, SHI-13, and SHI-14. Appendix 8 contains vibracore logs, granularmetric reports, and grain size curves/histograms for the 13 vibracores collected by the USACE in 1998. Composite median grain size and percent silt content were computed for each of the six (6) vibracores representing the sand borrow area by calculating the weighted average (sample weighted by representative lengths of the sampled layer within the core). Composite statistics for the dredged area were compiled by averaging the weighted results for those six (6) cores within the lateral and vertical limits of the dredged areas. Some values of percent silt were estimated from the provided granularmetric curves based on the #200 standard sieve. These estimated values are denoted by red text in the composite spreadsheet (Appendix 9).

The composite median grain size for the area analyzed using the 1998 vibracores is 0.16 mm, with a percent fines by weight of 1.3%.

Post-2001 USACE Vibracores: CPE-NC used 12 vibracores collected in 2005 and 2009 within the area dredged during the 2001 initial construction to determine composite sediment characteristics of the material that infilled the area following the 2001 initial construction (Figure 7). Appendix 10 contains vibracore logs, granularmetric reports, and grain size curves/ histograms for all 27 vibracores collected by the USACE in 2005 and 2009. Composite mean and median grain size, as well as percent by weight fine-grained sediments, were computed for each vibracore by calculating the weighted average (sample weighted by representative lengths of the sampled layer within the core). Composite data is included in Appendix 11. The composite statistics for the area were compiled by averaging the weighted results for all cores within the lateral and vertical limits of the borrow area. The composite mean grain size for the area analyzed using the 2005 and 2009 vibracores is 0.36 mm. The 12 vibracores used in the composite indicate that the sediment within the area dredged contains 1.95% fine-grained sediment by weight. Although no Munsell color values were available, the 2005 and 2009 vibracore logs describe the sediment as being tan to gray and tan to light gray, respectively.

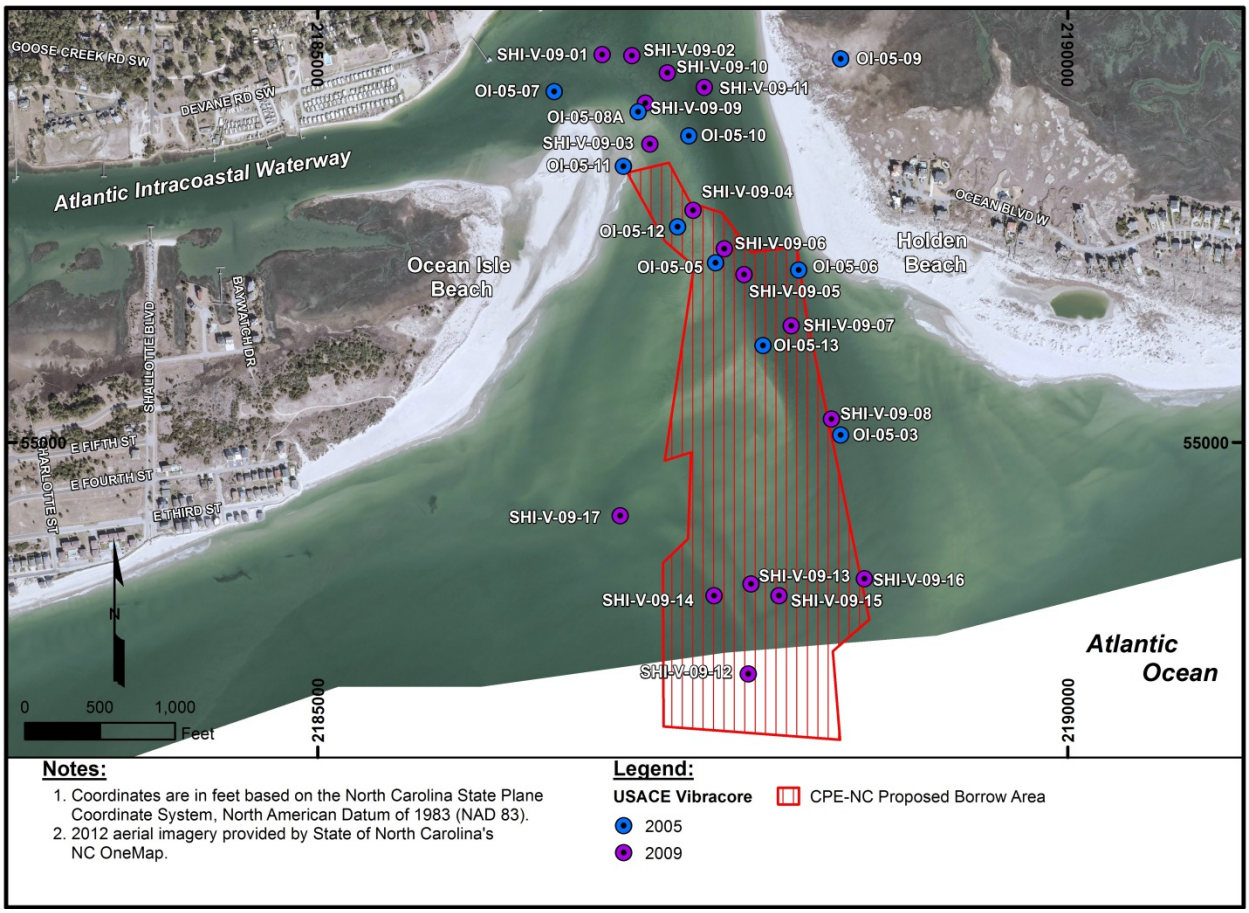


Figure 7. Map depicting the approximate area dredged in 2001 by the USACE and vibracores collected by the USACE in 2005 and 2009.

Compatibility Analysis

Given the proposed borrow area is completely confined to the authorized dredge depth of a maintained sediment deposition basin within the inlet shoal system, compatibility as defined by the rule (15A NCAC 07H.0312), is primarily defined in Section (2) (e) and (3) (a). Section (2) (e) allows an applicant to use previously collected data to establish sediment characteristics where both a pre-dredge and a post-dredge data set exist. Section (3) (a) states that compatibility for sediment completely confined to the permitted dredge depth of a sediment deposition basins within the inlet shoal system is defined as having an average percentage by weight of fine-grained (less than 0.0625 millimeters) sediment less than 10%. As stated above, the composite fine-grained sediment within the footprint of the area dredged in 2001 based on the data from six (6) vibracores collected in 1998 (Appendix 9) is 1.3%. The composite fine-grained sediment within the same footprint of the area dredged in 2001 based on data collected after the dredging event (Appendix 11) is 1.95%. The composite percent fine grained material for the existing beach sampled along the east end of Ocean Isle beach is 1.34%. Therefore, sediment confined to the footprint of the area dredged in 2001 in Shallotte Inlet is compatible in accordance with rule 15A NCAC 07H.0312.

Sediments recovered within the vertical boundaries of the proposed borrow area were described by the USACE as having a tan and or gray color (USACE, 1997c; Catlin, 2009). The wet Munsell Color values for sediment samples collected by CPE-NC in 2013 and 2014, range from 5 (gray to olive gray) to 7 (light gray), with a typical value of 7 (light gray). The samples collected by CPE-NC in 2013 and 2014 represent the existing beach, which is a composite of the characteristics of material that has been placed on the beach during past nourishment projects and native beach sediment.

Vibracore data obtained from the 2005 and 2009 vibracores recovered from within the proposed borrow area indicate a percent carbonate by weight of 15.5%. The carbonate content of the existing beach ranges from 5% to 7% with a composite value of 6%.

BORROW AREA DESIGN

The borrow area within Shallotte Inlet proposed for the Ocean Isle Beach terminal groin project was designed to be limited to the authorized federal borrow area (USACE, 1997c). This area is shown in Figure 5 as the "USACE Borrow Area" outlined in black. The entire borrow area was originally approved for a dredge depth of -15 ft. MLW (-17.97 NAVD88) (USACE, 2002). The conversion from MLW to NAVD88 is based on the NOAA benchmark 8661070, located at the Springmaid Pier, in South Carolina (http://tidesandcurrents.noaa.gov/benchmarks/8661070.html).

In order to comply with rule 15A NCAC 07H.0312 (2) (e), which allows an applicant to use two sets of sampling data with at least one dredging event in between to characterize material for future nourishment events, the proposed borrow area was also limited to the portion of the authorized federal borrow area dredged during the initial construction event in 2001. The

proposed borrow area for the Ocean Isle Beach terminal groin project, shown in Figures 6 and 7 "CPE-NC Proposed Borrow Area" outlined in red, has a total area of 83.1 acres.

An evaluation of vibracore data collected in 1998 as well as, 2005 and 2009 show the sediment in the proposed borrow area meet the criteria set forth in rule 15A NCAC 07H.0312. Furthermore, the Shallotte Inlet Borrow Area has been excavated and used for beach placement for subsequent maintenance events. Maintenance of the project was conducted in 2007, 2010, and 2014, during which material was dredged from the inlet borrow area and placed on the beach at Ocean Isle Beach.

Bathymetric data collected by the USACE in July and August 2013, during preliminary engineering and design work for the 2014 maintenance event, was used to determine volumes in the proposed borrow area. At the time of the survey, approximately 1,312,000 cy of sand were available within the proposed borrow area. Estimates available at the time of publication of this report indicate approximately 800,000 cy of sand were removed from this borrow area during the construction of the 2014 maintenance operation. Based on past performance of the project, the borrow area is expected to re-charge due to shoaling of the inlet complex.

CONCLUSIONS

The proposed borrow area within Shallotte Inlet was designed to be confined to the footprint of both the federally authorized borrow area (USACE, 1997c), and the portion of the borrow area dredged during the initial construction of the project in 2001. The maximum dredge depth of the proposed borrow area is limited to the maximum dredge depth of the federally authorized borrow area, which is -15 ft. MLW (-17.97 NAVD88).

Section (3) (a) of rule 15A NCAC 07H.0312 states that sediment completely confined to the permitted dredge depth of a maintained sediment deposition basin within an inlet shoal system is considered compatible if the average percentage by weight of fine-grained (less than 0.0625 millimeters) sediment is less than 10%. An evaluation of vibracore data collected in 1998 as well as, 2005 and 2009 show the sediment in the proposed borrow area meet these criteria. Composite data for those vibracores within the proposed borrow area collected in 1998 indicate the percent by weight of fine-grained (less than 0.0625 millimeters) material within the proposed borrow area is 1.3%. Composite data for those vibracores within the proposed borrow area collected in 2005 and 2009 indicate the percent by weight of fine-grained (less than 0.0625 millimeters) material within the proposed borrow area is 1.95%. The composite percent fine grained material for the existing beach sampled along the east end of Ocean Isle beach is 1.34%.

Analyses of the samples collected from the existing beach by CPE-NC and the USACE indicate that sediment along the eastern end of Ocean Isle Beach has a mean grain size of 0.23mm. The composite median grain size for the area analyzed using the 1998 vibracores is 0.16mm. The composite mean grain size for the area analyzed using the 2005 and 2009 vibracores is 0.36mm.

Sediments recovered within the vertical boundaries of the proposed borrow area were described by the USACE as having a tan and or gray color (USACE, 1997c; Catlin, 2009). The wet

Munsell Color value ranges from 4 to 7, with a typical value of 5. The dry Munsell Color value ranges from 6 to 8, with a typical value of 7. These characteristics represent the existing beach, which is a composite of the characteristics of material that has been placed on the beach during past nourishment projects and native beach sediment.

Prior to the most recent maintenance event, which dredged material from the federally authorized borrow area in Shallotte Inlet, the proposed borrow area contained approximately 1,312,000 cy of fine-grained sand with trace silt and trace shell. Based on project estimates provided by the Town of Ocean Isle Beach, approximately 800,000 cy of sand were placed on the beach during the 2014 maintenance event, suggesting sufficient volumes of sand will exist to construct the proposed terminal groin project. The proposed borrow area for the Ocean Isle Beach terminal groin project has a total area of 83.1 acres.

ACKNOWLEDGEMENTS

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APPENDIX OVERVIEW

Introduction:
In 2012, Coastal Planning & Engineering of North Carolina (CPE-NC) was authorized to provide services in support of the effort by the Town of Ocean Isle Beach (TOWN) Brunswick County to obtain the necessary permits and authorizations required to evaluate the feasibility of constructing a terminal groin on the east end of the TOWN's shoreline near Shallotte Inlet to mitigate the chronic erosion problem caused by Shallotte Inlet's influence on the movement of littoral sediment in this area. These appendices contain the geophysical and geotechnical data that was collected in support of the permitting effort.

The USACE has conducted numerous hydrographic surveys of the borrow area in Shallotte Inlet associated with the federal beach fill project for storm damage reduction at Ocean Isle Beach. The USACE developed composite information for the approved borrow area within Shallotte Inlet based on vibracores collected in 1994 (USACE, 1997c). CPE-NC used available data from vibracores collected in 1998 by the USACE to establish a pre-2001 composite for the area dredged in 2001. Likewise vibracores composites for the same area. In order to comply with the state Rule, specifically Section (2) (e), the borrow area proposed by CPE-NC as a result of this investigation is limited to the area dredged during the initial construction of the Ocean Isle Beach federal project in 2001. The vibracore data is provided in the form of vibracores logs, granularmetric reports, grain size distribution curves/histograms and composite summary tables. Beach samples were collected along five (5) shore-perpendicular profile lines within the project area. The beach data is provided in the form of granularmetric reports, grain size distribution curves/histograms and composite summary tables.

The USACE and Geodynamics Group bathymetry used during borrow area design was referenced to Mean Low Water (MLW). To satisfy Rule 15A NCAC 07H .0312, all final cut elevation were converted to NAVD88.

1) Scope of Services
The final scope of work for the geophysical and geotechnical investigations in support of Brunswick County's permitting efforts is included in this appendix.

2) CPE-NC Individual Beach Granularmetric Reports (Digital Only)
This appendix contains individual granularmetric reports for each of the fifty-two (52) beach samples collected in 2013 and 2014.

3) CPE-NC Individual Beach Grain Size Distribution Curves/Histograms (Digital Only)
This appendix contains individual grain size distribution curves/histograms for each of the fifty-two (52) beach samples collected in 2012.

4) Beach Composite Summary Tables
A series of summary tables are presented in this appendix. These tables are used to calculate and summarize composite data. Composite calculations are based on native beach samples collected along Ocean Isle Beach by CPE-NC in April 2013. Samples were collected along five (5) shore-

perpendicular profile lines from the dune to approximately -20 ft. NAVD 88 along Ocean Isle Beach. These samples were collected according to beach fill compatibility standards implemented by the North Carolina Division of Coastal Management (15A NCAC 07H .0312). Sample locations along each profile line are referenced to NAVD 88 and include: dune, dune toe, mid-berm, berm crest, MHW, MTL, MLW, trough, bar crest -12.5, -15, -17.5, and -20'. An average of samples collected along each profile line was calculated, producing the profile line composite. An average of samples collected at each sample elevation was calculated producing elevation composites. The profile line composites were then averaged to calculate the total native beach composite.

Five table types were produced to display this data. The *Profile Line Composite Summary Table* is a summary of key grain size data for all of the composites. The *Profile Line Composite Data Table* shows the composite data for the total composite beach and the supporting composite profile line data used to calculate the total composite beach. The *Profile Line Cumulative Percents and Computed Distribution* table shows the percent retained on all sieves for the individual samples used to create the profile line composites. The *Elevation Cumulative Percents and Computed Distribution* table shows the percent retained on all sieves for the individual samples used to create elevation composites. The *Percentage of Material by Sediment Grain Size Category* table shows the percent of material in each of the four grain size categories (fine, sand, granular and gravel) as defined by the North Carolina State Technical Standards outlined in 15A NCAC 07H .0312.

5) Beach Composite Granularmetric Reports (Digital Only)
Composite granularmetric reports, corresponding to the data presented in the tables in Appendix 4, are included here. Composite granularmetric reports are presented for the total beach, each elevation, and each of the profile lines.

6) Beach Composite Grain Size Distribution Curves/Histograms (Digital Only)
Composite grain size distribution curves and histograms, corresponding to the data presented in the tables in Appendix 4, are included here. Composite grain size distribution curves and histograms are presented for the total beach, each elevation, and each of the profile lines.

7) 1994 USACE Vibracore Logs (Digital Only)
Laboratory and descriptive information for each vibracore is presented on the log sheets. Unified Soils Classification terminology is used in the core layer descriptions and key grain size information (mean grain size, fines content and sorting) for each vibracore sample is presented under the *Remarks* column. Multiple layer intervals are sometimes represented by a single sample. The *Sample Number* column is used to identify the specific sample that represents a specific layer. Logs for the ten (10) vibracores collected in this investigation are included in this appendix.

8) 1998 USACE Vibracore Logs
Laboratory and descriptive information for each vibracore is presented on the log sheets. Unified Soils Classification terminology is used in the core layer descriptions and key grain size information (mean grain size, fines content and sorting) for each vibracore sample is presented under the *Remarks* column. Multiple layer intervals are sometimes represented by a single

sample. The *Sample Number* column is used to identify the specific sample that represents a specific layer. Logs for the ten (10) vibracores collected in this investigation are included in this appendix.

9) Pre 2001 Vibracore Composite Data

A series of summary tables are presented in this appendix. These tables are used to calculate and summarize composite data. Composite statistics for the borrow area were calculated based on the vibracore samples that are representative of the material defined within this area. Composite data provide the average physical characteristics of the sediment source. An average of the representative layers, weighted by effective length, was calculated for each vibracore, producing the vibracore composite. The vibracore composites were averaged and weighted by effective length to calculate the borrow area composite.

Four table types were produced to display these data. The *Composite Summary Table* is a summary of the key grain size data for all of the composites. The *Composite Data Table* shows the composite data for the borrow area and the supporting composite vibracore data used to calculate the borrow area composite. The *Cumulative Percents and Computed Distributions* table shows the weighted average percent retained on all sieves for the individual samples used to create vibracore composites. The *Percentage of Material by Sediment Grain Size Category* table shows the percent of material in each of the four grain size categories (fine, sand, granular and gravel) as defined by the North Carolina State Technical Standards outlined in 15A NCAC 07H .0312.

10) 2005 and 2009 USACE Vibracore Logs

A series of summary tables are presented in this appendix. These tables are used to calculate and summarize composite data. Composite statistics for the borrow area were calculated based on the vibracore samples that are representative of the material defined within this area. Composite data provide the average physical characteristics of the sediment source. An average of the representative layers, weighted by effective length, was calculated for each vibracore, producing the vibracore composite. The vibracore composites were averaged and weighted by effective length to calculate the borrow area composite.

Four table types were produced to display these data. The *Composite Summary Table* is a summary of the key grain size data for all of the composites. The *Composite Data Table* shows the composite data for the borrow area and the supporting composite vibracore data used to calculate the borrow area composite. The *Cumulative Percents and Computed Distributions* table shows the weighted average percent retained on all sieves for the individual samples used to create vibracore composites. The *Percentage of Material by Sediment Grain Size Category* table shows the percent of material in each of the four grain size categories (fine, sand, granular and gravel) as defined by the North Carolina State Technical Standards outlined in 15A NCAC 07H .0312.

11) Post 2001 Vibracore Composite Data

A series of summary tables are presented in this appendix. These tables are used to calculate and summarize composite data. Composite statistics for the borrow area were calculated based on the vibracore samples that are representative of the material defined within this area. Composite data

provide the average physical characteristics of the sediment source. An average of the representative layers, weighted by effective length, was calculated for each vibracore, producing the vibracore composite. The vibracore composites were averaged and weighted by effective length to calculate the borrow area composite.

Four table types were produced to display these data. The *Composite Summary Table* is a summary of the key grain size data for all of the composites. The *Composite Data Table* shows the composite data for the borrow area and the supporting composite vibracore data used to calculate the borrow area composite. The *Cumulative Percents and Computed Distributions* table shows the weighted average percent retained on all sieves for the individual samples used to create vibracore composites. The *Percentage of Material by Sediment Grain Size Category* table shows the percent of material in each of the four grain size categories (fine, sand, granular and gravel) as defined by the North Carolina State Technical Standards outlined in 15A NCAC 07H .0312.

12) 2013 CPENC Carbonate Analysis Results (Digital Only)

Composite sediment samples for each beach profile were compiled and tested for carbonate content. The data in this summary table characterizes the carbonate content as a percentage of the existing beach within the project area.

APPENDIX 1
SCOPE OF SERVICES

EXHIBIT "A"
SCOPE OF PROFESSIONAL SERVICES
TOWN OF OCEAN ISLE BEACH, NORTH CAROLINA
TERMINAL GROIN PROJECT
DESIGN & ENVIRONMENTAL PERMITTING

Coastal Planning & Engineering of North Carolina, Inc. (CPE-NC) will develop a design for a terminal groin and associated beach fill at the east end of Ocean Isle Beach, North Carolina adjacent to Shallotte Inlet to reduce the potential for upland property damages along the east end of the TOWN. CPE-NC will also work with the TOWN to prepare environmental documents and permit applications in support of obtaining permits for the proposed project. A detailed description of the work and estimated cost for each major task is presented below.

TASK 1 – PROJECT MANAGEMENT

Fees associated with TASK 1 include those efforts to plan, organize and monitor resources to achieve the specified goals of the project. In addition, TASK 1 includes efforts to control costs, and to coordinate with the TOWN on project schedule and periodic project updates. It is anticipated that there will be four (4) in person project meetings between CPE-NC and the TOWN over the anticipated 30 months to complete the contract. Additionally, five (5) conference call meetings are anticipated for a total of nine (9) meetings. This will allow for CPE-NC and the TOWN to hold quarterly progress meetings throughout the permitting process. In addition to these meetings, CPE-NC will provide the TOWN, with a monthly 1 page summary of activities, via e-mail.

TASK 1 - ENGINEERING PRODUCT DEVELOPMENT

A. Alternative Design

A range of alternatives will be formulated and evaluated. Based on recent studies for a terminal groin on Figure Eight Island and the associated coordination with resource agencies, this scope of work assumes the following alternatives will be considered: (1) no new actions, (2) demolition and/or relocation of threatened structures, (3) beach fill, and (4) beach fill with a terminal groin. The no new action alternative will be used as a basis of comparing the overall economic and environmental impacts of the other alternatives and will mimic the erosion response presently being attempted including the installation of sandbag revetments to protect threatened structures and infrastructure. The demolish and/or relocation alternative will assume no temporary measures, such as sandbags, would be used to delay the ultimate demise of structures and infrastructure. The beach fill alternative will evaluate two beach fill configurations along the extreme east end of Ocean Isle (Alternatives 3A and 3B) with both beach fill alternatives tying into the federal project near Shallotte Boulevard. Alternative 4, beach fill with a terminal groin, will evaluate the performance of beach fills on the east end of Ocean Isle Beach accompanied by a terminal groin on the extreme east end of the island. At least two terminal groins of varying length and associated beach fills will be evaluated.

If additional alternatives are to be considered based on agency comments, a new proposal will be developed to cover the analysis of the additional alternative(s) and a change order will be requested.

A preliminary design for the terminal groins, consisting of both rubblemound and sheet piles will be developed. The sheet piles would be used to tie the landward end of the structure to stable ground and thus prevent flanking of the landward end of the structure. The rubblemound portion of the structure would extend seaward from a point yet to be determined with the size of the stone and cross-sectional configuration of the structure dictated by selected water level and wave conditions deemed to provide a reasonable level of stability during future storm events. In this regard, historic water levels and wave conditions applicable to Ocean Isle Beach will be evaluated and the appropriate design conditions selected based on the results of this analysis.

B. Alternative Analysis

The objective of the work described in this section of the proposal will be to evaluate the performance of alternatives using a variety of analytical and numerical modeling tools. The primary tool in this investigation will be the Delft3D morphological model (Deltares, 2011, http://www.deltaressystems.com/hydro/product/621497/delft3d-suite). This packages consists of two models, which are coupled together to determine changes in a topographic and bathymetric surface based on the effects of waves, water levels, winds, and currents.

Phase 1 – Hydrodynamic Measurements: In most Delft3D modeling studies, both Delft3D-FLOW and SWAN are calibrated based on local waves and currents. The existing catalog of wave and water measurements is summarized in Figure 1. The existing wave measurements are generally sufficient for calibrating the SWAN model on a regional basis. However, hourly water level or current measurements in Shallotte Inlet or its drainage basin cannot be located. For this reason, the existing hydrodynamic measurements are not sufficient for calibrating the Delft3D-FLOW model.

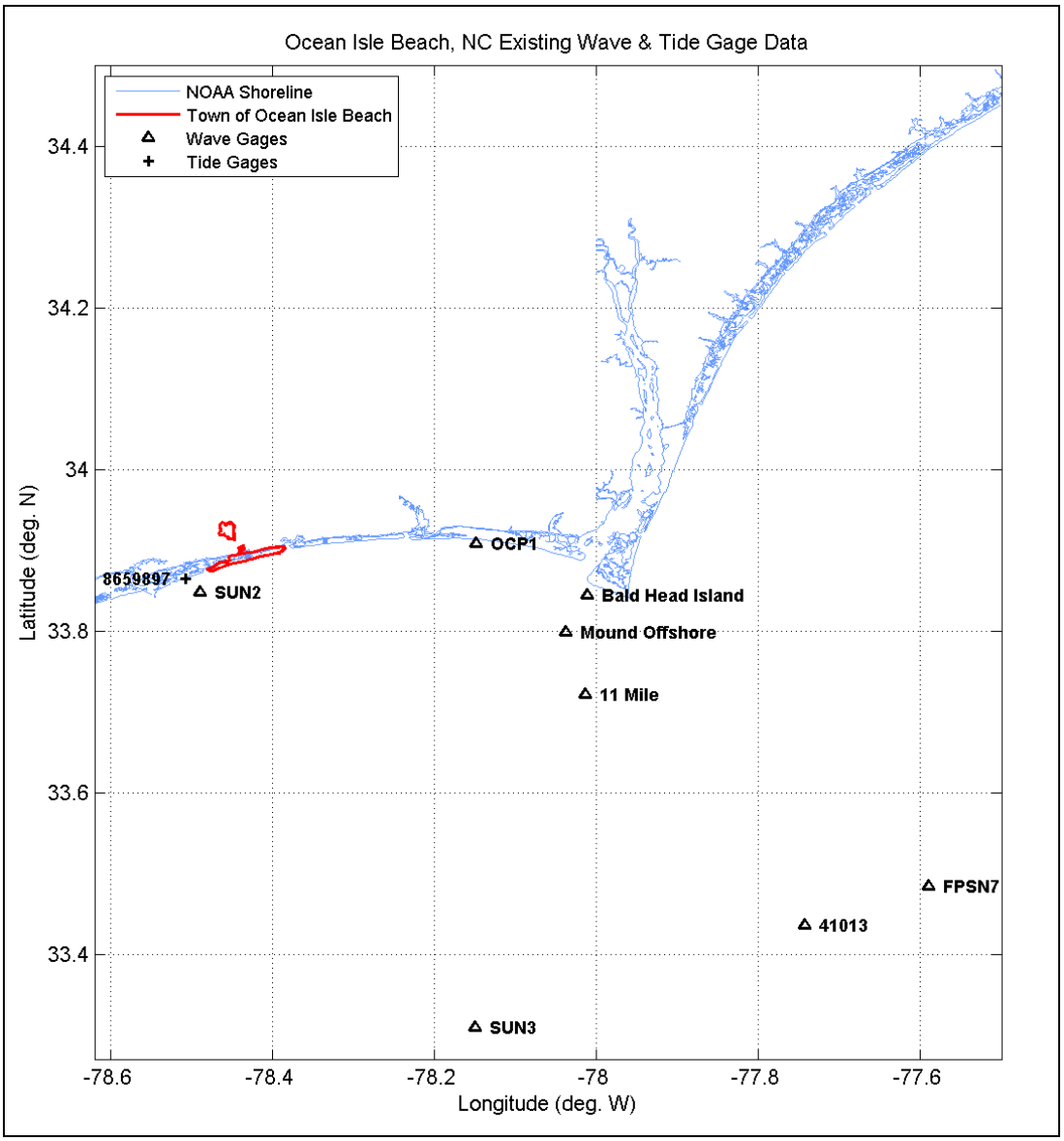

Figure 1: Ocean Isle Beach, NC Existing Wave & Tide Gage Data.

In order to acquire the necessary data for calibration two Acoustic Doppler Current Profilers (ADCPs) would be deployed along with two tide gages for a minimum of 30 days. The location of all 4 instruments to be deployed appears in Figure 2. It is important to note that the locations of the instruments are approximate. Actual locations will be determined based on field conditions, accessibility, public safety, etc. The two tide gages would be deployed to measure open-ocean tides and water levels in the AIWW to partially drive the Delft3D-FLOW and evaluate its results during the calibration process. To measure local wave conditions and currents along the beach near Shallotte Inlet, a Nortek AWAC ADCP or equivalent will be deployed near the depth of closure

(-27 feet NAVD) offshore of Shallotte Blvd. To measure currents and waves in the throat of Shallotte Inlet itself, a Nortek Aquadopp ADCP or equivalent will be deployed in a location where the current is visually judged to be unidirectional the majority of the time.

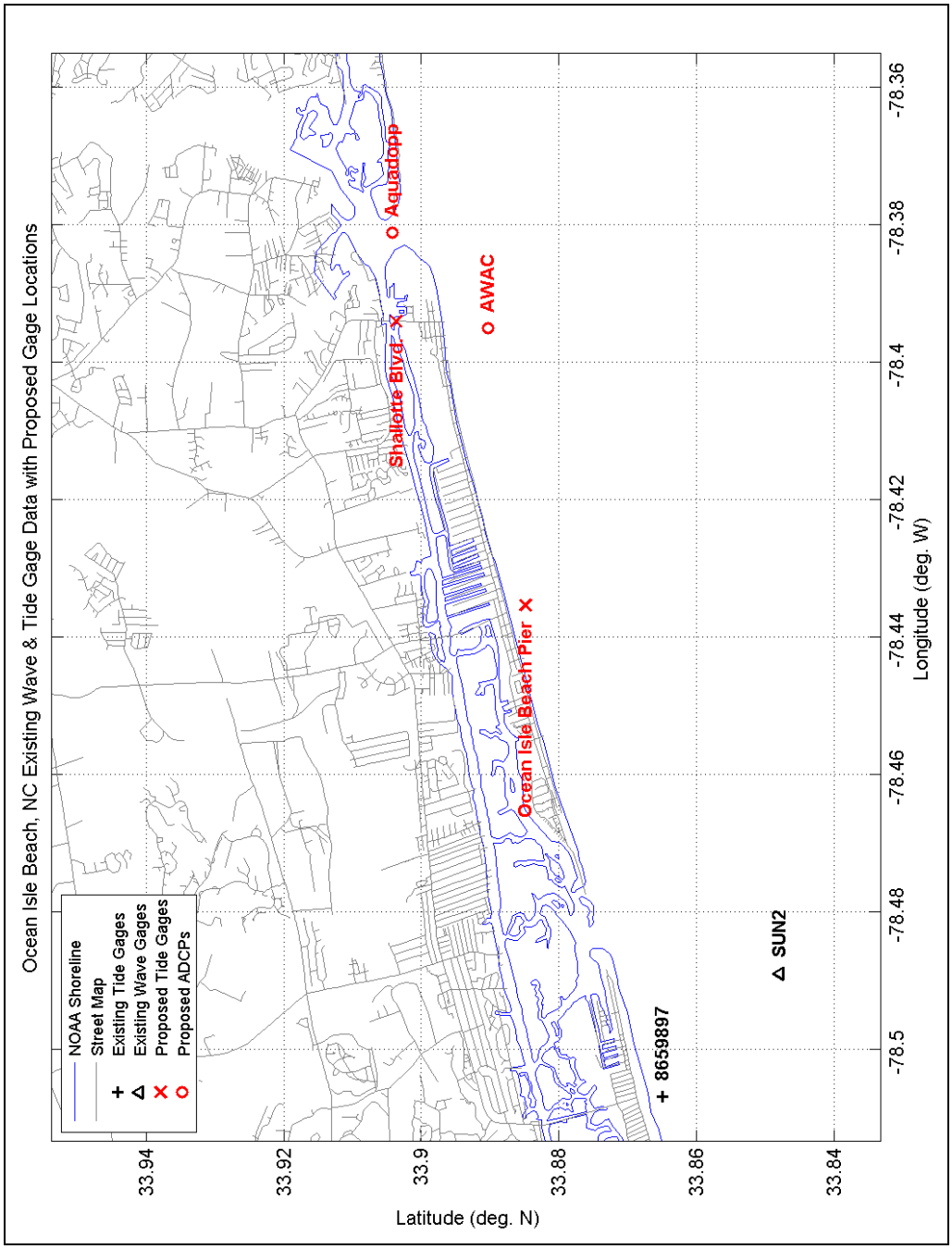

Figure 2: Ocean Isle Beach, NC Existing Wave & Tide Gage Data with Proposed Gage Locations.

Phase 1 includes deployment of the tide gages, retrieval of the instruments, data reduction, documentation of the work, and supervision of the work by a registered Engineer. It also includes the permitting required, if any, to deploy the instruments. To the greatest extent possible, all 4 instruments will be deployed on the same day to provide concurrent measurement sets. Likewise, all 4 instruments will be retrieved on the same day, if possible. Buoys, frames, weights, chains, flags, and/or posts will be used as necessary to prevent loss of the instruments and facilitate their ready identification at the time of retrieval. Photographs will be taken during the deployment and retrieval of the tide gages and ADCPs for documentation and presentation purposes. Position fixes of the instruments will also be taken during deployment and retrieval of the tide gages and ADCPs. As part of the data reduction process, listings of all water levels relative to the North American Vertical Datum of 1988 (NAVD) versus date and time will be prepared in electronic format. Likewise, the raw ADCP data will be reduced to list wave height, wave period, wave direction, wave spectra, and other key wave parameters versus date and time in electronic form. In addition, current profiles (3D currents) and depth-averaged currents versus date and time will also be tabulated at each ADCP in electronic format. Graphs, photography, and other information will be provided as needed to document the information. The raw and reduced wave, water level, and current data, along with photographs, position fixes, and field notes will be provided on a CD-ROM to the TOWN as an appendix to the modeling report detailed later in this Scope of Work.

Phase 2 – Setup and Calibrate Model: This phase consists of the setup and calibration of the Delft3D model. The existing sets of bathymetric and topographic data from the National Oceanographic and Atmospheric Administration (NOAA), USACE, North Carolina Floodplain Mapping Program, U.S. Geological Survey, and/or other sources will be acquired and reviewed to define the bottom bathymetry and initial conditions for the various model simulations. Wave and water level data from these sources (i.e. Figure 1) will also be acquired as needed for use in the calibration of the model and the characterization of the long-term wave and water level statistics.

Grids will be developed for the model. At a minimum, the grids will cover Shallotte Inlet, the AIWW between Causeway Drive and the midpoint of Holden Beach, and the oceanfront areas between Tubbs Inlet and the midpoint of Holden Beach. The highest resolution will be in the areas immediately surrounding Shallotte Inlet. A regional grid covering the offshore area between Frying Pan Shoals (FPSN7, Figure 1) and the coastline may also be needed to examine wave propagation on a regional basis. Using the bathymetric and topographic data acquired above, grid surfaces describing the present conditions and key conditions in the recent past (i.e. 2000-2011) will be created as needed as input for the Delft3D-FLOW and SWAN models.

The calibration of the model will be performed in 3 stages. First, the SWAN model will be calibrated based on the existing wave measurements provided by NOAA and/or USACE (see Figure 1). The results of each SWAN calibration run will be compared to

the new wave measurements taken in and near Shallotte Inlet. As a second stage, currents and water levels within Delft3D-FLOW will be calibrated using the current and water level measurements collected as part of Phase 1. As a final stage, sediment transport, erosion, and deposition within the Delft3D-FLOW model will be calibrated based on observed beach erosion rates over the past 5-10 years.

Phase 3 – Alternatives Screening & Project Performance: After the calibration of the model has been completed, the various alternatives will be simulated in the Delft3D model over a 5-10 year period. An upper limit of one No Action scenario and six (6) beach fill and/or terminal groin alternatives will be considered. The results of the model will be evaluated in terms of beach fill performance, erosional impacts to adjacent beaches and Shallotte Inlet, and the ability of any proposed terminal groins to retain material on the beach. If nearshore or inlet borrow areas are proposed, they will be incorporated into the initial conditions for each alternative to examine the erosional impacts of the borrow areas. Both short-term (1-2 years) and long-term (5-10 years) performance and impact will be assessed using the model results.

C. Economic Analysis

The economic impact of the no new action alternative (Alternative 1) and the demolish/retreat alternative (Alternative 2) will build off of the analysis that CPE-NC conducted for the Assessment of Terminal Groin Feasibility study completed in April 2012. These alternatives were evaluated based on existing erosion rates along the east end of Ocean Isle Beach as derived from the analysis of LiDAR data. Damages to buildings and infrastructure will be updated based on current market values. Protocols developed for the feasibility study with regard to the position of the shoreline relative to the structures to determine when a structure or the TOWN's infrastructure is either destroyed or when it must be relocated will be reassessed to determine if additional consideration is required. The availability of vacant lots on Ocean Isle Beach will be determined and will dictate how many structures could be relocated and how many would have to be demolished under Alternative 2. The cost of any measures that would be taken to delay the destruction of structures and infrastructure under Alternative 1 and the cost to relocate threatened structures and infrastructure under Alternative 2 will be added to the predicted erosion damages to arrive at the overall economic impact of the alternatives.

Alternative 3, the beach fill only alternative, will be formulated to prevent future erosion damages on the east end of Ocean Isle Beach. The size of the beach fill and the periodic nourishment requirements needed to prevent future erosion damages will be determined from the results of the numerical modeling. The relative difference in shoreline changes indicated by the model for Alternatives 1 and 3 along with the measured shoreline changes developed from the LiDAR data will be used to evaluate the life expectancy of the beach fill and how often it must be nourished to prevent the shoreline from encroaching into the development. The economic impact of Alternative 3 will be the

implementation cost for the initial beach fill plus the cost of future periodic nourishment operations.

The model results for the beach fill with terminal groin alternative (Alternative 4) will also be used to develop periodic nourishment requirements and costs that would be required to prevent future erosion damages on the east end of Ocean Isle Beach. The beach nourishment costs and the costs associated with constructing and maintaining the terminal groin will represent the economic impact of Alternative 4.

Beach fill construction costs for the alternatives will be estimated based on the project design volumes, sand characteristics, construction requirements, and recent dredging costs for similar projects in the area. Construction costs for the terminal groin will be based on a preliminary design of the structure based on an appropriate storm water level and wave conditions deemed to limit future damages to the structure to an acceptable level. The structure will include a sheet pile section extending a sufficient distance landward of the existing erosion scarp to prevent possible flanking and a rubble mound seaward section. The cost to construct the terminal groin will be based on the quantity of materials needed as well as the cost of similar structures constructed along the east coast over the last few years.

D. Engineering Report

A comprehensive engineering report will be developed documenting the historical background, alternative design, alternative analysis, economic analysis, and final results and conclusions. For alternatives involving a terminal groin, an inlet management plan will be developed and will include a description of the post-construction monitoring required to assess the impacts of the project and will include the development of shoreline change thresholds that would dictate when mitigation would be required. The draft report will be distributed to the Town of Ocean Isle Beach, along with interested State and Federal agencies as an appendix to the DRAFT EIS.

In addition to the preparation of a DRAFT Engineering Report, CPE-NC engineers will provide the necessary information to the environmental personnel preparing the environmental documentation.

Following the submittal of the Draft EIS, and subject to comments received, a final Engineering Report will be developed to be submitted as an appendix to the Final EIS.

EXHIBIT "A"
SCOPE OF PROFESSIONAL SERVICES
TOWN OF OCEAN ISLE BEACH, NORTH CAROLINA
TERMINAL GROIN PROJECT
DESIGN & ENVIRONMENTAL PERMITTING

TASK 3 – ENVIRONMENTAL PERMITTING AND DOCUMENTATION

Permitting

The construction of the terminal groin and associated nourishment along the east end of Ocean Isle Beach will require permits from the Department of the Army (U.S. Corps of Engineers, or USACE) and the State of North Carolina (major CAMA permit) in order to satisfy both the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA). In addition to the USACE, Federal agencies that will be involved in the project planning and formulation during the preparation of the environmental document will include (but not necessarily limited to) the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the Environmental Protection Agency (EPA). The lead State agency will be the North Carolina Division of Coastal Management (NC DCM), which is responsible for review and issuance of the major CAMA permit. Other State agencies include the North Carolina Division of Marine Fisheries (NC DMF), the North Carolina Wildlife Resources Commission (NC WRC), and the North Carolina Division of Water Quality (NC DWQ).

This Scope of Work includes the development and submittal of USACE Individual Permit (IP) application and the development and submittal of a major CAMA permit application under close coordination with various resource agencies listed above. The IP is used for projects proposing extensive impacts or impacts to rare or special aquatic types. CAMA Major Permits are necessary for activities that require other state or Federal permits, for projects that cover more than 20 acres or for construction covering more than 60,000 square feet. Applications for Major Permits are reviewed by ten (10) state and four (4) Federal agencies before a decision is made.

The permitting process for both the USACE and NC DCM will result in the issuance of additional approvals required by Federal and State agencies prior to the implementation of the terminal groin and beach nourishment project. These include:

- NEPA Compliance
- Coastal Area Management Act (CAMA) Major Authorization
- NCDWQ 401Certification
- USACE Section 10/404 Permit
- U.S. Fish and Wildlife Service Biological Opinion (BO)
- National Marine Fisheries Service Concurrence
- NC State Historic Preservation Office (SHPO) Concurrence

Fourteen (14) and ten (10) hardcopies of the major CAMA Permit application and DOA IP application, respectively, will be produced and disseminated to relevant resource

agencies. The submittal of complete major CAMA permit application and USACE IP application will serve as project deliverables.

It is possible that the State or the USACE will solicit a Request for Additional Information (RAI) in response to these permit applications. Should this occur, an additional task order will be submitted to the TOWN under a separate Scope of Work to address the specific RAI requirements.

Environmental Documentation

At the January 18, 2012 interagency pre-application meeting, it was determined that the construction of the terminal groin and associated beach nourishment project will require the development of four (4) distinct environmental documents. These include:

- An Environmental Impact Statement (EIS)
- A Cumulative Effects Assessment (CEA)
- An Essential Fish Habitat assessment (EFH)
- A Biological Assessment (BA)

EIS: North Carolina Senate Bill 110 specifies that an EIS must be developed in support of any project involving a terminal groin in order to satisfy SEPA requirements, although this document will serve to support the permit requests from both the USACE and NC DCM. As the designated Lead Federal agency for Environmental Impact Documentation and Assessment compliance under NEPA, the USACE will facilitate project coordination cooperatively with the TOWN. Preparation of the EIS will involve the formation of a Project Delivery Team (PDT) which will be made up of representatives from the Federal and State agencies mentioned above, as well as other stakeholders including private and/or non-profit interest groups or organizations.

After coordinating and attending an official NEPA scoping public meeting, during which issues and concerns associated with the project will be described and prioritized, CPE-NC will assist the USACE in implementing the second phase of the NEPA scoping process. The PDT will hold meetings as deemed necessary by the USACE to review the formulation of the project and offer specific recommendations on significant issues that must be considered to avoid or minimize the potential direct and indirect environmental consequences of the project. Recommendations for pre-construction, construction, and post-project monitoring activities (and mandated mitigative measures, if required) for project specific environmental impacts will be developed by CPE-NC and presented to the PDT for review and approval. These monitoring measures will be the basis for development of an effect determination by the resource protection agencies and issuance of project permits.

The EIS process requires an assessment of the direct, indirect, and cumulative impacts of the proposed actions on various species and their habitats. The document will include six (6) main sections including:

1. Introduction
2. Purpose and Need
3. Project Alternatives
4. Affected Environment
5. Environmental Consequences
6. Avoidance and Minimization

The time required to prepare the Draft EIS, Final EIS, and to obtain the necessary State and Federal permits for the construction of the terminal groin and nourishment project could take between 24 to 36 months, which means the earliest the project could be initiated would be during the fall 2014.

Specific tasks that must be undertaken to prepare the Draft EIS and Final EIS include:

- Conduct scoping meeting and coordinate project development with the PDT through periodic meetings.
- Conduct a baseline biological assessment and characterization of project area habitats including beach dune, submerged aquatic vegetation, salt marsh and shellfish habitats.
- Map identified habitat types (salt marsh, sand flats, shellfish, submerged aquatic vegetation) within project area using aerial mapping with groundtruthing.
- Develop an area-wide Geographic Information System (GIS) database to incorporate collected geotechnical, biological, and other relevant data.
- Utilize the GIS to evaluate potential project impacts and analyze project alternatives.
- Conduct a detailed assessment of potential physical impacts the project may have on adjacent beaches, inlet shoals, and estuarine environments.
- Conduct pre-project monitoring of birds, beach infauna, seabeach amaranth, sea turtles, significant habitats, and possibly benthic macroinvertebrates once these monitoring requirements have been specified by the PTD and following funding approval by the TOWN.
- Evaluate project alternatives including no action, the TOWN's preferred alternative, temporary protective measures, and relocation/abandonment for each phase of the project.
- Compile and analyze data and develop three EIS documents (Draft EIS and Final EIS) in compliance with NEPA and SEPA regulations and guidelines as mandated by the USACE.

- Develop required mitigation (if necessary) and resource monitoring plans for potential effects to significant resources.
- Participate in Draft EIS Public Hearing and respond to comments provided.
- Respond to comments and revise the Draft EIS and Final EIS documents.

Following the release of the Draft EIS and the Final EIS, governmental agencies, stakeholders, and the general public will be given an opportunity to provide comments in response to the documents. CPE-NC will respond to all comments submitted during the commenting period and, if necessary, will edit the EIS accordingly. Based on previous experience, CPE-NC finds that it is difficult to predict both the number of comments submitted and the nature of these comments. Therefore, we have proposed an estimated cost to respond to comments to be billed on a time and materials basis as opposed to the lump sum basis on which all other Tasks are proposed to be completed.

CEA: A Cumulative Effects Assessment will be drafted and submitted as an appendix to the EIS and therefore will undergo review by the USACE, the lead agency for the EIS. The Council on Environmental Quality (CEQ) defines cumulative effects as "

> *"…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other action*" (40 CFR 1508.7).

The CEA document describes the methods, rationale, and results of the assessment for the proposed terminal groin and beach nourishment project in terms of the eleven (11) step process identified by the CEQ. Cumulative effects analysis is an iterative process in which consequences are assessed following incorporation of avoidance, minimization, and mitigation measures into the alternatives considered. Monitoring is the last step in determining the cumulative effects that ultimately results from the action. The significance of cumulative effects depends upon the ecosystem, resource baseline conditions, and relevant resource stress thresholds.

Cumulative impacts result from spatial (concentration of a multiple impacts in a given area) and temporal (repeated occurrence of impacts in a given area) crowding of environmental perturbations. In general, many environmental effects could be considered as cumulative and almost all systems have already been modified, degraded or enhanced, through anthropogenic forces.

EFH: The EFH is utilized by the NMFS to ensure that the project will identify and protect important marine and estuarine fish habitat in accordance to the amended Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). The MSFCMA was enacted by the U.S. Congress to protect marine fish stocks and their habitat, prevent and stop overfishing and minimize bycatch. Congress defined Essential

Fish Habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." The MSFCMA requires that EFH be identified for all fish species Federally managed by the Fishery Management Councils (FMCs) and the NMFS. This document will evaluate the potential impacts to the various essential fish habitats within the designated Permit Area.

BA: The purpose for the development of the BA is to document analyses for actions that may affect federally listed species which will serve to satisfy the USFWS. The document is prepared for the Section 7 process to determine whether a proposed major construction activity under the authority of a federal action agency is likely to adversely affect listed species, proposed species, or designated critical habitat. The TOWN is required to determine whether the project related actions may affect listed or proposed species and designated and proposed critical habitat.

This Scope of Work includes the production costs associated with distributing six (6) hard copies of the Draft and Final environmental documents to the relevant agencies.

As mentioned previously it is difficult to gage the level of effort necessary to respond to comments to the Draft and Final EIS. Therefore we have split TASK 3 Environmental Documentation and Permitting into two sub-tasks. SUB-TASK 3A includes permitting, meetings, the development of the Draft EIS, Final EIS, CEA, EFH, BA, and production and distribution of all documents. SUB-TASK 3B includes responding to comments to the Draft and Final EIS.

TASK 4 – GEOTECHNICAL SUPPORT

Introduction: The State of North Carolina has adopted specific sediment criteria which must be adhered to for the emplacement of beach fill along the oceanfront shoreline (15A NCAC 07H.0312). These rules were adopted by the North Carolina Coastal Resource Commission (CRC), in February 2007, and later amended in April 2008. Beach fill projects for the purpose of this rule include beach nourishment, dredged material disposal, habitat restoration, storm protection, and erosion control projects. The material used for nourishment and/or to pre-fill a terminal groin fillet must adhere to these standards in order to obtain a Major CAMA Permit.

The proposed source of sand for the terminal groin project is the existing authorized borrow source within Shallotte Inlet used by the USACE for the Federal Storm Damage Reduction Project for Ocean Isle Beach (Figure 3). Despite the fact that the USACE has dredged sand from this borrow area to nourish and twice re-nourished the Ocean Isle Beach project since 2001, the TOWN will be required to comply with the state sediment criteria. In this regard, the USACE operates under the Federal consistency requirement of the Federal Coastal Zone Management Act (CZMA). This requires Federal actions

likely to affect any land or water in the coastal zone to be consistent with the state's coastal management program to the maximum extent practicable but does not require the USACE to obtain a state permit. As a result, the geotechnical information for the USACE borrow area for the Federal project may not meet the sediment criteria specified in the state rules, specifically with regards to density of data collection.

The current sediment criteria rules include special conditions for projects using sand from Federal or State maintained navigation channels. Recently, CPE-NC and other private and public entities have proposed revisions to the state sediment criteria. The proposed changes focus on the special condition exceptions in the rules for Federal or State maintained navigation channels. The proposed changes would modify the rules to allow for the inclusion of projects associated with inlet sources of sand that are not confined to Federal or State maintained navigation channels. The basis for this modification is that material that is removed from a portion of the inlet repeatedly and has been historically demonstrated to be of good quality should not be held to the same standards as unproven sand sources. The State is currently reviewing these proposed changes and may adopt the changes as early as October 1, 2012. If adopted, these changes would reduce the level of effort necessary for the Town of Ocean Isle Beach to obtain State permits.

Based on the proposed rule change, CPE-NC does not anticipate collecting any new data to characterize the borrow area. Proposed changes to the sediment criteria would allow for historic data to be used to characterize the borrow source for the purposes of permitting. No additional vibracores, bathymetric surveys, or cultural resource surveys are proposed as part of this scope.

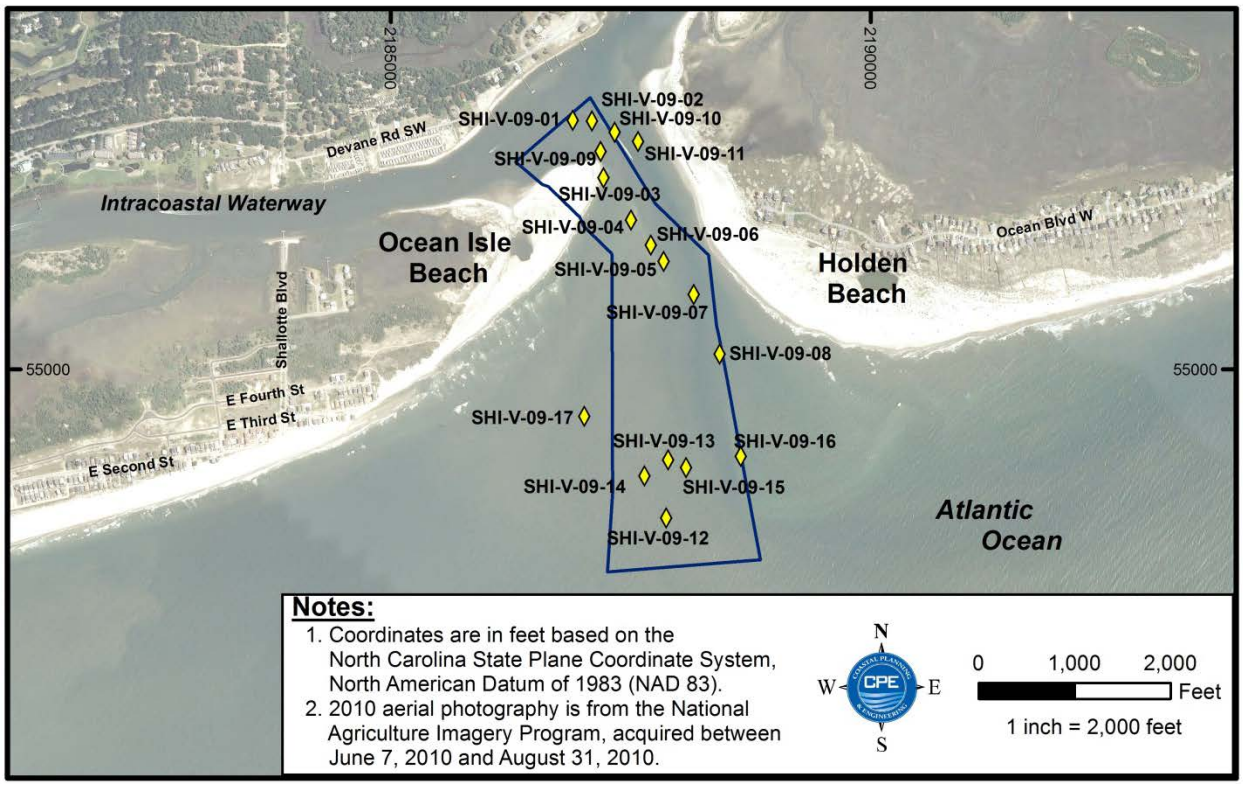

Figure 3. Map of the borrow area at Shallotte Inlet. Note locations of vibracores taken by USACE in 2009.

Assumptions made in developing the Geotechnical Scope:

- The anticipated schedule for developing the Draft EIS will allow for the geotechnical work to be put on hold until October 2012.
- The Coastal Resources Commission (CRC) will adopt the modified sediment criteria rules discussed herein by October 2012.
- The USACE will conduct pre-construction investigations including bathymetric surveys of the borrow area and beach profile surveys.
- The USACE will furnish historic native beach characteristic, bathymetric, and vibracores data collected within the Shallotte Inlet borrow area.
- The NC DCM will allow previously collected native sand samples (USACE, 1994) to be used as part of the required samples to characterize the native beach.

Native Beach: A State permit for disposal of material onto Ocean Isle Beach as part of the proposed terminal groin project will require the characterization of native material. During preparation of the General Reevaluation Report for the Ocean Isle Beach project, completed in 1994, the USACE collected beach samples along three profiles within the project area. Samples were collected from the Dune out to a depth of -30 ft NGVD29. The state sediment standards dictate a specific number of samples along at least five

profiles within the project area (15A NCAC 07H.0312)(1)(c and d). However, 15A NCAC 07H.0312 (1)(i) provides language that would allow special consideration of projects which were constructed prior to the adoption of the rules.

CPE-NC will obtain and analyze 13 sand samples along three (3) transects along the eastern end of Ocean Isle Beach. Samples will be collected from the frontal dune, frontal dune toe, mid berm, mean high water (MHW), mid tide (MT), mean low water (MLW), trough, bar crest and at even depth increments from 6 feet (1.8 meters) to 20 feet (6.1 meters) or to a shore-perpendicular distance 2,400 feet (732 meters) seaward of mean low water, whichever is in a more landward position. These data along with previously collected USACE data will be reviewed and analyzed to develop native beach characteristics as required by the sediment criteria.

In addition to the native beach samples, the state sediment criteria require a quantification of clasts larger than 3 inches in diameter along a representative section of the beach. The total number of sediments and shell material greater than three (3) inches (76 millimeters) in diameter, observable on the surface of the beach between mean low water (MLW) and the frontal dune toe, will be calculated for an area of 50,000 square feet (4,645 square meters) within the beach fill project boundaries. This area shall be considered a representative sample of the entire project area and referred to as the “background” value.

Supporting Documents: CPE-NC will coordinate with the USACE to identify and obtain the necessary data to support the permit application based on the adoption of proposed modifications to the sediment criteria. The data and documents will be reviewed and formatted to conform with the modified sediment criteria rules. A final geotechnical report will be developed to be included as an appendix to the EIS. The report will include a description of the data obtained and the methodology used to collect new data, available volume of sand, borrow area and native beach composite summary tables of sediment characteristics, vibracores logs, and vibracores sample reports.

APPENDIX 2
CPE-NC INDIVIDUAL BEACH GRANULARMETRIC REPORTS

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 001 DUNE

Analysis Date: 04-11-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,184,977	54,878	North Carolina State Plane	9.3 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-7/1 Dry - 5Y-8/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
117.94	117.82	0.00	0.01	#200 - 0.11 #230 - 0.10			0

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 1/2"	-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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.01	0.01	0.01	0.01
25	0.50	0.71	0.01	0.01	0.02	0.02
35	1.00	0.50	0.17	0.14	0.19	0.16
45	1.50	0.35	3.89	3.30	4.08	3.46
60	2.00	0.25	39.86	33.80	43.94	37.26
80	2.50	0.18	57.05	48.37	100.99	85.63
120	3.00	0.13	15.21	12.90	116.20	98.53
170	3.50	0.09	1.52	1.29	117.72	99.82
200	3.75	0.07	0.08	0.07	117.80	99.89
230	4.00	0.06	0.01	0.01	117.81	99.90

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.86	2.48	2.39	2.13	1.82	1.69	1.52

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.12	0.23	0.39	0.15	3.43

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 002 TOD

Analysis Date: 04-11-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,184,983	54,868	North Carolina State Plane	7.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-7/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
117.53	117.39	0.00	0.02	#200 - 0.15 #230 - 0.14			0

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 1/2"	-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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.01	0.01	0.01	0.01
18	0.00	1.00	0.12	0.10	0.13	0.11
25	0.50	0.71	0.63	0.54	0.76	0.65
35	1.00	0.50	6.50	5.53	7.26	6.18
45	1.50	0.35	26.31	22.39	33.57	28.57
60	2.00	0.25	48.46	41.23	82.03	69.80
80	2.50	0.18	29.08	24.74	111.11	94.54
120	3.00	0.13	5.35	4.55	116.46	99.09
170	3.50	0.09	0.84	0.71	117.30	99.80
200	3.75	0.07	0.06	0.05	117.36	99.85
230	4.00	0.06	0.01	0.01	117.37	99.86

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.55	2.29	2.11	1.76	1.42	1.22	0.89

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.75	0.30	0.5	-0.07	3.44

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 003MIDBERM

Analysis Date: 04-11-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,184,984	54,833	North Carolina State Plane	6.6 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/2	Average wet Munsell Value is 6. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
115.91	115.84	0.00	0.04	#200 - 0.08 #230 - 0.08			0

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 1/2"	-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	0.03	0.03	0.03	0.03
10	-1.00	2.00	0.03	0.03	0.06	0.06
14	-0.50	1.41	0.18	0.16	0.24	0.22
18	0.00	1.00	0.94	0.81	1.18	1.03
25	0.50	0.71	9.15	7.89	10.33	8.92
35	1.00	0.50	30.27	26.12	40.60	35.04
45	1.50	0.35	30.56	26.37	71.16	61.41
60	2.00	0.25	26.84	23.16	98.00	84.57
80	2.50	0.18	13.18	11.37	111.18	95.94
120	3.00	0.13	3.96	3.42	115.14	99.36
170	3.50	0.09	0.61	0.53	115.75	99.89
200	3.75	0.07	0.04	0.03	115.79	99.92
230	4.00	0.06	0.00	0.00	115.79	99.92

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.46	1.99	1.79	1.28	0.81	0.64	0.25

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.32	0.40	0.66	0.19	2.91

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 004BERMCRST

Analysis Date: 04-11-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,184,987	54,793	North Carolina State Plane	7.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/2	Average wet Munsell Value is 6. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.18	116.05	0.00	0.03	#200 - 0.15 #230 - 0.14			0

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 1/2"	-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	0.05	0.04	0.05	0.04
7	-1.50	2.83	0.01	0.01	0.06	0.05
10	-1.00	2.00	0.05	0.04	0.11	0.09
14	-0.50	1.41	0.03	0.03	0.14	0.12
18	0.00	1.00	0.08	0.07	0.22	0.19
25	0.50	0.71	1.07	0.92	1.29	1.11
35	1.00	0.50	18.38	15.82	19.67	16.93
45	1.50	0.35	40.68	35.01	60.35	51.94
60	2.00	0.25	35.63	30.67	95.98	82.61
80	2.50	0.18	15.72	13.53	111.70	96.14
120	3.00	0.13	3.80	3.27	115.50	99.41
170	3.50	0.09	0.48	0.41	115.98	99.82
200	3.75	0.07	0.03	0.03	116.01	99.85
230	4.00	0.06	0.01	0.01	116.02	99.86

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.46	2.05	1.88	1.47	1.12	0.97	0.62

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.5	0.35	0.55	0.11	4.08

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 005 MHW

Analysis Date: 02-04-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,184,989	54,767	North Carolina State Plane	1.3 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-7/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
94.24	93.27	0.00	0.27	#200 - 1.30 #230 - 1.30			

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.05	0.05	0.05	0.05
18	0.00	1.00	0.12	0.13	0.17	0.18
25	0.50	0.71	0.51	0.54	0.68	0.72
35	1.00	0.50	2.29	2.43	2.97	3.15
45	1.50	0.35	6.97	7.40	9.94	10.55
60	2.00	0.25	30.00	31.83	39.94	42.38
80	2.50	0.18	39.16	41.55	79.10	83.93
120	3.00	0.13	13.06	13.86	92.16	97.79
170	3.50	0.09	0.83	0.88	92.99	98.67
200	3.75	0.07	0.03	0.03	93.02	98.70
230	4.00	0.06	0.00	0.00	93.02	98.70

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.90	2.50	2.39	2.09	1.73	1.59	1.12

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.04	0.24	0.5	-0.7	4.64

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 006 MTL

Analysis Date: 04-10-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,184,995	54,729	North Carolina State Plane	0.3 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
101.08	100.08	0.01	0.01	#200 - 1.01 #230 - 1.00			0

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 1/2"	-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	0.03	0.03	0.03	0.03
14	-0.50	1.41	0.01	0.01	0.04	0.04
18	0.00	1.00	0.06	0.06	0.10	0.10
25	0.50	0.71	0.27	0.27	0.37	0.37
35	1.00	0.50	4.08	4.04	4.45	4.41
45	1.50	0.35	16.76	16.58	21.21	20.99
60	2.00	0.25	24.44	24.18	45.65	45.17
80	2.50	0.18	28.41	28.11	74.06	73.28
120	3.00	0.13	22.98	22.73	97.04	96.01
170	3.50	0.09	2.91	2.88	99.95	98.89
200	3.75	0.07	0.10	0.10	100.05	98.99
230	4.00	0.06	0.01	0.01	100.06	99.00

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.74	2.54	2.09	1.58	1.35	1.02

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.04	0.24	0.62	-0.28	2.69

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 007 MLW

Analysis Date: 04-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,185,017	54,549	North Carolina State Plane	-3.1 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-5/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.93	113.86	0.00	0.00	#200 - 0.94 #230 - 0.94			0

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	0.39	0.34	0.39	0.34
3.5	-2.50	5.66	0.00	0.00	0.39	0.34
4	-2.25	4.76	0.00	0.00	0.39	0.34
5	-2.00	4.00	0.10	0.09	0.49	0.43
7	-1.50	2.83	0.29	0.25	0.78	0.68
10	-1.00	2.00	0.36	0.31	1.14	0.99
14	-0.50	1.41	0.99	0.86	2.13	1.85
18	0.00	1.00	2.82	2.45	4.95	4.30
25	0.50	0.71	9.59	8.34	14.54	12.64
35	1.00	0.50	28.67	24.95	43.21	37.59
45	1.50	0.35	23.75	20.66	66.96	58.25
60	2.00	0.25	21.41	18.63	88.37	76.88
80	2.50	0.18	16.69	14.52	105.06	91.40
120	3.00	0.13	8.01	6.97	113.07	98.37
170	3.50	0.09	0.77	0.67	113.84	99.04
200	3.75	0.07	0.02	0.02	113.86	99.06
230	4.00	0.06	0.00	0.00	113.86	99.06

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.76	2.25	1.95	1.30	0.75	0.57	0.04

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.31	0.40	0.86	-0.64	5.4

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 008TROUGH

Analysis Date: 04-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,185,027	54,507	North Carolina State Plane	-5.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-4/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.65	108.65	0.01	0.00	#200 - 0.96 #230 - 0.93			1

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	0.84	0.77	0.84	0.77
4	-2.25	4.76	0.18	0.16	1.02	0.93
5	-2.00	4.00	0.42	0.38	1.44	1.31
7	-1.50	2.83	0.82	0.75	2.26	2.06
10	-1.00	2.00	0.75	0.68	3.01	2.74
14	-0.50	1.41	1.29	1.18	4.30	3.92
18	0.00	1.00	2.14	1.95	6.44	5.87
25	0.50	0.71	2.75	2.51	9.19	8.38
35	1.00	0.50	6.56	5.98	15.75	14.36
45	1.50	0.35	11.69	10.66	27.44	25.02
60	2.00	0.25	17.97	16.39	45.41	41.41
80	2.50	0.18	25.76	23.49	71.17	64.90
120	3.00	0.13	30.29	27.62	101.46	92.52
170	3.50	0.09	6.92	6.31	108.38	98.83
200	3.75	0.07	0.23	0.21	108.61	99.04
230	4.00	0.06	0.03	0.03	108.64	99.07

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.20	2.85	2.68	2.18	1.50	1.08	-0.22

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.92	0.26	1.07	-1.71	6.82

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 009 BARCRST

Analysis Date: 03-17-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-6.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
96.90	95.90	0.02	0.02	#200 - 1.10 #230 - 1.08			

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	0.09	0.09	0.09	0.09
7	-1.50	2.83	0.09	0.09	0.18	0.18
10	-1.00	2.00	0.15	0.15	0.33	0.33
14	-0.50	1.41	0.21	0.22	0.54	0.55
18	0.00	1.00	0.30	0.31	0.84	0.86
25	0.50	0.71	0.98	1.01	1.82	1.87
35	1.00	0.50	3.23	3.33	5.05	5.20
45	1.50	0.35	7.60	7.84	12.65	13.04
60	2.00	0.25	17.68	18.25	30.33	31.29
80	2.50	0.18	33.61	34.69	63.94	65.98
120	3.00	0.13	28.45	29.36	92.39	95.34
170	3.50	0.09	3.28	3.38	95.67	98.72
200	3.75	0.07	0.17	0.18	95.84	98.90
230	4.00	0.06	0.02	0.02	95.86	98.92

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.99	2.81	2.65	2.27	1.83	1.58	0.97

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.17	0.22	0.66	-1.45	7.49

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 010 (-8.75 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,184,983	54,082	North Carolina State Plane	-8.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
139.65	137.62	0.09	0.00	#200 - 1.76 #230 - 1.51			0

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	0.11	0.08	0.11	0.08
10	-1.00	2.00	0.08	0.06	0.19	0.14
14	-0.50	1.41	0.29	0.21	0.48	0.35
18	0.00	1.00	0.56	0.40	1.04	0.75
25	0.50	0.71	1.34	0.96	2.38	1.71
35	1.00	0.50	3.77	2.70	6.15	4.41
45	1.50	0.35	6.96	4.98	13.11	9.39
60	2.00	0.25	12.47	8.93	25.58	18.32
80	2.50	0.18	29.03	20.79	54.61	39.11
120	3.00	0.13	61.01	43.69	115.62	82.80
170	3.50	0.09	20.18	14.45	135.80	97.25
200	3.75	0.07	1.38	0.99	137.18	98.24
230	4.00	0.06	0.35	0.25	137.53	98.49

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.42	3.04	2.91	2.62	2.16	1.87	1.06

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.46	0.18	0.69	-1.5	6.51

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 011 (-12.5 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,185,004	53,858	North Carolina State Plane	-12.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
130.05	127.33	0.15	0.00	#200 - 2.62 #230 - 2.20			0

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	0.02	0.02	0.02	0.02
10	-1.00	2.00	0.03	0.02	0.05	0.04
14	-0.50	1.41	0.11	0.08	0.16	0.12
18	0.00	1.00	0.15	0.12	0.31	0.24
25	0.50	0.71	0.26	0.20	0.57	0.44
35	1.00	0.50	0.71	0.55	1.28	0.99
45	1.50	0.35	1.19	0.92	2.47	1.91
60	2.00	0.25	2.02	1.55	4.49	3.46
80	2.50	0.18	13.51	10.39	18.00	13.85
120	3.00	0.13	75.11	57.75	93.11	71.60
170	3.50	0.09	30.77	23.66	123.88	95.26
200	3.75	0.07	2.76	2.12	126.64	97.38
230	4.00	0.06	0.54	0.42	127.18	97.80

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.49	3.26	3.07	2.81	2.60	2.52	2.07

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.79	0.14	0.46	-2.2	15.12

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 012 (-16.25 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,185,049	53,253	North Carolina State Plane	-16.3 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/1 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
126.01	122.92	0.79	0.00	#200 - 3.34 #230 - 3.09			0

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	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.03	0.02	0.04	0.03
14	-0.50	1.41	0.03	0.02	0.07	0.05
18	0.00	1.00	0.05	0.04	0.12	0.09
25	0.50	0.71	0.15	0.12	0.27	0.21
35	1.00	0.50	0.31	0.25	0.58	0.46
45	1.50	0.35	0.57	0.45	1.15	0.91
60	2.00	0.25	2.06	1.63	3.21	2.54
80	2.50	0.18	12.80	10.16	16.01	12.70
120	3.00	0.13	60.43	47.96	76.44	60.66
170	3.50	0.09	41.56	32.98	118.00	93.64
200	3.75	0.07	3.81	3.02	121.81	96.66
230	4.00	0.06	0.32	0.25	122.13	96.91

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.61	3.35	3.22	2.89	2.63	2.53	2.12

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.86	0.14	0.43	-1.61	11.57

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 013 (-20 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,185,111	52,713	North Carolina State Plane	-20.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-4/1 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
149.72	145.45	0.33	0.00	#200 - 3.87 #230 - 3.08			0

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	2.77	1.85	2.77	1.85
5/16"	-3.00	8.00	0.00	0.00	2.77	1.85
3.5	-2.50	5.66	0.46	0.31	3.23	2.16
4	-2.25	4.76	0.04	0.03	3.27	2.19
5	-2.00	4.00	0.24	0.16	3.51	2.35
7	-1.50	2.83	0.47	0.31	3.98	2.66
10	-1.00	2.00	0.39	0.26	4.37	2.92
14	-0.50	1.41	0.30	0.20	4.67	3.12
18	0.00	1.00	0.22	0.15	4.89	3.27
25	0.50	0.71	0.35	0.23	5.24	3.50
35	1.00	0.50	0.80	0.53	6.04	4.03
45	1.50	0.35	1.84	1.23	7.88	5.26
60	2.00	0.25	5.47	3.65	13.35	8.91
80	2.50	0.18	26.21	17.51	39.56	26.42
120	3.00	0.13	62.56	41.78	102.12	68.20
170	3.50	0.09	36.99	24.71	139.11	92.91
200	3.75	0.07	4.82	3.22	143.93	96.13
230	4.00	0.06	1.19	0.79	145.12	96.92

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.66	3.32	3.14	2.78	2.46	2.20	1.39

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.56	0.17	1.14	-3.99	21.08

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 001 DUNE

Analysis Date: 04-10-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,878	54,341	North Carolina State Plane	15.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
119.61	119.37	0.00	0.08	#200 - 0.36 #230 - 0.28			0

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 1/2"	-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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.00	0.00	0.00	0.00
25	0.50	0.71	0.01	0.01	0.01	0.01
35	1.00	0.50	0.17	0.14	0.18	0.15
45	1.50	0.35	7.46	6.24	7.64	6.39
60	2.00	0.25	31.37	26.23	39.01	32.62
80	2.50	0.18	47.88	40.03	86.89	72.65
120	3.00	0.13	27.12	22.67	114.01	95.32
170	3.50	0.09	4.75	3.97	118.76	99.29
200	3.75	0.07	0.42	0.35	119.18	99.64
230	4.00	0.06	0.10	0.08	119.28	99.72

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.99	2.75	2.55	2.22	1.85	1.68	1.39

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.21	0.22	0.49	0.05	2.85

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 002 TOD

Analysis Date: 04-10-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,863	54,318	North Carolina State Plane	5.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.94	114.66	0.01	0.09	#200 - 0.35 #230 - 0.35			0

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.02	0.02	0.02	0.02
18	0.00	1.00	0.12	0.10	0.14	0.12
25	0.50	0.71	0.12	0.10	0.26	0.22
35	1.00	0.50	4.63	4.03	4.89	4.25
45	1.50	0.35	30.59	26.61	35.48	30.86
60	2.00	0.25	56.14	48.84	91.62	79.70
80	2.50	0.18	19.77	17.20	111.39	96.90
120	3.00	0.13	2.62	2.28	114.01	99.18
170	3.50	0.09	0.52	0.45	114.53	99.63
200	3.75	0.07	0.02	0.02	114.55	99.65
230	4.00	0.06	0.00	0.00	114.55	99.65

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.44	2.12	1.95	1.70	1.39	1.22	1.01

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.69	0.31	0.43	0.09	4.03

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 003MidBerm

Analysis Date: 04-10-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,805	54,281	North Carolina State Plane	4.7 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
120.02	119.75	0.01	0.01	#200 - 0.23 #230 - 0.23			0

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	0.01	0.01	0.01	0.01
14	-0.50	1.41	0.01	0.01	0.02	0.02
18	0.00	1.00	0.02	0.02	0.04	0.04
25	0.50	0.71	0.19	0.16	0.23	0.20
35	1.00	0.50	4.70	3.92	4.93	4.12
45	1.50	0.35	36.80	30.66	41.73	34.78
60	2.00	0.25	59.84	49.86	101.57	84.64
80	2.50	0.18	16.82	14.01	118.39	98.65
120	3.00	0.13	1.19	0.99	119.58	99.64
170	3.50	0.09	0.14	0.12	119.72	99.76
200	3.75	0.07	0.01	0.01	119.73	99.77
230	4.00	0.06	0.00	0.00	119.73	99.77

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.37	1.99	1.90	1.65	1.34	1.19	1.01

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.64	0.32	0.4	-0.01	3.76

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 004BermCrest

Analysis Date: 04-10-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,810	54,274	North Carolina State Plane	3.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
113.73	113.51	0.00	0.04	#200 - 0.23 #230 - 0.23			0

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	0.05	0.04	0.05	0.04
14	-0.50	1.41	0.07	0.06	0.12	0.10
18	0.00	1.00	0.16	0.14	0.28	0.24
25	0.50	0.71	0.94	0.83	1.22	1.07
35	1.00	0.50	10.02	8.81	11.24	9.88
45	1.50	0.35	36.44	32.04	47.68	41.92
60	2.00	0.25	48.57	42.71	96.25	84.63
80	2.50	0.18	15.59	13.71	111.84	98.34
120	3.00	0.13	1.42	1.25	113.26	99.59
170	3.50	0.09	0.19	0.17	113.45	99.76
200	3.75	0.07	0.01	0.01	113.46	99.77
230	4.00	0.06	0.00	0.00	113.46	99.77

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.38	1.99	1.89	1.59	1.24	1.10	0.72

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.57	0.34	0.47	-0.27	4.17

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 005 MHW

Analysis Date: 04-10-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,810	54,257	North Carolina State Plane	1.6 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
111.61	111.14	0.00	0.03	#200 - 0.45 #230 - 0.45			0

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	0.01	0.01	0.01	0.01
14	-0.50	1.41	0.00	0.00	0.01	0.01
18	0.00	1.00	0.05	0.04	0.06	0.05
25	0.50	0.71	0.29	0.26	0.35	0.31
35	1.00	0.50	2.57	2.30	2.92	2.61
45	1.50	0.35	18.49	16.57	21.41	19.18
60	2.00	0.25	50.82	45.53	72.23	64.71
80	2.50	0.18	31.92	28.60	104.15	93.31
120	3.00	0.13	6.62	5.93	110.77	99.24
170	3.50	0.09	0.32	0.29	111.09	99.53
200	3.75	0.07	0.02	0.02	111.11	99.55
230	4.00	0.06	0.00	0.00	111.11	99.55

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.64	2.34	2.18	1.84	1.56	1.40	1.07

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.85	0.28	0.45	-0.13	3.63

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 006 MTL

Analysis Date: 04-10-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,812	54,241	North Carolina State Plane	0.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
96.06	95.22	0.01	0.00	#200 - 0.90 #230 - 0.90			0

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.03	0.03	0.03	0.03
18	0.00	1.00	0.11	0.11	0.14	0.14
25	0.50	0.71	0.47	0.49	0.61	0.63
35	1.00	0.50	5.90	6.14	6.51	6.77
45	1.50	0.35	19.45	20.25	25.96	27.02
60	2.00	0.25	31.92	33.23	57.88	60.25
80	2.50	0.18	26.92	28.02	84.80	88.27
120	3.00	0.13	9.82	10.22	94.62	98.49
170	3.50	0.09	0.58	0.60	95.20	99.09
200	3.75	0.07	0.01	0.01	95.21	99.10
230	4.00	0.06	0.00	0.00	95.21	99.10

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.83	2.42	2.26	1.85	1.45	1.23	0.86

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.83	0.28	0.56	-0.19	2.89

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 007 MLW

Analysis Date: 04-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,837	54,097	North Carolina State Plane	-3.1 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
124.15	122.87	0.00	0.06	#200 - 1.12 #230 - 1.12			0

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	0.09	0.07	0.09	0.07
5	-2.00	4.00	0.00	0.00	0.09	0.07
7	-1.50	2.83	0.04	0.03	0.13	0.10
10	-1.00	2.00	0.08	0.06	0.21	0.16
14	-0.50	1.41	0.44	0.35	0.65	0.51
18	0.00	1.00	2.00	1.61	2.65	2.12
25	0.50	0.71	13.04	10.50	15.69	12.62
35	1.00	0.50	47.43	38.20	63.12	50.82
45	1.50	0.35	24.76	19.94	87.88	70.76
60	2.00	0.25	16.79	13.52	104.67	84.28
80	2.50	0.18	13.01	10.48	117.68	94.76
120	3.00	0.13	4.82	3.88	122.50	98.64
170	3.50	0.09	0.28	0.23	122.78	98.87
200	3.75	0.07	0.01	0.01	122.79	98.88
230	4.00	0.06	0.00	0.00	122.79	98.88

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.53	1.99	1.66	0.99	0.66	0.54	0.14

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.15	0.45	0.71	0.37	3.31

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 008TROUGH

Analysis Date: 04-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,841	54,044	North Carolina State Plane	-5.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.99	107.85	0.00	0.00	#200 - 1.06 #230 - 1.03			0

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	0.01	0.01	0.01	0.01
4	-2.25	4.76	0.00	0.00	0.01	0.01
5	-2.00	4.00	0.21	0.19	0.22	0.20
7	-1.50	2.83	0.05	0.05	0.27	0.25
10	-1.00	2.00	0.02	0.02	0.29	0.27
14	-0.50	1.41	0.19	0.17	0.48	0.44
18	0.00	1.00	0.25	0.23	0.73	0.67
25	0.50	0.71	0.50	0.46	1.23	1.13
35	1.00	0.50	1.50	1.38	2.73	2.51
45	1.50	0.35	3.91	3.59	6.64	6.10
60	2.00	0.25	10.94	10.04	17.58	16.14
80	2.50	0.18	40.20	36.88	57.78	53.02
120	3.00	0.13	43.55	39.96	101.33	92.98
170	3.50	0.09	6.32	5.80	107.65	98.78
200	3.75	0.07	0.17	0.16	107.82	98.94
230	4.00	0.06	0.03	0.03	107.85	98.97

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.17	2.89	2.78	2.46	2.12	1.99	1.35

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.37	0.19	0.58	-2.24	14.06

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 009BarCrest

Analysis Date: 02-04-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-6.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.05	94.08	0.00	0.15	#200 - 1.17 #230 - 1.17			

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	0.03	0.03	0.03	0.03
14	-0.50	1.41	0.06	0.06	0.09	0.09
18	0.00	1.00	0.12	0.13	0.21	0.22
25	0.50	0.71	0.28	0.29	0.49	0.51
35	1.00	0.50	1.74	1.83	2.23	2.34
45	1.50	0.35	7.01	7.38	9.24	9.72
60	2.00	0.25	21.49	22.61	30.73	32.33
80	2.50	0.18	35.49	37.34	66.22	69.67
120	3.00	0.13	25.08	26.39	91.30	96.06
170	3.50	0.09	2.57	2.70	93.87	98.76
200	3.75	0.07	0.07	0.07	93.94	98.83
230	4.00	0.06	0.00	0.00	93.94	98.83

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.77	2.60	2.24	1.84	1.64	1.18

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.18	0.22	0.54	-0.74	4.47

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 010 (-8.75 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,895	53,791	North Carolina State Plane	-8.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
176.51	173.96	0.10	0.00	#200 - 1.71 #230 - 1.52			0

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	0.07	0.04	0.07	0.04
4	-2.25	4.76	0.07	0.04	0.14	0.08
5	-2.00	4.00	0.11	0.06	0.25	0.14
7	-1.50	2.83	0.20	0.11	0.45	0.25
10	-1.00	2.00	0.28	0.16	0.73	0.41
14	-0.50	1.41	0.55	0.31	1.28	0.72
18	0.00	1.00	1.05	0.59	2.33	1.31
25	0.50	0.71	2.64	1.50	4.97	2.81
35	1.00	0.50	7.40	4.19	12.37	7.00
45	1.50	0.35	12.00	6.80	24.37	13.80
60	2.00	0.25	19.44	11.01	43.81	24.81
80	2.50	0.18	48.00	27.19	91.81	52.00
120	3.00	0.13	63.23	35.82	155.04	87.82
170	3.50	0.09	17.10	9.69	172.14	97.51
200	3.75	0.07	1.38	0.78	173.52	98.29
230	4.00	0.06	0.34	0.19	173.86	98.48

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.37	2.95	2.82	2.46	2.00	1.60	0.76

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.28	0.21	0.77	-1.52	6.97

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 011 (-12.5 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,919	53,540	North Carolina State Plane	-12.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/1 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
125.65	122.65	0.36	0.00	#200 - 3.80 #230 - 2.66			0

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	0.01	0.01	0.01	0.01
7	-1.50	2.83	0.09	0.07	0.10	0.08
10	-1.00	2.00	0.01	0.01	0.11	0.09
14	-0.50	1.41	0.04	0.03	0.15	0.12
18	0.00	1.00	0.06	0.05	0.21	0.17
25	0.50	0.71	0.12	0.10	0.33	0.27
35	1.00	0.50	0.36	0.29	0.69	0.56
45	1.50	0.35	0.79	0.63	1.48	1.19
60	2.00	0.25	1.86	1.48	3.34	2.67
80	2.50	0.18	6.31	5.02	9.65	7.69
120	3.00	0.13	52.43	41.73	62.08	49.42
170	3.50	0.09	52.55	41.82	114.63	91.24
200	3.75	0.07	6.23	4.96	120.86	96.20
230	4.00	0.06	1.43	1.14	122.29	97.34

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.69	3.41	3.31	3.01	2.71	2.60	2.23

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.96	0.13	0.45	-2.4	18.93

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 012 (-16.25 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,968	53,188	North Carolina State Plane	-16.3 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/1 Dry - 5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
128.02	124.56	1.66	0.00	#200 - 4.15 #230 - 4.03			0

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	0.05	0.04	0.05	0.04
4	-2.25	4.76	0.21	0.16	0.26	0.20
5	-2.00	4.00	0.21	0.16	0.47	0.36
7	-1.50	2.83	0.27	0.21	0.74	0.57
10	-1.00	2.00	0.21	0.16	0.95	0.73
14	-0.50	1.41	0.29	0.23	1.24	0.96
18	0.00	1.00	0.27	0.21	1.51	1.17
25	0.50	0.71	0.51	0.40	2.02	1.57
35	1.00	0.50	1.26	0.98	3.28	2.55
45	1.50	0.35	2.54	1.98	5.82	4.53
60	2.00	0.25	6.06	4.73	11.88	9.26
80	2.50	0.18	12.42	9.70	24.30	18.96
120	3.00	0.13	45.87	35.83	70.17	54.79
170	3.50	0.09	46.19	36.08	116.36	90.87
200	3.75	0.07	6.38	4.98	122.74	95.85
230	4.00	0.06	0.16	0.12	122.90	95.97

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.71	3.40	3.28	2.93	2.58	2.35	1.55

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.77	0.15	0.74	-3.01	17.19

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 013 (-20 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,667	52,664	North Carolina State Plane	-20.0 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 5Y-4/2 Dry - 5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
138.09	128.79	0.82	0.00	#200 - 9.17 #230 - 7.33			0

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	0.35	0.25	0.35	0.25
5/16"	-3.00	8.00	0.11	0.08	0.46	0.33
3.5	-2.50	5.66	0.14	0.10	0.60	0.43
4	-2.25	4.76	0.00	0.00	0.60	0.43
5	-2.00	4.00	0.08	0.06	0.68	0.49
7	-1.50	2.83	0.33	0.24	1.01	0.73
10	-1.00	2.00	0.23	0.17	1.24	0.90
14	-0.50	1.41	0.24	0.17	1.48	1.07
18	0.00	1.00	0.22	0.16	1.70	1.23
25	0.50	0.71	0.40	0.29	2.10	1.52
35	1.00	0.50	0.82	0.59	2.92	2.11
45	1.50	0.35	1.30	0.94	4.22	3.05
60	2.00	0.25	3.01	2.18	7.23	5.23
80	2.50	0.18	12.96	9.39	20.19	14.62
120	3.00	0.13	52.24	37.83	72.43	52.45
170	3.50	0.09	44.94	32.54	117.37	84.99
200	3.75	0.07	8.06	5.84	125.43	90.83
230	4.00	0.06	2.54	1.84	127.97	92.67

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.48	3.35	2.97	2.64	2.52	1.95

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.83	0.14	0.77	-4.17	29.95

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 001 DUNE

Analysis Date: 04-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,428	53,833	North Carolina State Plane	9.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-8/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
120.55	118.04	0.00	0.08	#200 - 2.17 #230 - 2.17			0

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.01	0.01	0.01	0.01
25	0.50	0.71	0.10	0.08	0.11	0.09
35	1.00	0.50	1.93	1.60	2.04	1.69
45	1.50	0.35	18.32	15.20	20.36	16.89
60	2.00	0.25	55.38	45.94	75.74	62.83
80	2.50	0.18	34.33	28.48	110.07	91.31
120	3.00	0.13	7.08	5.87	117.15	97.18
170	3.50	0.09	0.76	0.63	117.91	97.81
200	3.75	0.07	0.03	0.02	117.94	97.83
230	4.00	0.06	0.00	0.00	117.94	97.83

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.81	2.37	2.21	1.86	1.59	1.47	1.11

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.87	0.27	0.44	0.12	3.4

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 002TOD

Analysis Date: 04-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,434	53,827	North Carolina State Plane	8.3 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-7/2 Dry - 5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
123.95	123.74	0.00	0.00	#200 - 0.18 #230 - 0.18			0

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.04	0.03	0.04	0.03
18	0.00	1.00	0.08	0.06	0.12	0.09
25	0.50	0.71	0.29	0.23	0.41	0.32
35	1.00	0.50	5.55	4.48	5.96	4.80
45	1.50	0.35	36.27	29.26	42.23	34.06
60	2.00	0.25	54.75	44.17	96.98	78.23
80	2.50	0.18	22.89	18.47	119.87	96.70
120	3.00	0.13	3.37	2.72	123.24	99.42
170	3.50	0.09	0.47	0.38	123.71	99.80
200	3.75	0.07	0.03	0.02	123.74	99.82
230	4.00	0.06	0.00	0.00	123.74	99.82

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.45	2.16	1.96	1.68	1.35	1.19	1.00

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.68	0.31	0.45	0.1	3.67

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 003MIDBERM

Analysis Date: 04-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,436	53,817	North Carolina State Plane	6.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.61	116.25	0.00	0.00	#200 - 0.31 #230 - 0.31			0

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	0.26	0.22	0.26	0.22
10	-1.00	2.00	0.21	0.18	0.47	0.40
14	-0.50	1.41	0.23	0.20	0.70	0.60
18	0.00	1.00	0.53	0.45	1.23	1.05
25	0.50	0.71	1.87	1.60	3.10	2.65
35	1.00	0.50	10.21	8.76	13.31	11.41
45	1.50	0.35	27.86	23.89	41.17	35.30
60	2.00	0.25	42.84	36.74	84.01	72.04
80	2.50	0.18	24.66	21.15	108.67	93.19
120	3.00	0.13	6.52	5.59	115.19	98.78
170	3.50	0.09	1.01	0.87	116.20	99.65
200	3.75	0.07	0.05	0.04	116.25	99.69
230	4.00	0.06	0.00	0.00	116.25	99.69

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.66	2.28	2.07	1.70	1.28	1.10	0.63

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.67	0.31	0.62	-0.74	5.92

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 004BERMCRST

Analysis Date: 04-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,437	53,798	North Carolina State Plane	3.6 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
120.96	120.63	0.00	0.08	#200 - 0.37 #230 - 0.37			0

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	0.02	0.02	0.02	0.02
14	-0.50	1.41	0.01	0.01	0.03	0.03
18	0.00	1.00	0.10	0.08	0.13	0.11
25	0.50	0.71	0.32	0.26	0.45	0.37
35	1.00	0.50	4.82	3.98	5.27	4.35
45	1.50	0.35	31.46	26.01	36.73	30.36
60	2.00	0.25	53.83	44.50	90.56	74.86
80	2.50	0.18	25.85	21.37	116.41	96.23
120	3.00	0.13	3.56	2.94	119.97	99.17
170	3.50	0.09	0.53	0.44	120.50	99.61
200	3.75	0.07	0.03	0.02	120.53	99.63
230	4.00	0.06	0.00	0.00	120.53	99.63

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.47	2.21	2.00	1.72	1.40	1.22	1.01

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.72	0.30	0.46	0	3.8

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 005 MHW

Analysis Date: 02-04-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,434	53,827	North Carolina State Plane	1.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-7/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.27	94.24	0.00	0.12	#200 - 1.19 #230 - 1.19			

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.00	0.00	0.00	0.00
25	0.50	0.71	0.08	0.08	0.08	0.08
35	1.00	0.50	0.94	0.99	1.02	1.07
45	1.50	0.35	9.50	9.97	10.52	11.04
60	2.00	0.25	33.78	35.46	44.30	46.50
80	2.50	0.18	38.42	40.33	82.72	86.83
120	3.00	0.13	10.39	10.91	93.11	97.74
170	3.50	0.09	0.97	1.02	94.08	98.76
200	3.75	0.07	0.05	0.05	94.13	98.81
230	4.00	0.06	0.00	0.00	94.13	98.81

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.87	2.46	2.35	2.04	1.70	1.57	1.20

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.02	0.25	0.45	-0.09	3.21

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 006 MTL

Analysis Date: 04-15-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,445	53,759	North Carolina State Plane	0.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.75	106.66	0.00	0.00	#200 - 0.99 #230 - 0.99			0

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	0.11	0.10	0.11	0.10
7	-1.50	2.83	0.00	0.00	0.11	0.10
10	-1.00	2.00	0.02	0.02	0.13	0.12
14	-0.50	1.41	0.02	0.02	0.15	0.14
18	0.00	1.00	0.16	0.15	0.31	0.29
25	0.50	0.71	0.99	0.92	1.30	1.21
35	1.00	0.50	11.74	10.90	13.04	12.11
45	1.50	0.35	20.21	18.76	33.25	30.87
60	2.00	0.25	25.36	23.54	58.61	54.41
80	2.50	0.18	30.77	28.56	89.38	82.97
120	3.00	0.13	16.12	14.96	105.50	97.93
170	3.50	0.09	1.13	1.05	106.63	98.98
200	3.75	0.07	0.03	0.03	106.66	99.01
230	4.00	0.06	0.00	0.00	106.66	99.01

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.90	2.53	2.36	1.91	1.34	1.10	0.67

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.84	0.28	0.67	-0.45	3.56

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 007 MLW

Analysis Date: 04-15-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,460	53,620	North Carolina State Plane	-3.2 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-5/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
117.12	116.11	0.00	0.11	#200 - 0.97 #230 - 0.97			3

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	2.99	2.55	2.99	2.55
5/16"	-3.00	8.00	2.69	2.30	5.68	4.85
3.5	-2.50	5.66	0.86	0.73	6.54	5.58
4	-2.25	4.76	0.64	0.55	7.18	6.13
5	-2.00	4.00	1.15	0.98	8.33	7.11
7	-1.50	2.83	1.81	1.55	10.14	8.66
10	-1.00	2.00	2.40	2.05	12.54	10.71
14	-0.50	1.41	5.45	4.65	17.99	15.36
18	0.00	1.00	9.98	8.52	27.97	23.88
25	0.50	0.71	17.15	14.64	45.12	38.52
35	1.00	0.50	25.48	21.76	70.60	60.28
45	1.50	0.35	19.10	16.31	89.70	76.59
60	2.00	0.25	13.79	11.77	103.49	88.36
80	2.50	0.18	8.92	7.62	112.41	95.98
120	3.00	0.13	3.36	2.87	115.77	98.85
170	3.50	0.09	0.20	0.17	115.97	99.02
200	3.75	0.07	0.01	0.01	115.98	99.03
230	4.00	0.06	0.00	0.00	115.98	99.03

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.44	1.81	1.45	0.76	0.04	-0.46	-2.90

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.54	0.69	1.39	-1.22	4.71

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 008TROUGH

Analysis Date: 04-15-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,467	53,590	North Carolina State Plane	-5.1 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-4/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
148.24	146.05	0.00	0.08	#200 - 1.60 #230 - 1.57			0

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	0.69	0.47	0.69	0.47
3.5	-2.50	5.66	0.57	0.38	1.26	0.85
4	-2.25	4.76	0.61	0.41	1.87	1.26
5	-2.00	4.00	0.33	0.22	2.20	1.48
7	-1.50	2.83	0.65	0.44	2.85	1.92
10	-1.00	2.00	0.54	0.36	3.39	2.28
14	-0.50	1.41	0.66	0.45	4.05	2.73
18	0.00	1.00	0.99	0.67	5.04	3.40
25	0.50	0.71	1.16	0.78	6.20	4.18
35	1.00	0.50	3.09	2.08	9.29	6.26
45	1.50	0.35	6.52	4.40	15.81	10.66
60	2.00	0.25	18.52	12.49	34.33	23.15
80	2.50	0.18	61.27	41.33	95.60	64.48
120	3.00	0.13	45.01	30.36	140.61	94.84
170	3.50	0.09	5.09	3.43	145.70	98.27
200	3.75	0.07	0.19	0.13	145.89	98.40
230	4.00	0.06	0.04	0.03	145.93	98.43

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.02	2.82	2.67	2.32	2.02	1.71	0.70

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.15	0.23	0.91	-3.17	16.05

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 009BarCrest

Analysis Date: 03-17-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-6.5 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.35	94.35	0.00	0.08	#200 - 1.13 #230 - 1.13			

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	0.08	0.08	0.08	0.08
5	-2.00	4.00	0.26	0.27	0.34	0.35
7	-1.50	2.83	1.03	1.08	1.37	1.43
10	-1.00	2.00	0.97	1.02	2.34	2.45
14	-0.50	1.41	1.22	1.28	3.56	3.73
18	0.00	1.00	2.14	2.24	5.70	5.97
25	0.50	0.71	4.85	5.09	10.55	11.06
35	1.00	0.50	16.58	17.39	27.13	28.45
45	1.50	0.35	23.56	24.71	50.69	53.16
60	2.00	0.25	19.31	20.25	70.00	73.41
80	2.50	0.18	15.52	16.28	85.52	89.69
120	3.00	0.13	8.02	8.41	93.54	98.10
170	3.50	0.09	0.72	0.76	94.26	98.86
200	3.75	0.07	0.01	0.01	94.27	98.87
230	4.00	0.06	0.00	0.00	94.27	98.87

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.82	2.33	2.05	1.44	0.90	0.64	-0.22

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.39	0.38	0.91	-0.89	4.71

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 010 (-8.75 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,420	53,308	North Carolina State Plane	-8.8 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-4/1 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
168.28	165.60	0.24	0.01	#200 - 2.13 #230 - 1.74			0

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	0.72	0.43	0.72	0.43
5/16"	-3.00	8.00	0.00	0.00	0.72	0.43
3.5	-2.50	5.66	0.23	0.14	0.95	0.57
4	-2.25	4.76	0.23	0.14	1.18	0.71
5	-2.00	4.00	0.10	0.06	1.28	0.77
7	-1.50	2.83	0.59	0.35	1.87	1.12
10	-1.00	2.00	0.60	0.36	2.47	1.48
14	-0.50	1.41	1.06	0.63	3.53	2.11
18	0.00	1.00	1.42	0.84	4.95	2.95
25	0.50	0.71	2.34	1.39	7.29	4.34
35	1.00	0.50	4.56	2.71	11.85	7.05
45	1.50	0.35	5.81	3.45	17.66	10.50
60	2.00	0.25	8.28	4.92	25.94	15.42
80	2.50	0.18	22.44	13.33	48.38	28.75
120	3.00	0.13	80.78	48.00	129.16	76.75
170	3.50	0.09	32.94	19.57	162.10	96.32
200	3.75	0.07	2.60	1.55	164.70	97.87
230	4.00	0.06	0.65	0.39	165.35	98.26

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.47	3.19	2.98	2.72	2.36	2.02	0.62

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.48	0.18	0.96	-2.92	14.76

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 011 (-12.5 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,471	53,111	North Carolina State Plane	-12.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/2 Dry - 5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
173.10	169.74	0.43	0.00	#200 - 3.32 #230 - 2.18			0

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	0.05	0.03	0.05	0.03
7	-1.50	2.83	0.15	0.09	0.20	0.12
10	-1.00	2.00	0.12	0.07	0.32	0.19
14	-0.50	1.41	0.10	0.06	0.42	0.25
18	0.00	1.00	0.08	0.05	0.50	0.30
25	0.50	0.71	0.17	0.10	0.67	0.40
35	1.00	0.50	0.59	0.34	1.26	0.74
45	1.50	0.35	1.15	0.66	2.41	1.40
60	2.00	0.25	2.19	1.27	4.60	2.67
80	2.50	0.18	9.02	5.21	13.62	7.88
120	3.00	0.13	75.46	43.59	89.08	51.47
170	3.50	0.09	68.53	39.59	157.61	91.06
200	3.75	0.07	9.73	5.62	167.34	96.68
230	4.00	0.06	1.97	1.14	169.31	97.82

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.68	3.41	3.30	2.98	2.70	2.59	2.22

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.94	0.13	0.48	-2.89	23.47

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 012 (-16.25 ft)

Analysis Date: 06-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,508	52,882	North Carolina State Plane	-16.3 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 5Y-4/2 Dry - 5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
185.51	179.97	3.25	0.21	#200 - 5.76 #230 - 4.93			0

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	0.21	0.11	0.21	0.11
3.5	-2.50	5.66	0.00	0.00	0.21	0.11
4	-2.25	4.76	0.03	0.02	0.24	0.13
5	-2.00	4.00	0.11	0.06	0.35	0.19
7	-1.50	2.83	0.35	0.19	0.70	0.38
10	-1.00	2.00	0.33	0.18	1.03	0.56
14	-0.50	1.41	0.42	0.23	1.45	0.79
18	0.00	1.00	0.39	0.21	1.84	1.00
25	0.50	0.71	0.81	0.44	2.65	1.44
35	1.00	0.50	3.30	1.78	5.95	3.22
45	1.50	0.35	4.37	2.36	10.32	5.58
60	2.00	0.25	5.94	3.20	16.26	8.78
80	2.50	0.18	14.35	7.74	30.61	16.52
120	3.00	0.13	63.54	34.25	94.15	50.77
170	3.50	0.09	69.67	37.56	163.82	88.33
200	3.75	0.07	10.97	5.91	174.79	94.24
230	4.00	0.06	1.54	0.83	176.33	95.07

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.98	3.44	3.32	2.99	2.62	2.47	1.38

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.81	0.14	0.74	-2.85	16.01

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 013 (-20 ft)

Analysis Date: 06-17-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,182,578	52,461	North Carolina State Plane	-20.0 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 5Y-4/2 Dry - 5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
207.90	195.93	2.71	0.00	#200 - 9.93 #230 - 7.06			1

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	0.97	0.47	0.97	0.47
5/16"	-3.00	8.00	0.00	0.00	0.97	0.47
3.5	-2.50	5.66	0.89	0.43	1.86	0.90
4	-2.25	4.76	0.25	0.12	2.11	1.02
5	-2.00	4.00	0.49	0.24	2.60	1.26
7	-1.50	2.83	0.91	0.44	3.51	1.70
10	-1.00	2.00	1.42	0.68	4.93	2.38
14	-0.50	1.41	1.53	0.74	6.46	3.12
18	0.00	1.00	1.21	0.58	7.67	3.70
25	0.50	0.71	1.96	0.94	9.63	4.64
35	1.00	0.50	7.49	3.60	17.12	8.24
45	1.50	0.35	8.06	3.88	25.18	12.12
60	2.00	0.25	8.69	4.18	33.87	16.30
80	2.50	0.18	22.83	10.98	56.70	27.28
120	3.00	0.13	56.93	27.38	113.63	54.66
170	3.50	0.09	60.05	28.88	173.68	83.54
200	3.75	0.07	13.57	6.53	187.25	90.07
230	4.00	0.06	5.97	2.87	193.22	92.94

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.52	3.35	2.91	2.40	1.96	0.55

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.56	0.17	1.15	-2.46	10.81

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB040 001 DUNE

Analysis Date: 03-17-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-0.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-7/1 Dry - 5Y-8/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.99	116.83	0.00	0.06	#200 - 0.19 #230 - 0.18			

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.02	0.02	0.02	0.02
25	0.50	0.71	0.16	0.14	0.18	0.16
35	1.00	0.50	2.54	2.17	2.72	2.33
45	1.50	0.35	16.62	14.21	19.34	16.54
60	2.00	0.25	48.79	41.70	68.13	58.24
80	2.50	0.18	37.62	32.16	105.75	90.40
120	3.00	0.13	9.94	8.50	115.69	98.90
170	3.50	0.09	0.99	0.85	116.68	99.75
200	3.75	0.07	0.07	0.06	116.75	99.81
230	4.00	0.06	0.01	0.01	116.76	99.82

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.77	2.40	2.26	1.90	1.60	1.48	1.09

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.91	0.27	0.47	-0.01	3.3

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 001 DUNE

Analysis Date: 04-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,202	52,836	North Carolina State Plane	12.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.78	114.53	0.02	0.00	#200 - 0.24 #230 - 0.23			0

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.01	0.01	0.01	0.01
25	0.50	0.71	0.03	0.03	0.04	0.04
35	1.00	0.50	0.51	0.44	0.55	0.48
45	1.50	0.35	3.47	3.02	4.02	3.50
60	2.00	0.25	18.95	16.51	22.97	20.01
80	2.50	0.18	56.51	49.23	79.48	69.24
120	3.00	0.13	31.61	27.54	111.09	96.78
170	3.50	0.09	3.22	2.81	114.31	99.59
200	3.75	0.07	0.19	0.17	114.50	99.76
230	4.00	0.06	0.01	0.01	114.51	99.77

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.97	2.77	2.60	2.30	2.05	1.88	1.55

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.3	0.20	0.43	-0.37	3.82

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 002 TOD

Analysis Date: 04-15-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,206	52,825	North Carolina State Plane	9.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-8/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
118.45	118.15	0.00	0.00	#200 - 0.29 #230 - 0.26			0

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	0.05	0.04	0.05	0.04
14	-0.50	1.41	0.13	0.11	0.18	0.15
18	0.00	1.00	0.69	0.58	0.87	0.73
25	0.50	0.71	4.78	4.04	5.65	4.77
35	1.00	0.50	15.69	13.25	21.34	18.02
45	1.50	0.35	18.40	15.53	39.74	33.55
60	2.00	0.25	36.41	30.74	76.15	64.29
80	2.50	0.18	31.88	26.91	108.03	91.20
120	3.00	0.13	8.79	7.42	116.82	98.62
170	3.50	0.09	1.19	1.00	118.01	99.62
200	3.75	0.07	0.11	0.09	118.12	99.71
230	4.00	0.06	0.03	0.03	118.15	99.74

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.76	2.37	2.20	1.77	1.22	0.92	0.51

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.69	0.31	0.68	-0.41	2.98

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 003MIDBERM

Analysis Date: 04-15-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,212	52,796	North Carolina State Plane	7.7 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-6/1 Dry - 5Y-8/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
117.96	117.62	0.00	0.00	#200 - 0.31 #230 - 0.29			0

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.04	0.03	0.04	0.03
18	0.00	1.00	0.03	0.03	0.07	0.06
25	0.50	0.71	0.09	0.08	0.16	0.14
35	1.00	0.50	3.00	2.54	3.16	2.68
45	1.50	0.35	26.47	22.44	29.63	25.12
60	2.00	0.25	49.73	42.16	79.36	67.28
80	2.50	0.18	29.81	25.27	109.17	92.55
120	3.00	0.13	6.94	5.88	116.11	98.43
170	3.50	0.09	1.35	1.14	117.46	99.57
200	3.75	0.07	0.14	0.12	117.60	99.69
230	4.00	0.06	0.02	0.02	117.62	99.71

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.71	2.33	2.15	1.80	1.50	1.30	1.05

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.81	0.29	0.49	0.25	3.58

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 004BERMCRST

Analysis Date: 04-15-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,228	52,745	North Carolina State Plane	3.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-7/2 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.26	115.81	0.00	0.11	#200 - 0.52 #230 - 0.52			0

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.00	0.00	0.00	0.00
25	0.50	0.71	0.04	0.03	0.04	0.03
35	1.00	0.50	0.41	0.35	0.45	0.38
45	1.50	0.35	5.92	5.09	6.37	5.47
60	2.00	0.25	51.48	44.28	57.85	49.75
80	2.50	0.18	50.05	43.05	107.90	92.80
120	3.00	0.13	7.19	6.18	115.09	98.98
170	3.50	0.09	0.54	0.46	115.63	99.44
200	3.75	0.07	0.05	0.04	115.68	99.48
230	4.00	0.06	0.00	0.00	115.68	99.48

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.68	2.40	2.29	2.00	1.72	1.62	1.45

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.01	0.25	0.37	0.08	3.67

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 005 MHW

Analysis Date: 02-04-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,244	52,732	North Carolina State Plane	1.3 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
93.77	92.76	0.01	0.11	#200 - 1.19 #230 - 1.18			

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	0.08	0.09	0.08	0.09
4	-2.25	4.76	0.00	0.00	0.08	0.09
5	-2.00	4.00	0.18	0.19	0.26	0.28
7	-1.50	2.83	0.38	0.41	0.64	0.69
10	-1.00	2.00	0.28	0.30	0.92	0.99
14	-0.50	1.41	0.53	0.57	1.45	1.56
18	0.00	1.00	0.85	0.91	2.30	2.47
25	0.50	0.71	1.86	1.98	4.16	4.45
35	1.00	0.50	7.48	7.98	11.64	12.43
45	1.50	0.35	19.12	20.39	30.76	32.82
60	2.00	0.25	29.15	31.09	59.91	63.91
80	2.50	0.18	23.07	24.60	82.98	88.51
120	3.00	0.13	8.81	9.40	91.79	97.91
170	3.50	0.09	0.81	0.86	92.60	98.77
200	3.75	0.07	0.04	0.04	92.64	98.81
230	4.00	0.06	0.01	0.01	92.65	98.82

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.85	2.41	2.23	1.78	1.31	1.09	0.53

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.7	0.31	0.74	-1.34	7.48

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 006 MTL

Analysis Date: 04-16-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,248	52,691	North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
106.12	105.04	0.00	0.00	#200 - 1.02 #230 - 1.01			0

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	0.10	0.09	0.10	0.09
5	-2.00	4.00	0.00	0.00	0.10	0.09
7	-1.50	2.83	0.07	0.07	0.17	0.16
10	-1.00	2.00	0.07	0.07	0.24	0.23
14	-0.50	1.41	0.23	0.22	0.47	0.45
18	0.00	1.00	0.52	0.49	0.99	0.94
25	0.50	0.71	1.04	0.98	2.03	1.92
35	1.00	0.50	3.57	3.36	5.60	5.28
45	1.50	0.35	10.28	9.69	15.88	14.97
60	2.00	0.25	25.46	23.99	41.34	38.96
80	2.50	0.18	39.35	37.08	80.69	76.04
120	3.00	0.13	22.27	20.99	102.96	97.03
170	3.50	0.09	2.01	1.89	104.97	98.92
200	3.75	0.07	0.06	0.06	105.03	98.98
230	4.00	0.06	0.01	0.01	105.04	98.99

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.95	2.69	2.49	2.15	1.71	1.52	0.96

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.06	0.24	0.63	-1.33	7.5

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 007 MLW

Analysis Date: 04-16-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,287	52,524	North Carolina State Plane	-3.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-5/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
112.48	111.51	0.00	0.08	#200 - 0.93 #230 - 0.93			2

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	0.74	0.66	0.74	0.66
3.5	-2.50	5.66	0.81	0.72	1.55	1.38
4	-2.25	4.76	0.45	0.40	2.00	1.78
5	-2.00	4.00	1.34	1.19	3.34	2.97
7	-1.50	2.83	1.36	1.21	4.70	4.18
10	-1.00	2.00	1.89	1.68	6.59	5.86
14	-0.50	1.41	3.76	3.34	10.35	9.20
18	0.00	1.00	6.51	5.79	16.86	14.99
25	0.50	0.71	13.11	11.66	29.97	26.65
35	1.00	0.50	22.08	19.63	52.05	46.28
45	1.50	0.35	19.18	17.05	71.23	63.33
60	2.00	0.25	19.73	17.54	90.96	80.87
80	2.50	0.18	14.00	12.45	104.96	93.32
120	3.00	0.13	5.99	5.33	110.95	98.65
170	3.50	0.09	0.45	0.40	111.40	99.05
200	3.75	0.07	0.02	0.02	111.42	99.07
230	4.00	0.06	0.00	0.00	111.42	99.07

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.66	2.13	1.83	1.11	0.43	0.04	-1.26

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.99	0.50	1.15	-0.98	4.42

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 008TROUGH

Analysis Date: 04-16-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,299	52,478	North Carolina State Plane	-5.1 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/1 Dry - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.94	108.77	0.00	0.00	#200 - 1.06 #230 - 1.05			0

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	0.13	0.12	0.13	0.12
4	-2.25	4.76	0.05	0.05	0.18	0.17
5	-2.00	4.00	0.00	0.00	0.18	0.17
7	-1.50	2.83	0.04	0.04	0.22	0.21
10	-1.00	2.00	0.05	0.05	0.27	0.26
14	-0.50	1.41	0.09	0.08	0.36	0.34
18	0.00	1.00	0.21	0.19	0.57	0.53
25	0.50	0.71	0.41	0.37	0.98	0.90
35	1.00	0.50	1.85	1.68	2.83	2.58
45	1.50	0.35	7.09	6.45	9.92	9.03
60	2.00	0.25	22.40	20.37	32.32	29.40
80	2.50	0.18	48.14	43.79	80.46	73.19
120	3.00	0.13	26.13	23.77	106.59	96.96
170	3.50	0.09	2.12	1.93	108.71	98.89
200	3.75	0.07	0.05	0.05	108.76	98.94
230	4.00	0.06	0.01	0.01	108.77	98.95

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.96	2.73	2.54	2.24	1.89	1.67	1.19

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.17	0.22	0.56	-1.94	14.13

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 009BarCrest

Analysis Date: 02-04-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-6.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
93.86	92.81	0.00	0.16	#200 - 1.29 #230 - 1.28			

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	0.58	0.62	0.58	0.62
4	-2.25	4.76	0.00	0.00	0.58	0.62
5	-2.00	4.00	0.04	0.04	0.62	0.66
7	-1.50	2.83	0.30	0.32	0.92	0.98
10	-1.00	2.00	0.35	0.37	1.27	1.35
14	-0.50	1.41	0.44	0.47	1.71	1.82
18	0.00	1.00	1.14	1.21	2.85	3.03
25	0.50	0.71	3.26	3.47	6.11	6.50
35	1.00	0.50	14.59	15.54	20.70	22.04
45	1.50	0.35	24.86	26.49	45.56	48.53
60	2.00	0.25	23.94	25.51	69.50	74.04
80	2.50	0.18	14.34	15.28	83.84	89.32
120	3.00	0.13	7.76	8.27	91.60	97.59
170	3.50	0.09	1.03	1.10	92.63	98.69
200	3.75	0.07	0.02	0.02	92.65	98.71
230	4.00	0.06	0.01	0.01	92.66	98.72

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.84	2.33	2.03	1.53	1.06	0.81	0.28

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.5	0.35	0.82	-1.17	7.55

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 010 -8.75 ft

Analysis Date: 06-17-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,361	52,216	North Carolina State Plane	-8.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/1 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
185.76	182.91	0.29	0.00	#200 - 2.00 #230 - 1.69			0

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	0.01	0.01	0.01	0.01
5	-2.00	4.00	0.18	0.10	0.19	0.11
7	-1.50	2.83	0.37	0.20	0.56	0.31
10	-1.00	2.00	0.25	0.13	0.81	0.44
14	-0.50	1.41	0.60	0.32	1.41	0.76
18	0.00	1.00	0.63	0.34	2.04	1.10
25	0.50	0.71	1.12	0.60	3.16	1.70
35	1.00	0.50	2.35	1.27	5.51	2.97
45	1.50	0.35	3.24	1.74	8.75	4.71
60	2.00	0.25	6.04	3.25	14.79	7.96
80	2.50	0.18	25.38	13.66	40.17	21.62
120	3.00	0.13	102.07	54.95	142.24	76.57
170	3.50	0.09	37.04	19.94	179.28	96.51
200	3.75	0.07	2.76	1.49	182.04	98.00
230	4.00	0.06	0.58	0.31	182.62	98.31

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.46	3.19	2.99	2.76	2.53	2.29	1.54

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.66	0.16	0.64	-2.93	16.55

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 011 -12.5 ft

Analysis Date: 06-17-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,376	52,149	North Carolina State Plane	-12.5 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-4/2 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
136.56	134.15	0.16	0.00	#200 - 2.41 #230 - 1.88			0

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	1.56	1.14	1.56	1.14
5/16"	-3.00	8.00	0.00	0.00	1.56	1.14
3.5	-2.50	5.66	0.00	0.00	1.56	1.14
4	-2.25	4.76	0.00	0.00	1.56	1.14
5	-2.00	4.00	0.15	0.11	1.71	1.25
7	-1.50	2.83	0.19	0.14	1.90	1.39
10	-1.00	2.00	0.28	0.21	2.18	1.60
14	-0.50	1.41	0.24	0.18	2.42	1.78
18	0.00	1.00	0.20	0.15	2.62	1.93
25	0.50	0.71	0.28	0.21	2.90	2.14
35	1.00	0.50	0.40	0.29	3.30	2.43
45	1.50	0.35	0.58	0.42	3.88	2.85
60	2.00	0.25	1.13	0.83	5.01	3.68
80	2.50	0.18	8.50	6.22	13.51	9.90
120	3.00	0.13	76.82	56.25	90.33	66.15
170	3.50	0.09	39.40	28.85	129.73	95.00
200	3.75	0.07	3.54	2.59	133.27	97.59
230	4.00	0.06	0.72	0.53	133.99	98.12

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.50	3.31	3.15	2.86	2.63	2.55	2.11

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.76	0.15	0.88	-5.51	38.75

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 012 -16.25 ft

Analysis Date: 06-18-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,421	51,924	North Carolina State Plane	-16.3 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-4/2 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
148.88	146.47	0.07	0.05	#200 - 1.82 #230 - 1.71			1

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	0.24	0.16	0.24	0.16
4	-2.25	4.76	0.16	0.11	0.40	0.27
5	-2.00	4.00	0.27	0.18	0.67	0.45
7	-1.50	2.83	1.16	0.78	1.83	1.23
10	-1.00	2.00	2.56	1.72	4.39	2.95
14	-0.50	1.41	3.53	2.37	7.92	5.32
18	0.00	1.00	4.87	3.27	12.79	8.59
25	0.50	0.71	15.63	10.50	28.42	19.09
35	1.00	0.50	47.16	31.68	75.58	50.77
45	1.50	0.35	38.95	26.16	114.53	76.93
60	2.00	0.25	18.80	12.63	133.33	89.56
80	2.50	0.18	4.02	2.70	137.35	92.26
120	3.00	0.13	4.38	2.94	141.73	95.20
170	3.50	0.09	3.81	2.56	145.54	97.76
200	3.75	0.07	0.63	0.42	146.17	98.18
230	4.00	0.06	0.16	0.11	146.33	98.29

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.97	1.78	1.46	0.99	0.59	0.35	-0.57

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1	0.50	0.9	-0.17	5.01

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 013 -20 ft

Analysis Date: 06-18-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,179,464	51,631	North Carolina State Plane	-20.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-4/1 Dry - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
150.34	146.85	0.30	0.01	#200 - 3.55 #230 - 2.53			0

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	0.04	0.03	0.04	0.03
4	-2.25	4.76	0.15	0.10	0.19	0.13
5	-2.00	4.00	0.12	0.08	0.31	0.21
7	-1.50	2.83	0.28	0.19	0.59	0.40
10	-1.00	2.00	0.77	0.51	1.36	0.91
14	-0.50	1.41	0.87	0.58	2.23	1.49
18	0.00	1.00	0.75	0.50	2.98	1.99
25	0.50	0.71	1.69	1.12	4.67	3.11
35	1.00	0.50	6.63	4.41	11.30	7.52
45	1.50	0.35	15.29	10.17	26.59	17.69
60	2.00	0.25	24.96	16.60	51.55	34.29
80	2.50	0.18	23.66	15.74	75.21	50.03
120	3.00	0.13	36.99	24.60	112.20	74.63
170	3.50	0.09	27.74	18.45	139.94	93.08
200	3.75	0.07	5.07	3.37	145.01	96.45
230	4.00	0.06	1.53	1.02	146.54	97.47

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.64	3.25	3.01	2.50	1.72	1.42	0.71

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.28	0.21	0.93	-1.11	5.28

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #001

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,062	53,511	North Carolina State Plane	7.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.95	0.00	#200 - 1.92 #230 - 0.95		4	

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	0.04	0.04	0.04	0.04
5	-2.00	4.00	0.04	0.04	0.08	0.08
7	-1.50	2.83	0.06	0.06	0.14	0.14
10	-1.00	2.00	0.05	0.05	0.19	0.19
14	-0.50	1.41	0.02	0.02	0.21	0.21
18	0.00	1.00	0.08	0.08	0.29	0.29
25	0.50	0.71	0.19	0.19	0.48	0.48
35	1.00	0.50	0.47	0.47	0.95	0.95
45	1.50	0.35	0.46	0.46	1.41	1.41
60	2.00	0.25	6.72	6.72	8.13	8.13
80	2.50	0.18	23.67	23.67	31.80	31.80
120	3.00	0.13	23.66	23.66	55.46	55.46
170	3.50	0.09	21.32	21.32	76.78	76.78
200	3.75	0.07	21.30	21.30	98.08	98.08
230	4.00	0.06	0.97	0.97	99.05	99.05

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.71	3.58	3.46	2.88	2.36	2.17	1.77

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.84	0.14	0.67	-1.12	7.59

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #002

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,064	53,496	North Carolina State Plane	5.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.39	0.00	#200 - 0.78 #230 - 0.39		1	

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	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.00	0.00	0.01	0.01
14	-0.50	1.41	0.00	0.00	0.01	0.01
18	0.00	1.00	0.01	0.01	0.02	0.02
25	0.50	0.71	0.02	0.02	0.04	0.04
35	1.00	0.50	0.14	0.14	0.18	0.18
45	1.50	0.35	0.14	0.14	0.32	0.32
60	2.00	0.25	12.34	12.34	12.66	12.66
80	2.50	0.18	32.59	32.59	45.25	45.25
120	3.00	0.13	32.59	32.59	77.84	77.84
170	3.50	0.09	10.69	10.69	88.53	88.53
200	3.75	0.07	10.69	10.69	99.22	99.22
230	4.00	0.06	0.39	0.39	99.61	99.61

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.65	3.29	2.96	2.57	2.19	2.05	1.69

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.61	0.16	0.56	0.18	2.93

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #003

Analysis Date: 07-14-03

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,075	53,428	North Carolina State Plane	3.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.11	0.00	#200 - 0.22 #230 - 0.11		1	

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.00	0.00	0.00	0.00
25	0.50	0.71	0.00	0.00	0.00	0.00
35	1.00	0.50	0.01	0.01	0.01	0.01
45	1.50	0.35	0.01	0.01	0.02	0.02
60	2.00	0.25	5.97	5.97	5.99	5.99
80	2.50	0.18	39.91	39.91	45.90	45.90
120	3.00	0.13	39.90	39.90	85.80	85.80
170	3.50	0.09	6.99	6.99	92.79	92.79
200	3.75	0.07	6.99	6.99	99.78	99.78
230	4.00	0.06	0.11	0.11	99.89	99.89

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.58	2.98	2.86	2.55	2.24	2.13	1.92

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.59	0.17	0.45	0.55	3.14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #004

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,078	53,407	North Carolina State Plane	1.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.37	0.00	#200 - 0.75 #230 - 0.37		1	

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.00	0.00	0.00	0.00
25	0.50	0.71	0.01	0.01	0.01	0.01
35	1.00	0.50	2.35	2.35	2.36	2.36
45	1.50	0.35	2.35	2.35	4.71	4.71
60	2.00	0.25	34.93	34.93	39.64	39.64
80	2.50	0.18	24.75	24.75	64.39	64.39
120	3.00	0.13	24.75	24.75	89.14	89.14
170	3.50	0.09	5.06	5.06	94.20	94.20
200	3.75	0.07	5.05	5.05	99.25	99.25
230	4.00	0.06	0.38	0.38	99.63	99.63

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.54	2.90	2.71	2.21	1.79	1.66	1.50

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.27	0.21	0.62	0.27	2.97

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #005

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,084	53,369	North Carolina State Plane	-1.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.57	0.00	#200 - 1.14 #230 - 0.57		1	

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	0.17	0.17	0.17	0.17
5	-2.00	4.00	0.00	0.00	0.17	0.17
7	-1.50	2.83	0.00	0.00	0.17	0.17
10	-1.00	2.00	0.00	0.00	0.17	0.17
14	-0.50	1.41	0.03	0.03	0.20	0.20
18	0.00	1.00	0.06	0.06	0.26	0.26
25	0.50	0.71	0.24	0.24	0.50	0.50
35	1.00	0.50	8.54	8.54	9.04	9.04
45	1.50	0.35	8.54	8.54	17.58	17.58
60	2.00	0.25	30.97	30.97	48.55	48.55
80	2.50	0.18	19.42	19.42	67.97	67.97
120	3.00	0.13	19.42	19.42	87.39	87.39
170	3.50	0.09	5.74	5.74	93.13	93.13
200	3.75	0.07	5.73	5.73	98.86	98.86
230	4.00	0.06	0.57	0.57	99.43	99.43

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.58	2.91	2.68	2.04	1.62	1.41	0.76

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.11	0.23	0.79	-0.2	4.14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #006

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,092	53,315	North Carolina State Plane	-3.0 NAVD 88

USCS:	Munsell:	Comments:
SW		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.57	0.00	#200 - 1.15 #230 - 0.57		8	

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	0.88	0.88	0.88	0.88
4	-2.25	4.76	0.20	0.20	1.08	1.08
5	-2.00	4.00	0.00	0.00	1.08	1.08
7	-1.50	2.83	0.04	0.04	1.12	1.12
10	-1.00	2.00	0.03	0.03	1.15	1.15
14	-0.50	1.41	0.01	0.01	1.16	1.16
18	0.00	1.00	0.06	0.06	1.22	1.22
25	0.50	0.71	0.30	0.30	1.52	1.52
35	1.00	0.50	3.58	3.58	5.10	5.10
45	1.50	0.35	3.58	3.58	8.68	8.68
60	2.00	0.25	26.74	26.74	35.42	35.42
80	2.50	0.18	23.67	23.67	59.09	59.09
120	3.00	0.13	23.67	23.67	82.76	82.76
170	3.50	0.09	8.05	8.05	90.81	90.81
200	3.75	0.07	8.04	8.04	98.85	98.85
230	4.00	0.06	0.58	0.58	99.43	99.43

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.63	3.08	2.84	2.31	1.81	1.64	0.99

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.28	0.21	0.88	-1.88	12.23

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #007

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,097	53,282	North Carolina State Plane	-5.0 NAVD 88

USCS:	Munsell:	Comments:
SW		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.48	0.01	#200 - 0.98 #230 - 0.49		14	

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	5.43	5.43	5.43	5.43
5/16"	-3.00	8.00	0.00	0.00	5.43	5.43
3.5	-2.50	5.66	0.00	0.00	5.43	5.43
4	-2.25	4.76	0.00	0.00	5.43	5.43
5	-2.00	4.00	0.00	0.00	5.43	5.43
7	-1.50	2.83	0.04	0.04	5.47	5.47
10	-1.00	2.00	0.04	0.04	5.51	5.51
14	-0.50	1.41	0.04	0.04	5.55	5.55
18	0.00	1.00	0.10	0.10	5.65	5.65
25	0.50	0.71	0.31	0.31	5.96	5.96
35	1.00	0.50	6.02	6.02	11.98	11.98
45	1.50	0.35	6.01	6.01	17.99	17.99
60	2.00	0.25	42.95	42.95	60.94	60.94
80	2.50	0.18	16.72	16.72	77.66	77.66
120	3.00	0.13	16.72	16.72	94.38	94.38
170	3.50	0.09	2.32	2.32	96.70	96.70
200	3.75	0.07	2.32	2.32	99.02	99.02
230	4.00	0.06	0.49	0.49	99.51	99.51

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.13	2.69	2.42	1.87	1.58	1.33	-2.18

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.69	0.31	1.45	-2.72	10.94

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #008

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,127	53,089	North Carolina State Plane	-7.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.51	0.00	#200 - 1.03 #230 - 0.51		5	

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	0.45	0.45	0.45	0.45
5	-2.00	4.00	0.00	0.00	0.45	0.45
7	-1.50	2.83	0.15	0.15	0.60	0.60
10	-1.00	2.00	0.15	0.15	0.75	0.75
14	-0.50	1.41	0.28	0.28	1.03	1.03
18	0.00	1.00	0.43	0.43	1.46	1.46
25	0.50	0.71	0.61	0.61	2.07	2.07
35	1.00	0.50	5.67	5.67	7.74	7.74
45	1.50	0.35	4.66	4.66	12.40	12.40
60	2.00	0.25	31.29	31.29	43.69	43.69
80	2.50	0.18	21.72	21.72	65.41	65.41
120	3.00	0.13	21.71	21.71	87.12	87.12
170	3.50	0.09	5.93	5.93	93.05	93.05
200	3.75	0.07	5.92	5.92	98.97	98.97
230	4.00	0.06	0.52	0.52	99.49	99.49

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.58	2.93	2.72	2.15	1.70	1.56	0.76

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.16	0.22	0.84	-1.05	7.28

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #009

Analysis Date: 07-15-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,137	53,027	North Carolina State Plane	-9.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.39	0.01	#200 - 0.80 #230 - 0.40		1	

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	0.01	0.01	0.01	0.01
10	-1.00	2.00	0.00	0.00	0.01	0.01
14	-0.50	1.41	0.05	0.05	0.06	0.06
18	0.00	1.00	0.07	0.07	0.13	0.13
25	0.50	0.71	0.17	0.17	0.30	0.30
35	1.00	0.50	2.24	2.24	2.54	2.54
45	1.50	0.35	2.24	2.24	4.78	4.78
60	2.00	0.25	14.74	14.74	19.52	19.52
80	2.50	0.18	25.62	25.62	45.14	45.14
120	3.00	0.13	25.62	25.62	70.76	70.76
170	3.50	0.09	14.22	14.22	84.98	84.98
200	3.75	0.07	14.22	14.22	99.20	99.20
230	4.00	0.06	0.40	0.40	99.60	99.60

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.68	3.47	3.15	2.59	2.11	1.88	1.51

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.59	0.17	0.71	-0.4	3.19

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #010

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,149	52,951	North Carolina State Plane	-11.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.53	0.00	#200 - 1.07 #230 - 0.53		1	

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	0.04	0.04	0.04	0.04
14	-0.50	1.41	0.04	0.04	0.08	0.08
18	0.00	1.00	0.07	0.07	0.15	0.15
25	0.50	0.71	0.12	0.12	0.27	0.27
35	1.00	0.50	0.26	0.26	0.53	0.53
45	1.50	0.35	1.68	1.68	2.21	2.21
60	2.00	0.25	11.65	11.65	13.86	13.86
80	2.50	0.18	23.44	23.44	37.30	37.30
120	3.00	0.13	23.43	23.43	60.73	60.73
170	3.50	0.09	19.10	19.10	79.83	79.83
200	3.75	0.07	19.10	19.10	98.93	98.93
230	4.00	0.06	0.54	0.54	99.47	99.47

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.70	3.55	3.37	2.77	2.24	2.05	1.62

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.75	0.15	0.67	-0.46	3.23

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #011

Analysis Date: 08-05-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,202	52,603	North Carolina State Plane	-13.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.73	0.00	#200 - 1.46 #230 - 0.73			

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	0.08	0.08	0.08	0.08
5	-2.00	4.00	0.00	0.00	0.08	0.08
7	-1.50	2.83	0.06	0.06	0.14	0.14
10	-1.00	2.00	0.06	0.06	0.20	0.20
14	-0.50	1.41	0.09	0.09	0.29	0.29
18	0.00	1.00	0.12	0.12	0.41	0.41
25	0.50	0.71	0.22	0.22	0.63	0.63
35	1.00	0.50	0.95	0.95	1.58	1.58
45	1.50	0.35	0.95	0.95	2.53	2.53
60	2.00	0.25	3.83	3.83	6.36	6.36
80	2.50	0.18	18.54	18.54	24.90	24.90
120	3.00	0.13	18.54	18.54	43.44	43.44
170	3.50	0.09	27.55	27.55	70.99	70.99
200	3.75	0.07	27.55	27.55	98.54	98.54
230	4.00	0.06	0.73	0.73	99.27	99.27

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.72	3.62	3.54	3.12	2.50	2.26	1.82

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.95	0.13	0.69	-1.67	9.11

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #012

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,222	52,475	North Carolina State Plane	-15.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.92	0.00	#200 - 1.85 #230 - 0.92		1	

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	0.04	0.04	0.04	0.04
5	-2.00	4.00	0.00	0.00	0.04	0.04
7	-1.50	2.83	0.06	0.06	0.10	0.10
10	-1.00	2.00	0.06	0.06	0.16	0.16
14	-0.50	1.41	0.17	0.17	0.33	0.33
18	0.00	1.00	0.22	0.22	0.55	0.55
25	0.50	0.71	0.40	0.40	0.95	0.95
35	1.00	0.50	0.92	0.92	1.87	1.87
45	1.50	0.35	0.92	0.92	2.79	2.79
60	2.00	0.25	2.91	2.91	5.70	5.70
80	2.50	0.18	15.43	15.43	21.13	21.13
120	3.00	0.13	15.42	15.42	36.55	36.55
170	3.50	0.09	30.80	30.80	67.35	67.35
200	3.75	0.07	30.80	30.80	98.15	98.15
230	4.00	0.06	0.93	0.93	99.08	99.08

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.72	3.64	3.56	3.22	2.63	2.33	1.88

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	3.02	0.12	0.69	-1.94	9.55

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #013

Analysis Date: 08-05-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,244	52,332	North Carolina State Plane	-17.0 NAVD 88

USCS:	Munsell:	Comments:
SP		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	1.85	0.00	#200 - 3.70 #230 - 1.85			

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	0.02	0.02	0.02	0.02
10	-1.00	2.00	0.01	0.01	0.03	0.03
14	-0.50	1.41	0.02	0.02	0.05	0.05
18	0.00	1.00	0.03	0.03	0.08	0.08
25	0.50	0.71	0.06	0.06	0.14	0.14
35	1.00	0.50	0.21	0.21	0.35	0.35
45	1.50	0.35	0.20	0.20	0.55	0.55
60	2.00	0.25	1.05	1.05	1.60	1.60
80	2.50	0.18	13.51	13.51	15.11	15.11
120	3.00	0.13	13.51	13.51	28.62	28.62
170	3.50	0.09	33.84	33.84	62.46	62.46
200	3.75	0.07	33.84	33.84	96.30	96.30
230	4.00	0.06	1.85	1.85	98.15	98.15

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.74	3.66	3.59	3.32	2.87	2.53	2.13

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	3.15	0.11	0.53	-1.41	6.77

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #014

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,265	52,201	North Carolina State Plane	-19.0 NAVD 88

USCS:	Munsell:	Comments:

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	3.07	0.00	#200 - 6.14 #230 - 3.07		2	

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	0.05	0.05	0.05	0.05
5	-2.00	4.00	0.00	0.00	0.05	0.05
7	-1.50	2.83	0.03	0.03	0.08	0.08
10	-1.00	2.00	0.02	0.02	0.10	0.10
14	-0.50	1.41	0.06	0.06	0.16	0.16
18	0.00	1.00	0.07	0.07	0.23	0.23
25	0.50	0.71	0.16	0.16	0.39	0.39
35	1.00	0.50	0.53	0.53	0.92	0.92
45	1.50	0.35	0.52	0.52	1.44	1.44
60	2.00	0.25	2.16	2.16	3.60	3.60
80	2.50	0.18	8.88	8.88	12.48	12.48
120	3.00	0.13	8.88	8.88	21.36	21.36
170	3.50	0.09	36.25	36.25	57.61	57.61
200	3.75	0.07	36.25	36.25	93.86	93.86
230	4.00	0.06	3.07	3.07	96.93	96.93

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.84	3.68	3.62	3.40	3.05	2.70	2.08

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	3.2	0.11	0.59	-2.43	13.58

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: USACE OIB040 #015

Analysis Date: 07-14-13

Analyzed By: ATP

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Boca Raton, FL 33431
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Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,181,290	52,037	North Carolina State Plane	-21.0 NAVD 88

USCS:	Munsell:	Comments:

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	3.25	0.00	#200 - 6.50 #230 - 3.25		2	

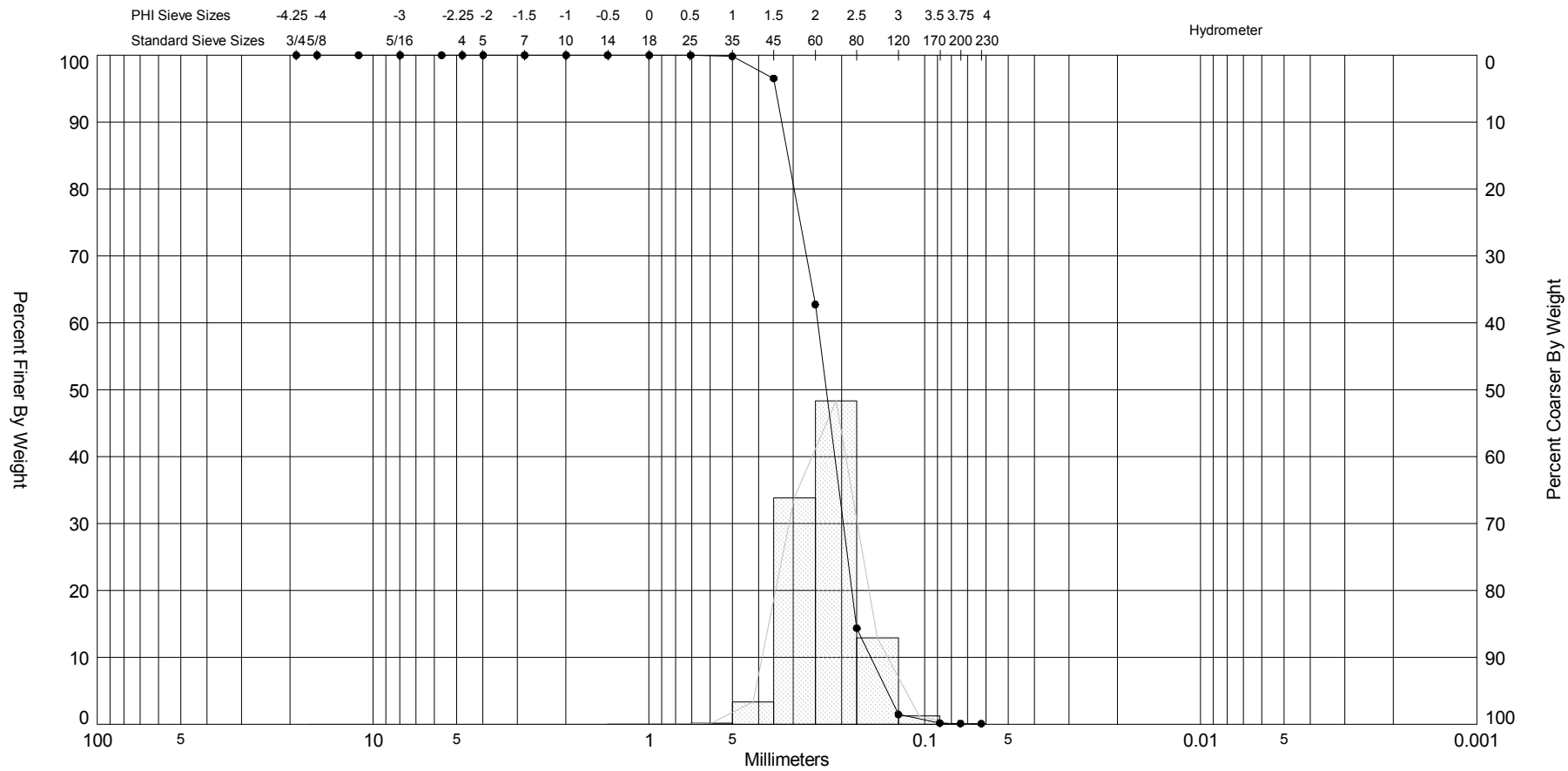
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.08	0.08	0.08	0.08
5	-2.00	4.00	0.00	0.00	0.08	0.08
7	-1.50	2.83	0.17	0.17	0.25	0.25
10	-1.00	2.00	0.16	0.16	0.41	0.41
14	-0.50	1.41	0.29	0.29	0.70	0.70
18	0.00	1.00	0.23	0.23	0.93	0.93
25	0.50	0.71	0.39	0.39	1.32	1.32
35	1.00	0.50	1.61	1.61	2.93	2.93
45	1.50	0.35	1.61	1.61	4.54	4.54
60	2.00	0.25	6.06	6.06	10.60	10.60
80	2.50	0.18	13.19	13.19	23.79	23.79
120	3.00	0.13	13.19	13.19	36.98	36.98
170	3.50	0.09	28.26	28.26	65.24	65.24
200	3.75	0.07	28.26	28.26	93.50	93.50
230	4.00	0.06	3.25	3.25	96.75	96.75

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.87	3.67	3.59	3.23	2.55	2.20	1.54

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.95	0.13	0.82	-1.91	8.71

APPENDIX 3
CPE-NC INDIVIDUAL BEACH GRAIN SIZE DISTRIBUTION CURVES/HISTOGRAMS



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 001 DUNE	—●—	9.3	SP	#200 - 0.11 #230 - 0.10			2.13	2.12	0.15	3.43	0.39

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-11-13
Analyzed By:	ATP
Easting (X, ft):	2,184,977
Northing (Y, ft):	54,878
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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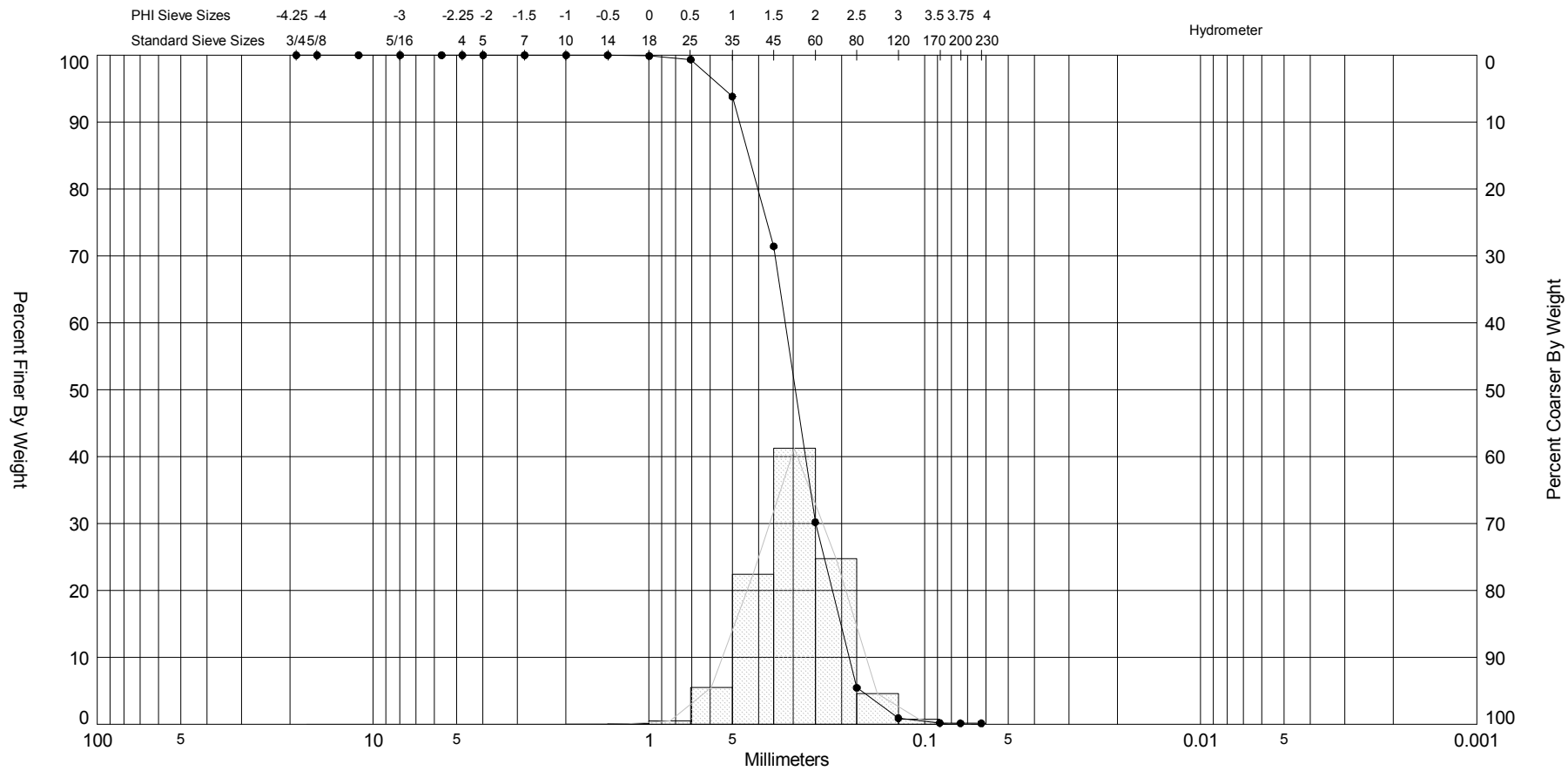

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 002 TOD	—●—	7.2	SP	#200 - 0.15 #230 - 0.14			1.76	1.75	-0.07	3.44	0.5

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-11-13
Analyzed By:	ATP
Easting (X, ft):	2,184,983
Northing (Y, ft):	54,868
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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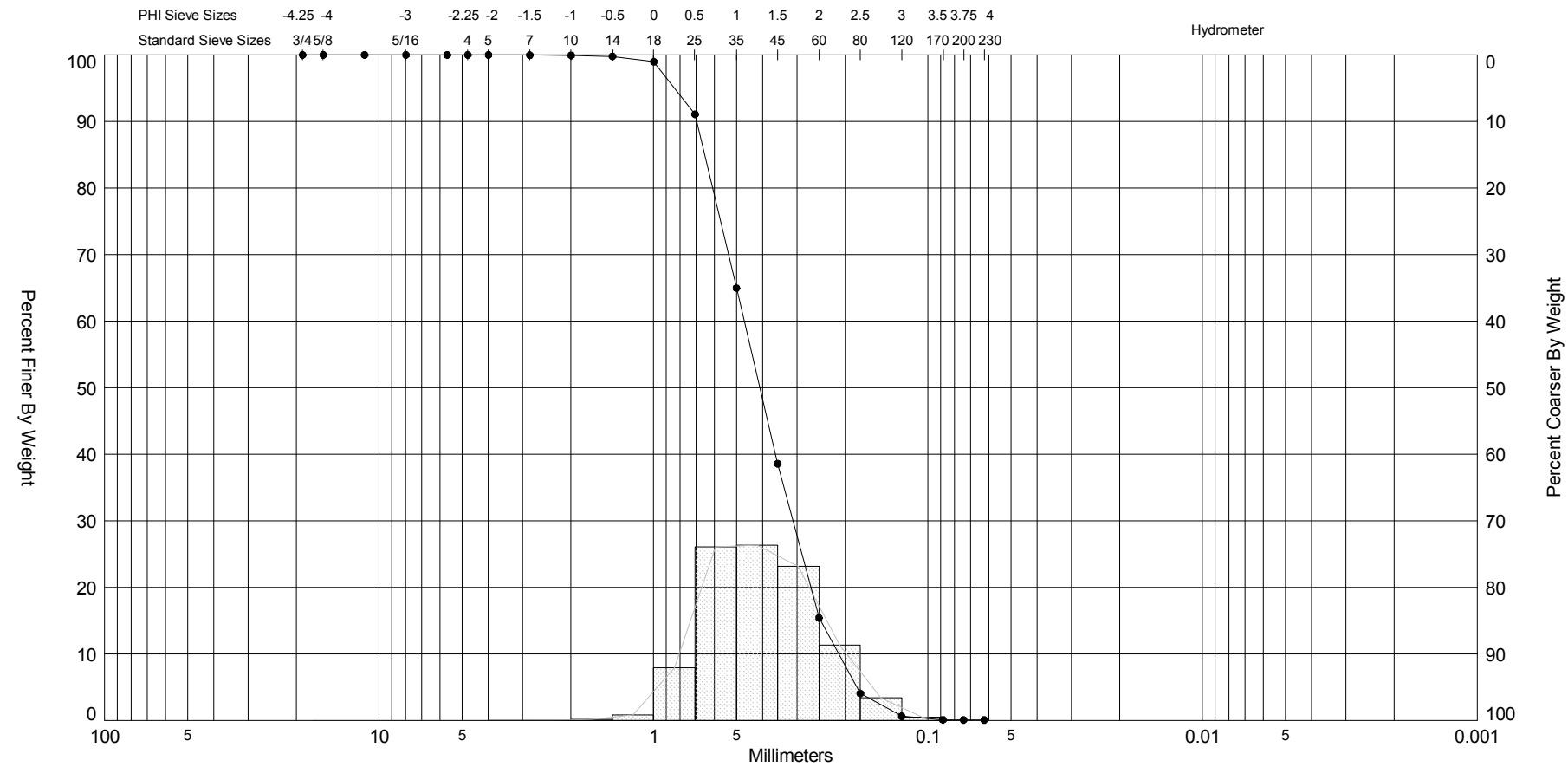

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 003MIDBERM	—●—	6.6	SP	#200 - 0.08 #230 - 0.08			1.28	1.32	0.19	2.91	0.66

Comments: Average wet Munsell Value is 6. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-11-13
Analyzed By:	ATP
Easting (X, ft):	2,184,984
Northing (Y, ft):	54,833
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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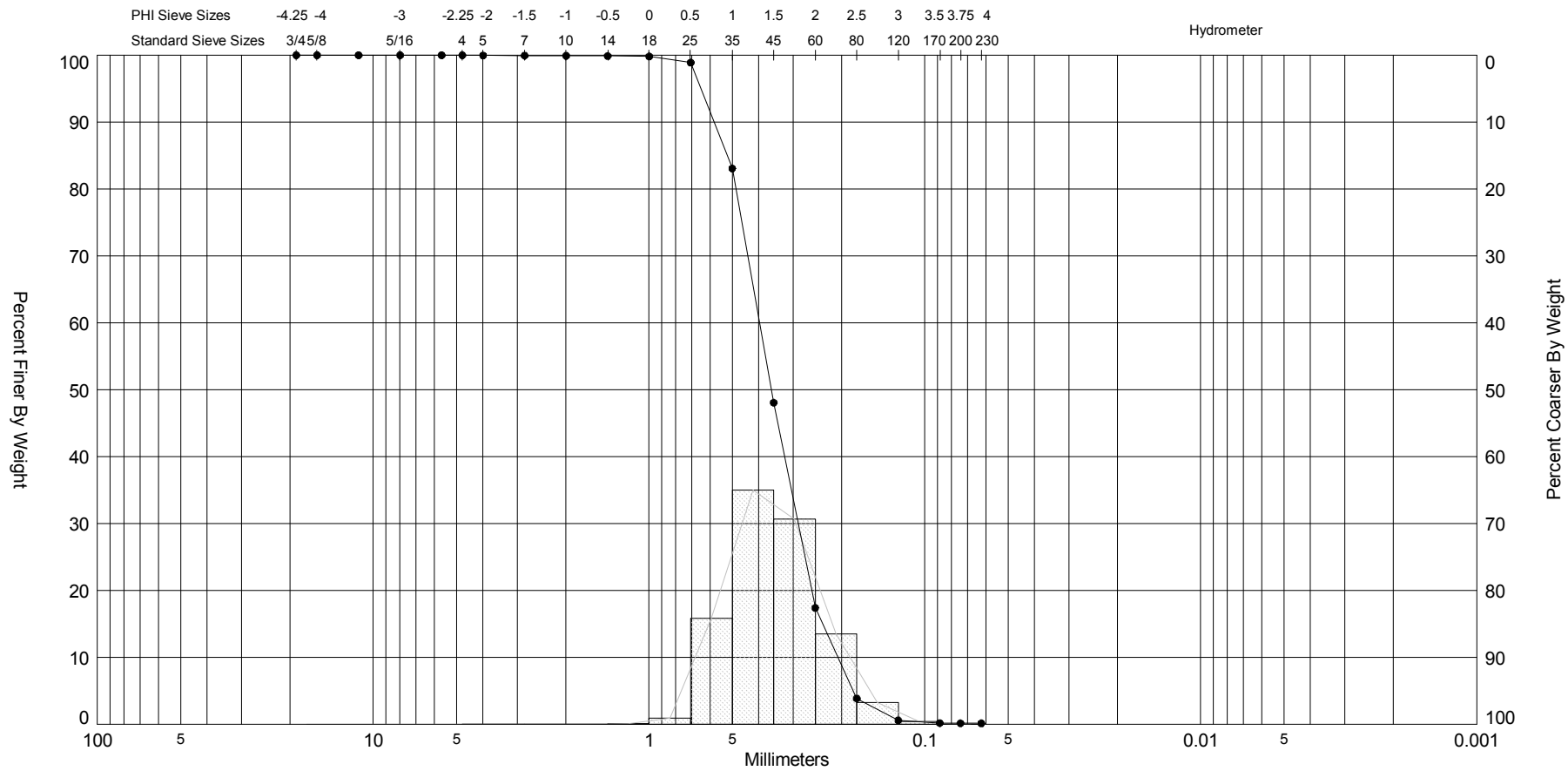

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 004BERMCRST	—●—	7.0	SP	#200 - 0.15 #230 - 0.14			1.47	1.5	0.11	4.08	0.55

Comments: Average wet Munsell Value is 6. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-11-13
Analyzed By:	ATP
Easting (X, ft):	2,184,987
Northing (Y, ft):	54,793
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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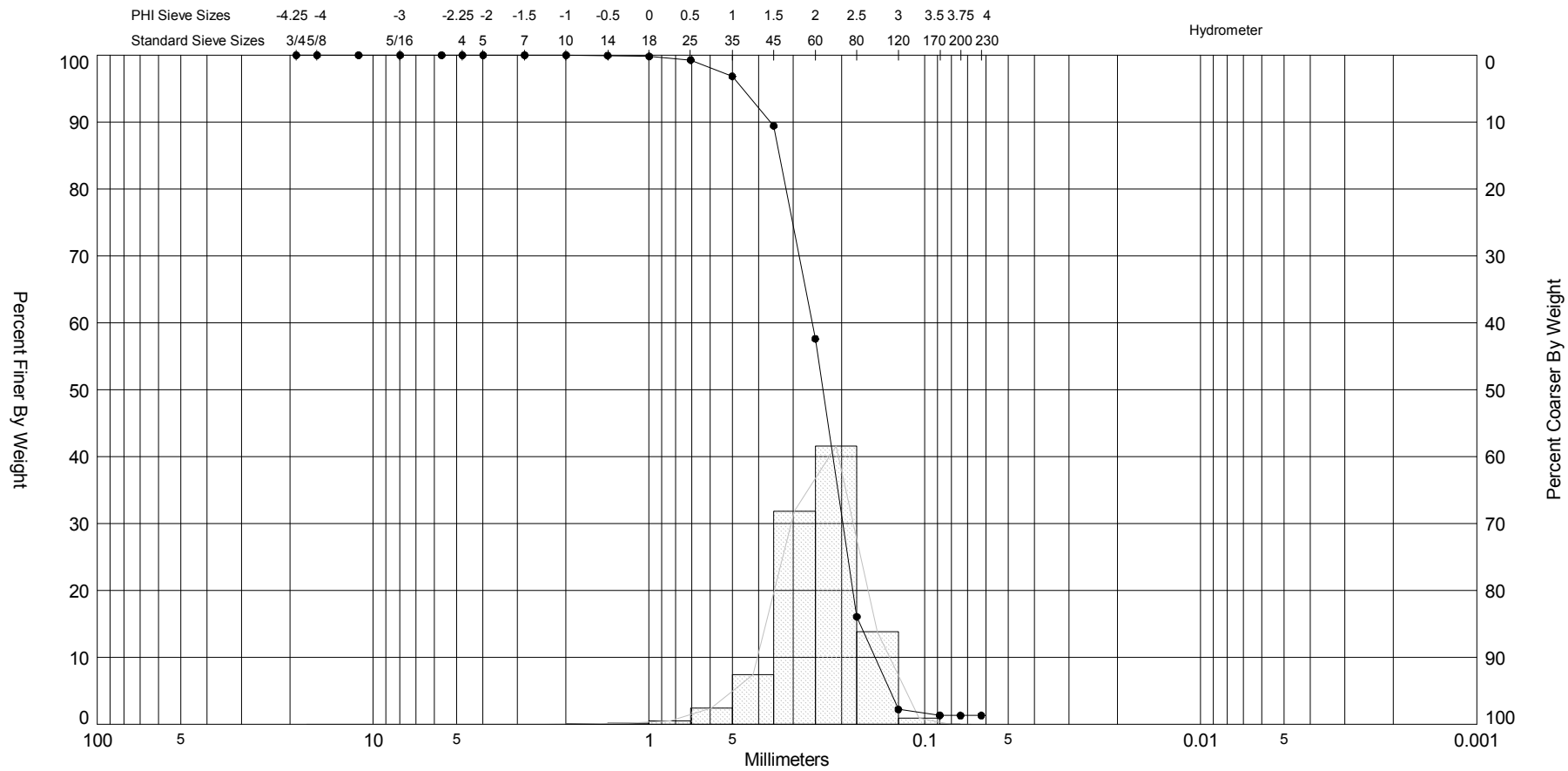

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 005 MHW	—●—	1.3	SP	#200 - 1.30 #230 - 1.30			2.09	2.04	-0.7	4.64	0.5

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-04-14
Analyzed By:	TM
Easting (X, ft):	2,184,989
Northing (Y, ft):	54,767
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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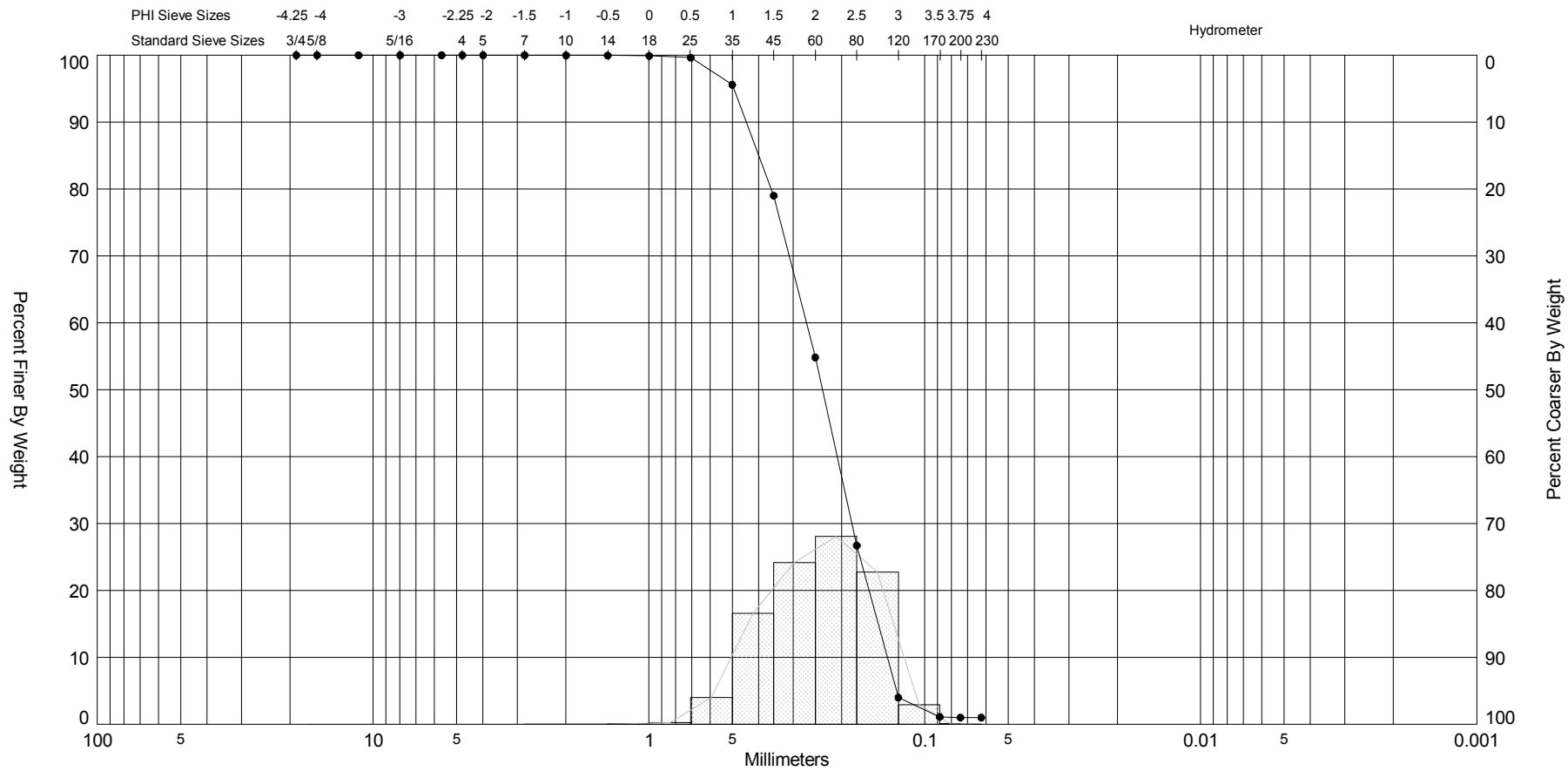

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 006 MTL	—●—	0.3	SP	#200 - 1.01 #230 - 1.00			2.09	2.04	-0.28	2.69	0.62

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-10-13
Analyzed By:	ATP
Easting (X, ft):	2,184,995
Northing (Y, ft):	54,729
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

Comments:

Depths and elevations based on measured values

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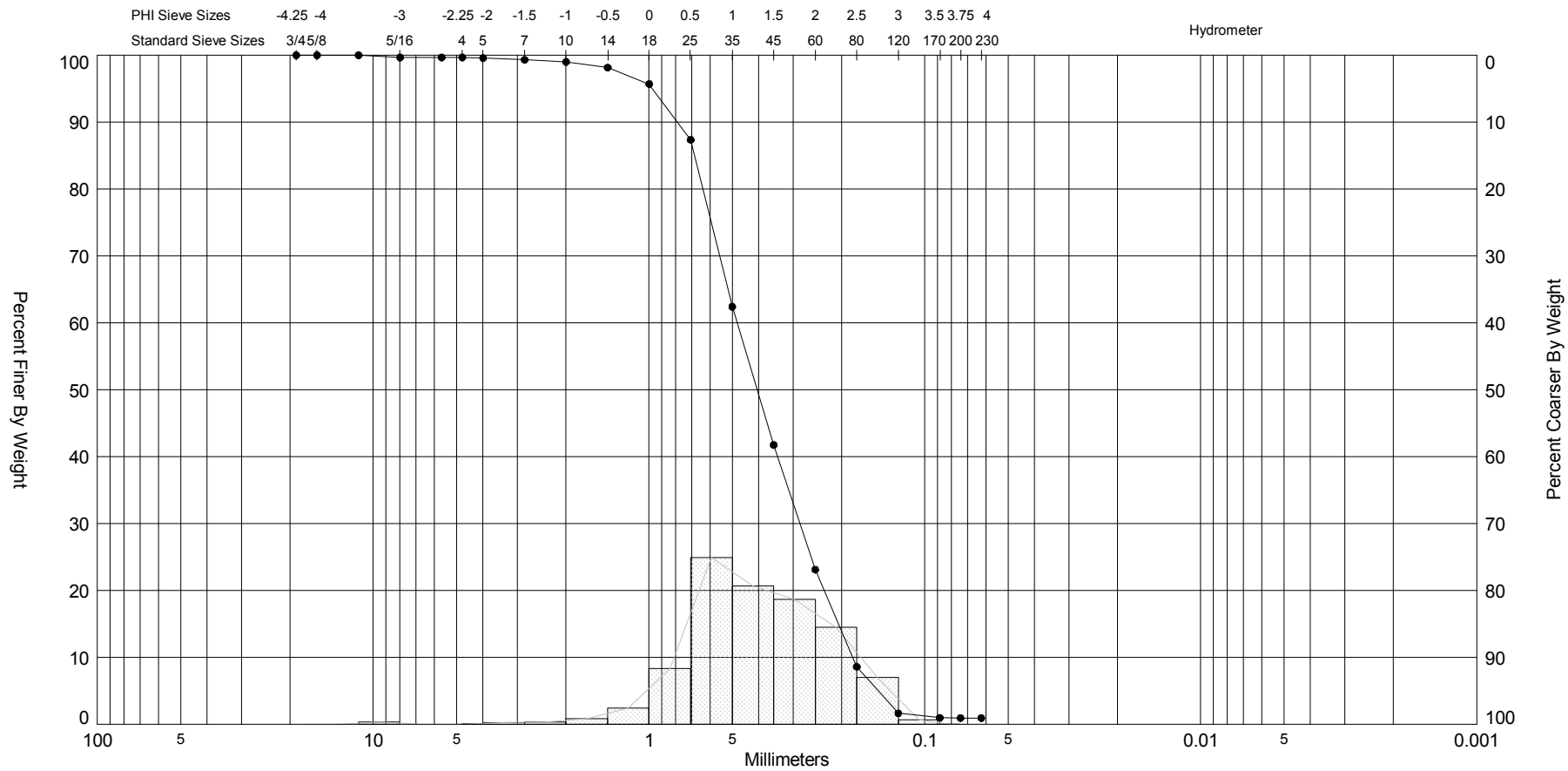

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 007 MLW	—●—	-3.1	SW	#200 - 0.94 #230 - 0.94			1.3	1.31	-0.64	5.4	0.86

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-12-13
Analyzed By:	ATP
Easting (X, ft):	2,185,017
Northing (Y, ft):	54,549
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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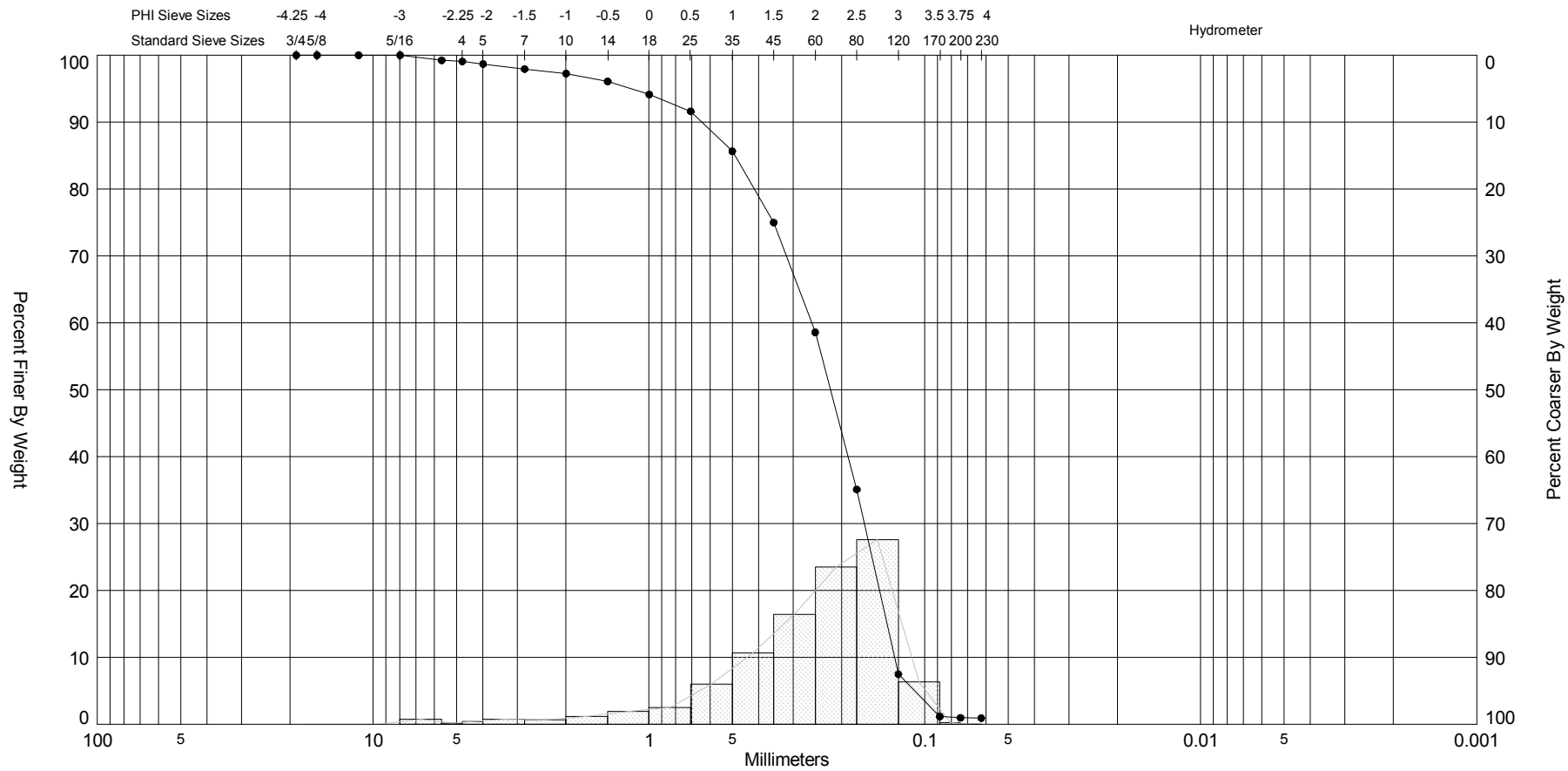

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 008TROUGH	—●—	-5.0	SW	#200 - 0.96 #230 - 0.93			2.18	1.92	-1.71	6.82	1.07

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-12-13
Analyzed By:	ATP
Easting (X, ft):	2,185,027
Northing (Y, ft):	54,507
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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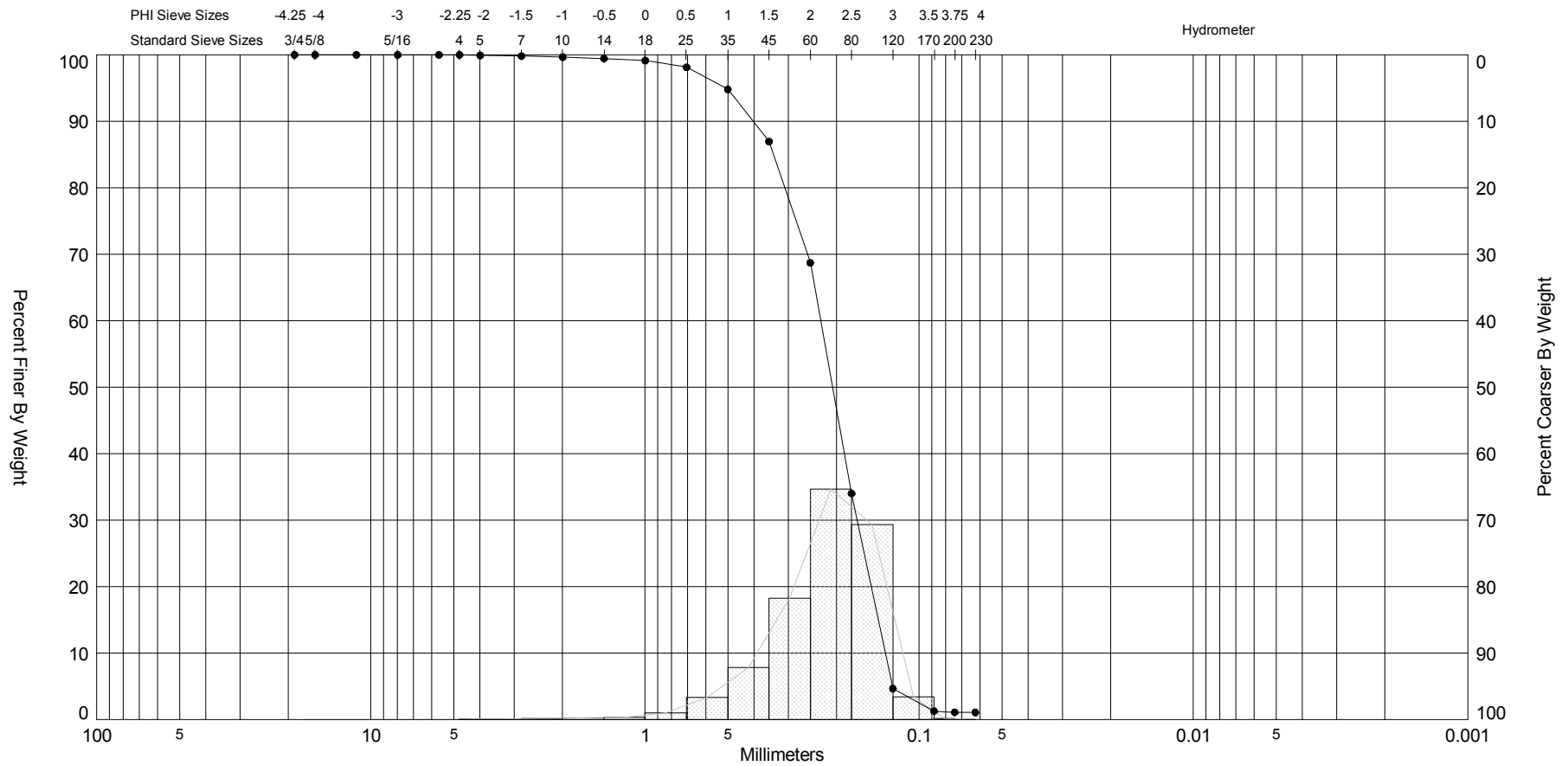

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 009 BARCRST	—●—	-6.5	SP	#200 - 1.10 #230 - 1.08			2.27	2.17	-1.45	7.49	0.66

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	03-17-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

Comments:

Depths and elevations based on measured values

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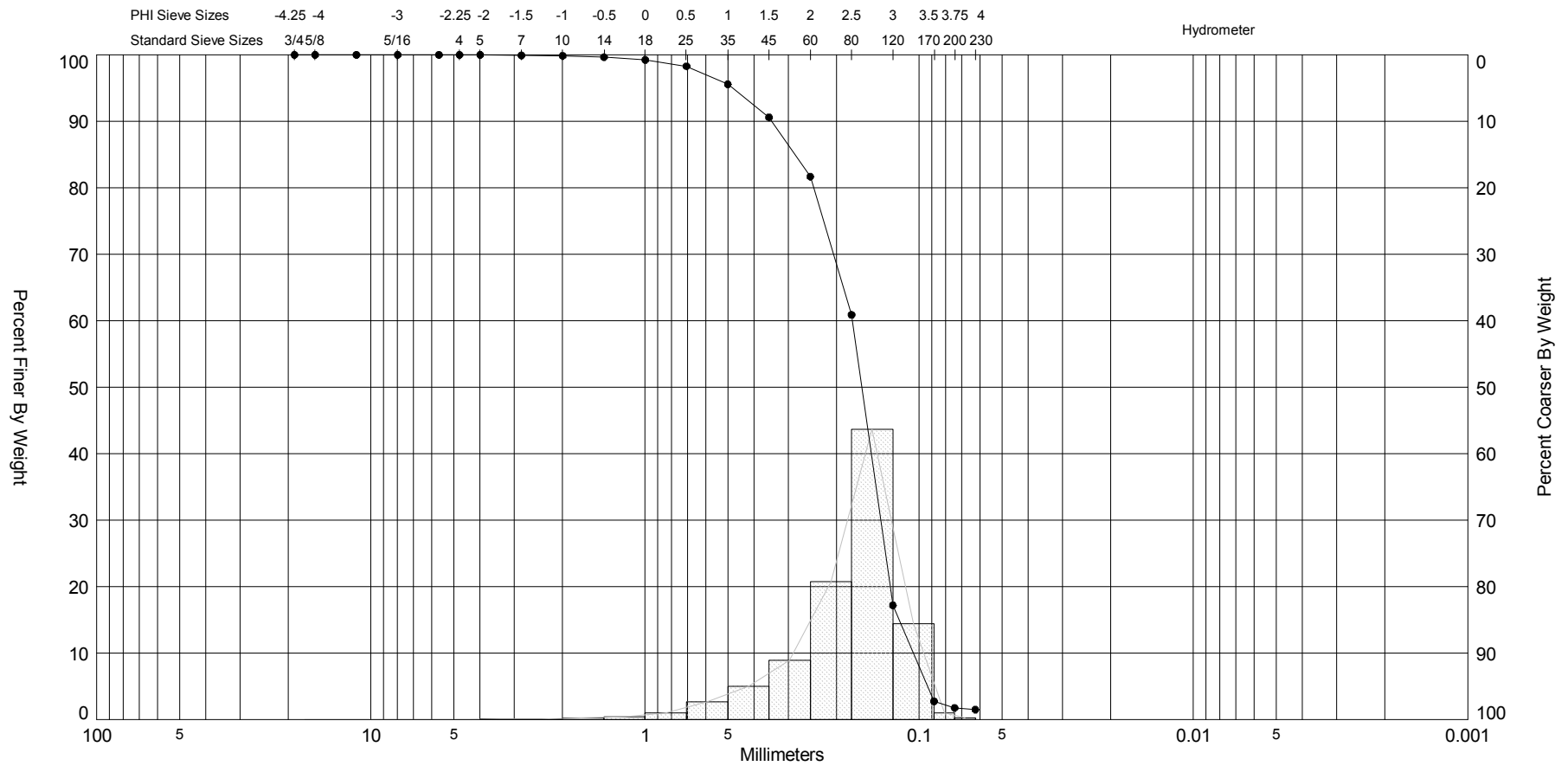

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 010 (-8.75 ft)	—●—	-8.8	SP	#200 - 1.76 #230 - 1.51			2.62	2.46	-1.5	6.51	0.69

Comments:

Depths and elevations based on measured values

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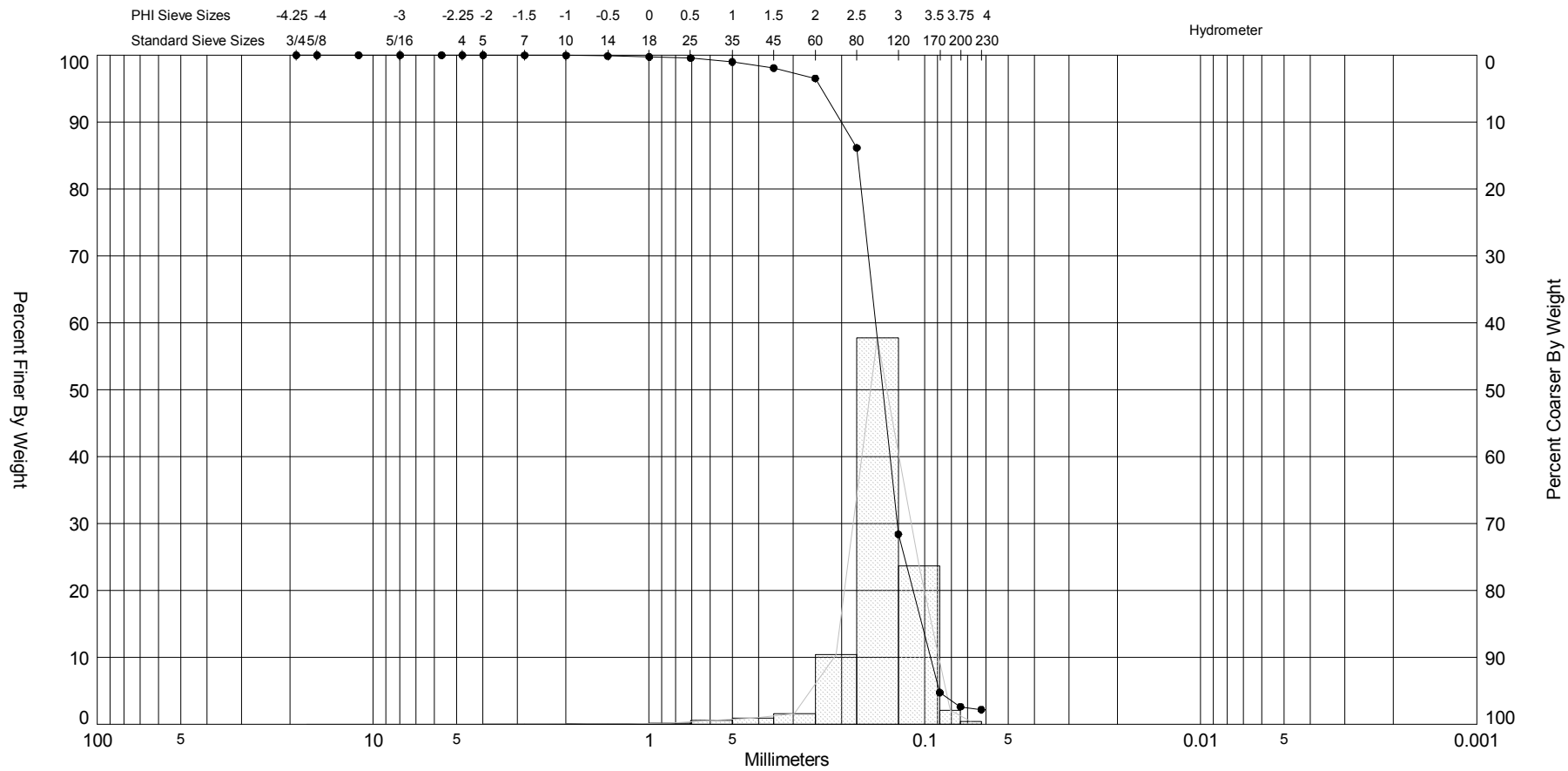
Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,184,983
Northing (Y, ft):	54,082
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

SIEVE ANALYSIS OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 011 (-12.5 ft)	—●—	-12.5	SP	#200 - 2.62 #230 - 2.20			2.81	2.79	-2.2	15.12	0.46

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,185,004
Northing (Y, ft):	53,858
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

Comments:

Depths and elevations based on measured values

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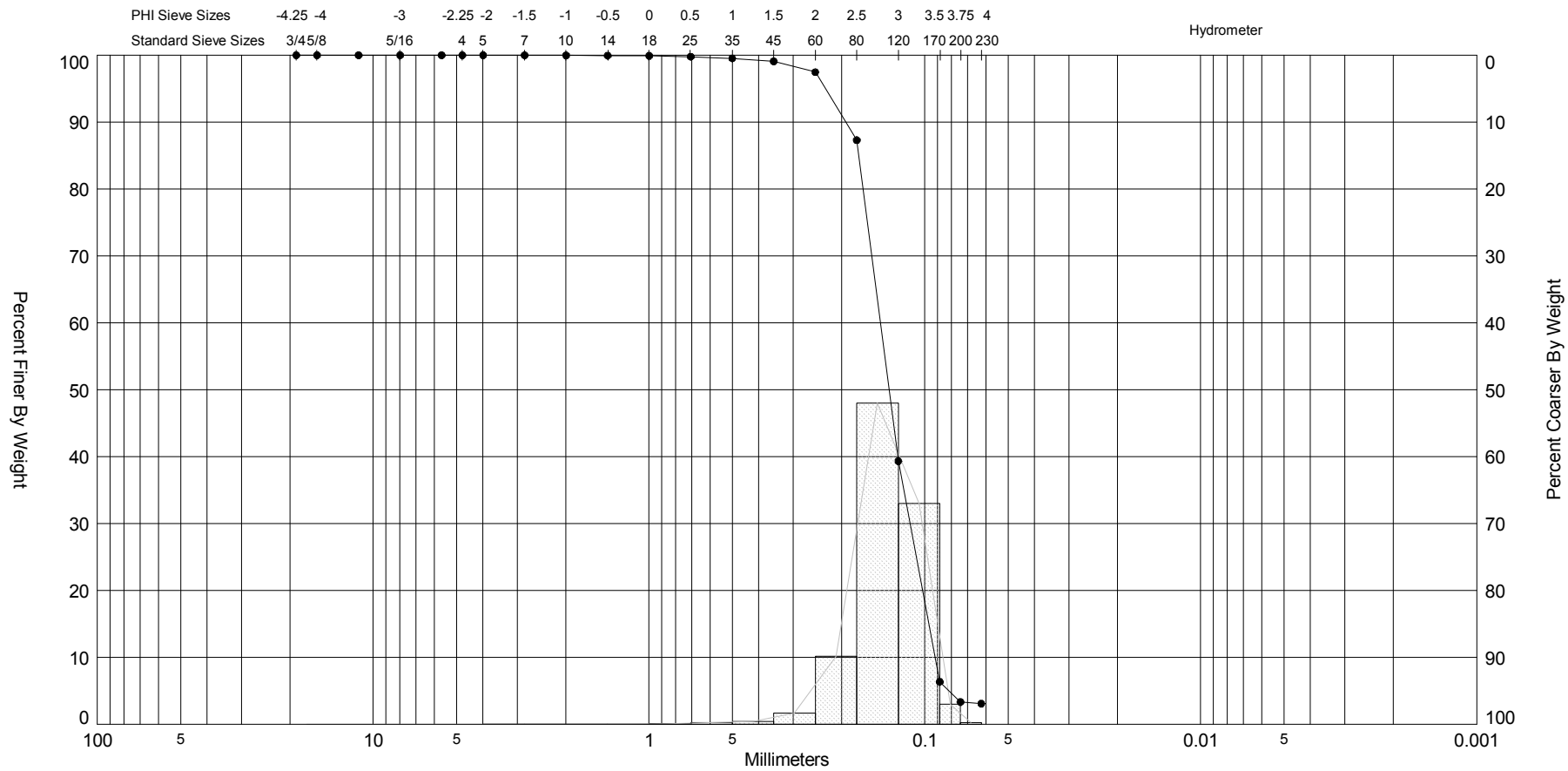

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 012 (-16.25 ft)	—●—	-16.3	SP	#200 - 3.34 #230 - 3.09			2.89	2.86	-1.61	11.57	0.43

Comments:

Depths and elevations based on measured values

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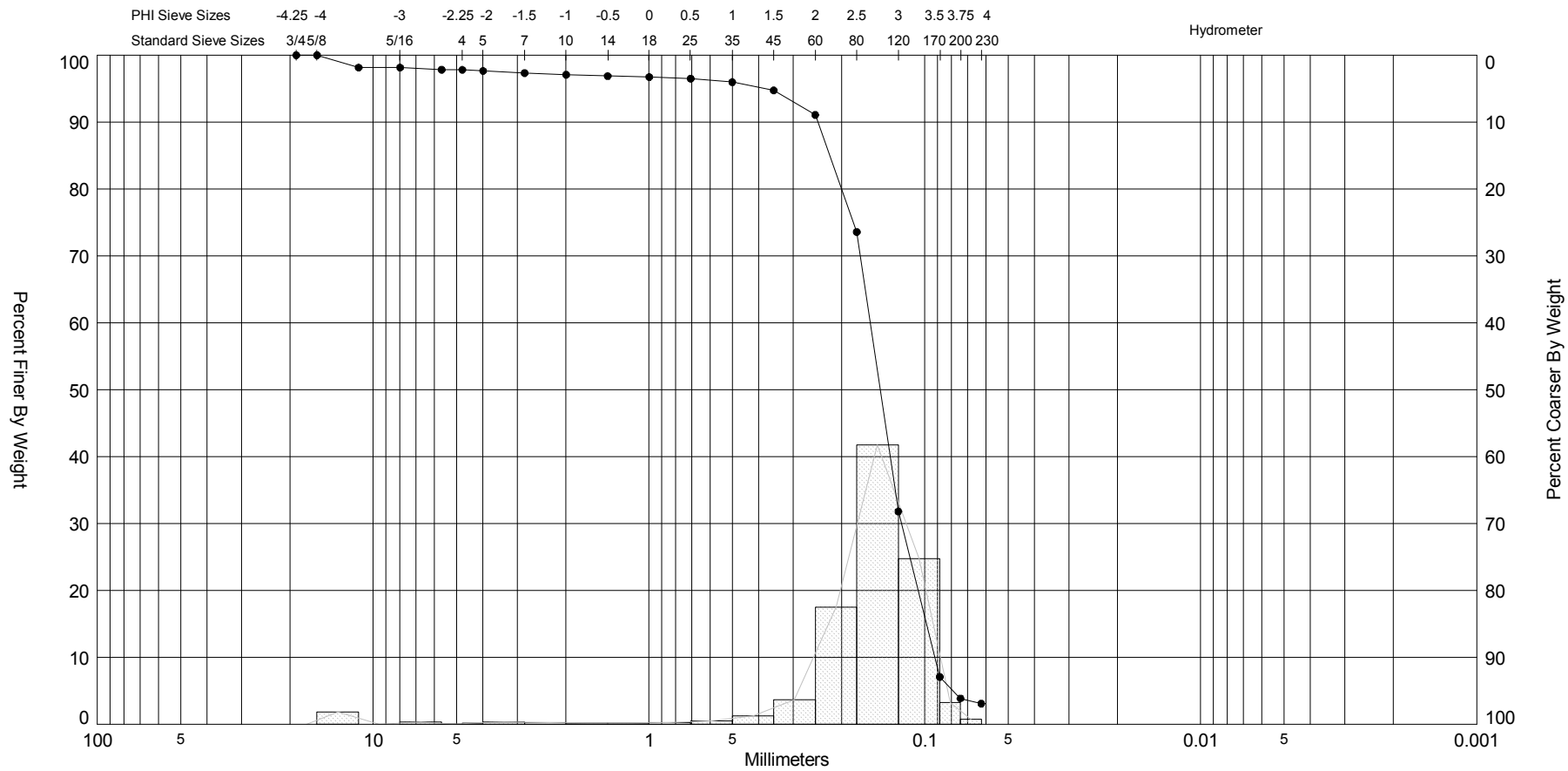
Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,185,049
Northing (Y, ft):	53,253
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

SIEVE ANALYSIS OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 013 (-20 ft)	—●—	-20.0	SW	#200 - 3.87 #230 - 3.08			2.78	2.56	-3.99	21.08	1.14

Comments:

Depths and elevations based on measured values

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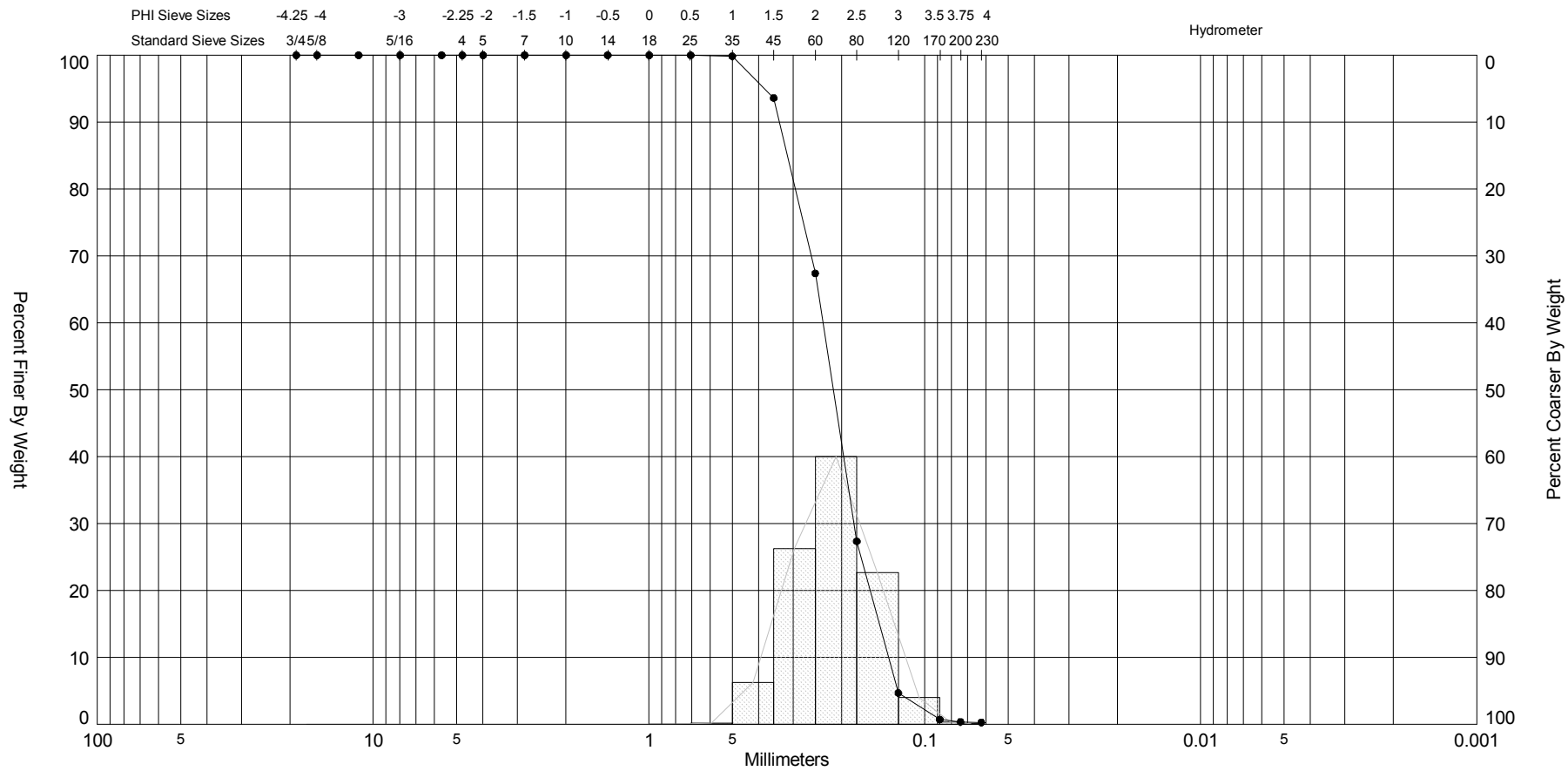
Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,185,111
Northing (Y, ft):	52,713
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

SIEVE ANALYSIS OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 001 DUNE	—●—	15.2	SP	#200 - 0.36 #230 - 0.28			2.22	2.21	0.05	2.85	0.49

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-10-13
Analyzed By:	ATP
Easting (X, ft):	2,183,878
Northing (Y, ft):	54,341
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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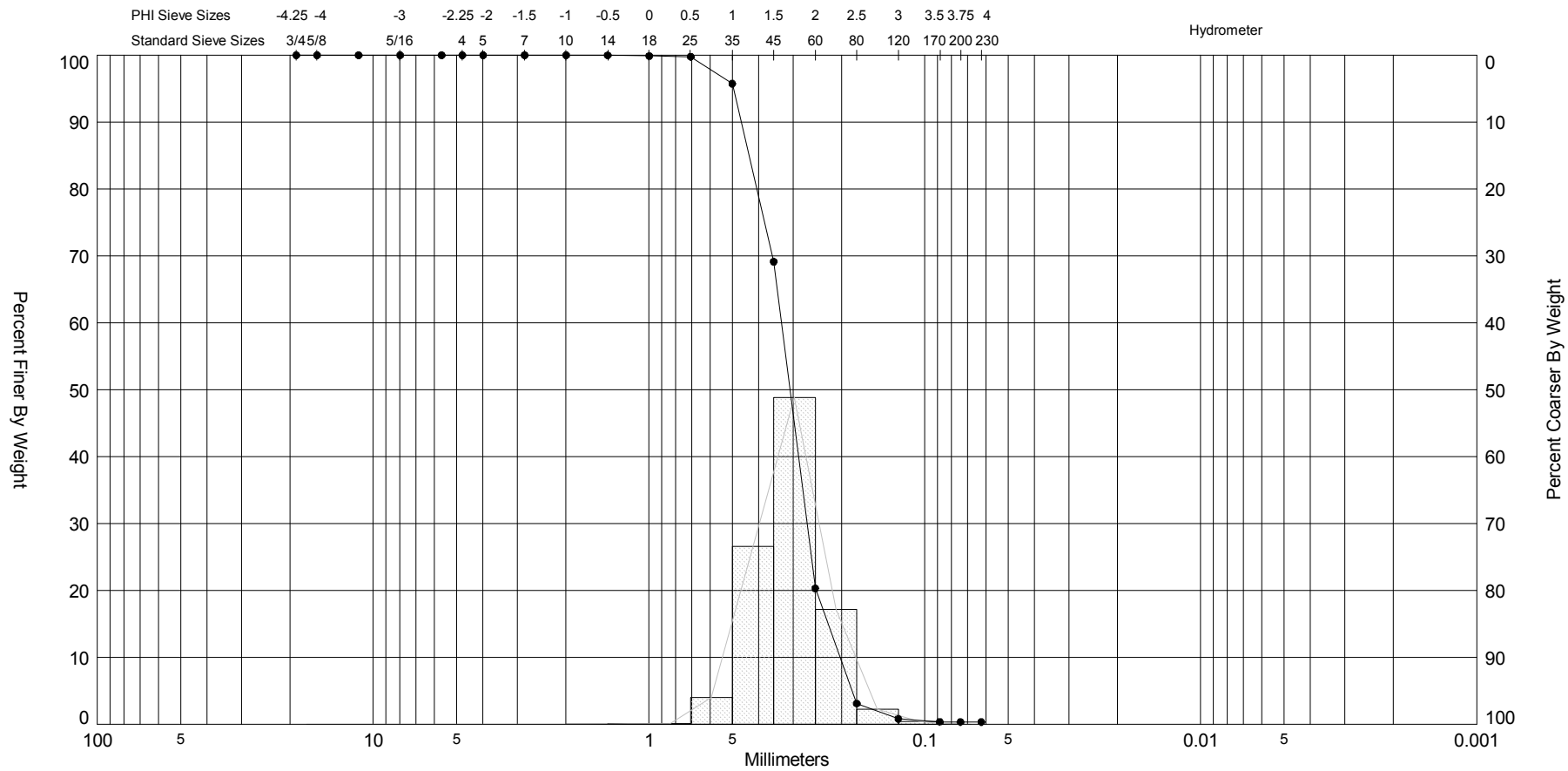

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 002 TOD	—●—	5.2	SP	#200 - 0.35 #230 - 0.35			1.7	1.69	0.09	4.03	0.43

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-10-13
Analyzed By:	ATP
Easting (X, ft):	2,183,863
Northing (Y, ft):	54,318
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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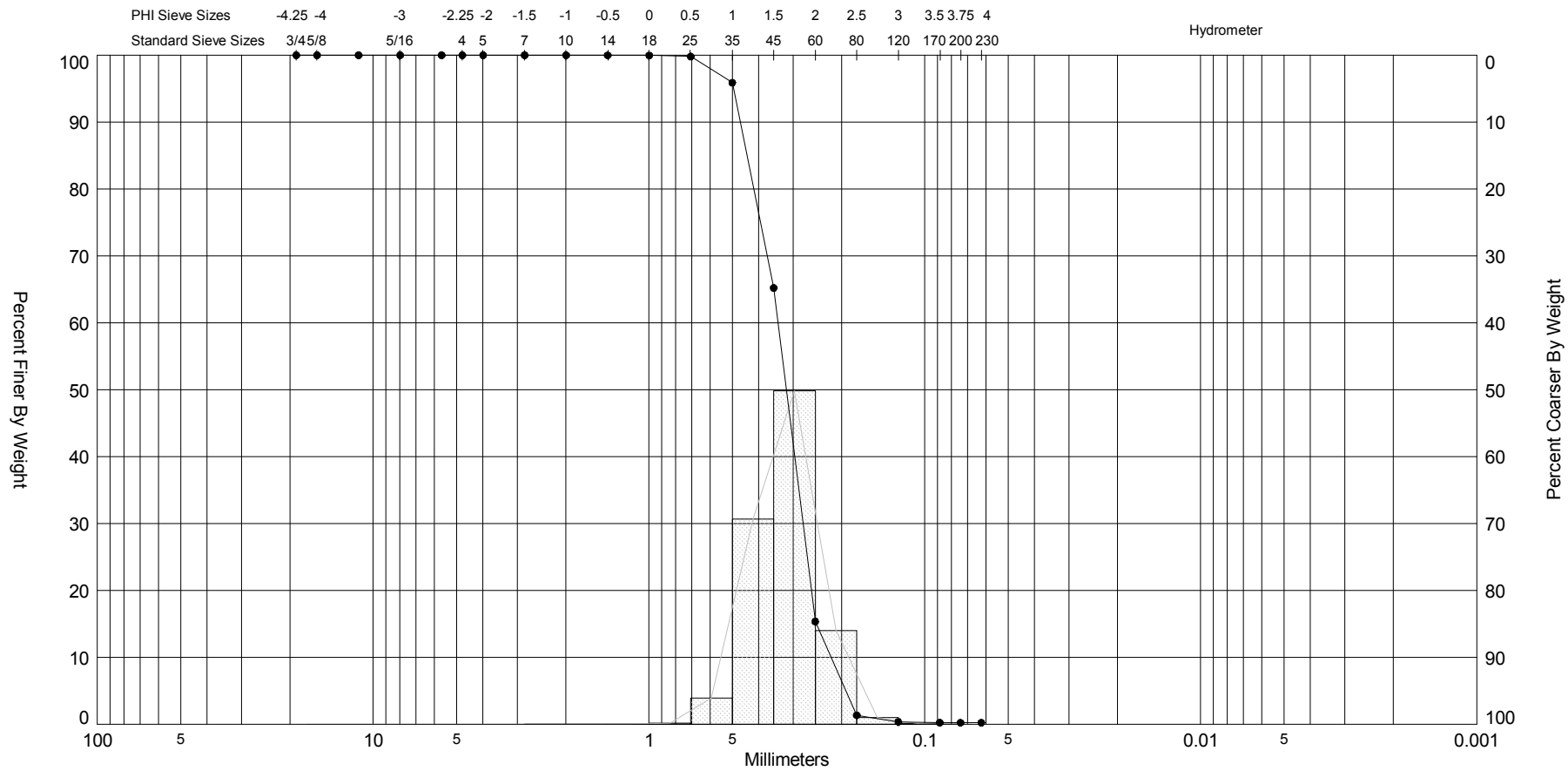

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 003MidBerm	—●—	4.7	SP	#200 - 0.23 #230 - 0.23			1.65	1.64	-0.01	3.76	0.4

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-10-13
Analyzed By:	ATP
Easting (X, ft):	2,183,805
Northing (Y, ft):	54,281
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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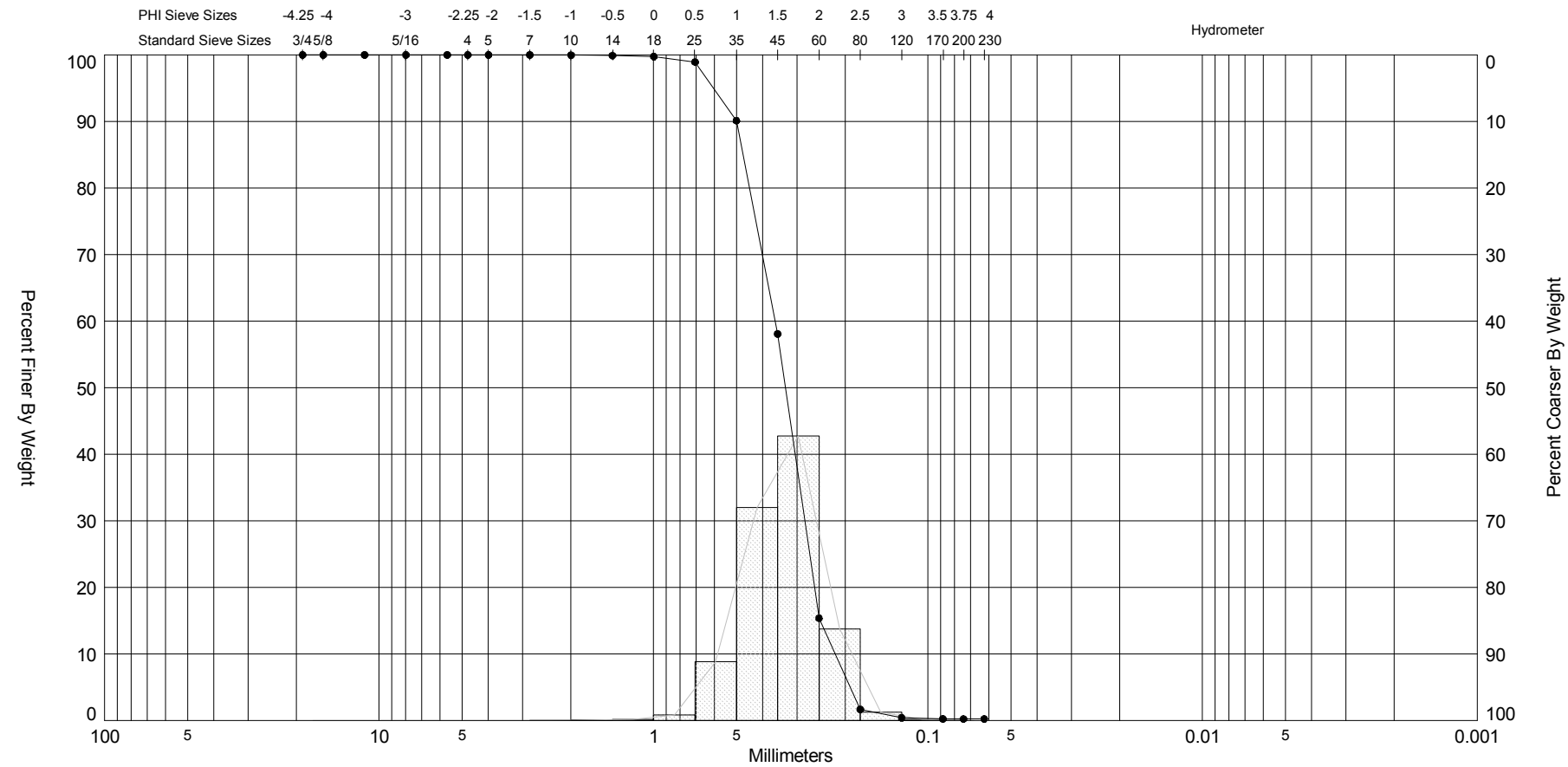

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 004BermCrest	—●—	3.5	SP	#200 - 0.23 #230 - 0.23			1.59	1.57	-0.27	4.17	0.47

Comments:

Depths and elevations based on measured values

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Boca Raton, FL 33431
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Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-10-13
Analyzed By:	ATP
Easting (X, ft):	2,183,810
Northing (Y, ft):	54,274
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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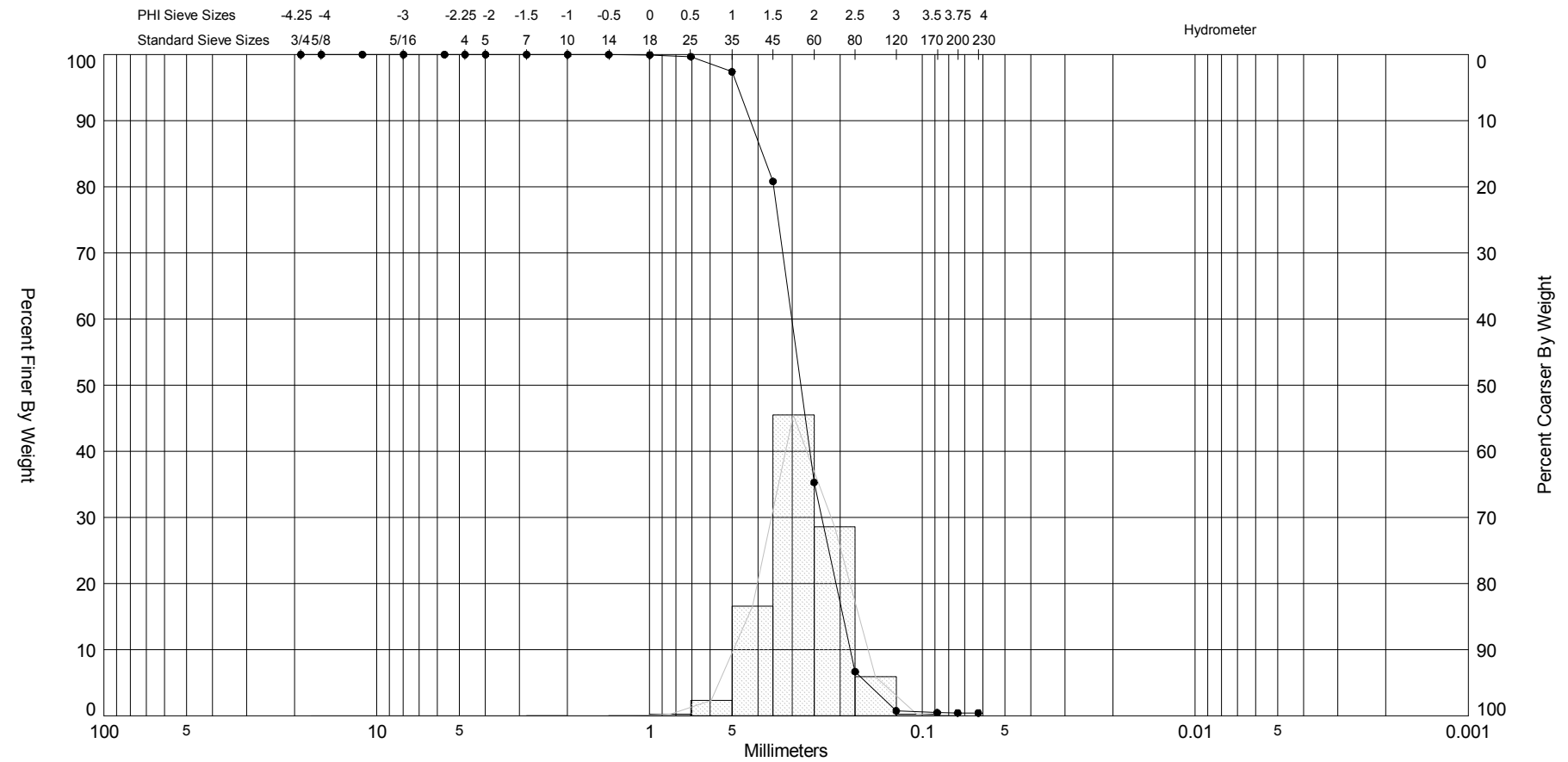

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 005 MHW	—●—	1.6	SP	#200 - 0.45 #230 - 0.45			1.84	1.85	-0.13	3.63	0.45

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-10-13
Analyzed By:	ATP
Easting (X, ft):	2,183,810
Northing (Y, ft):	54,257
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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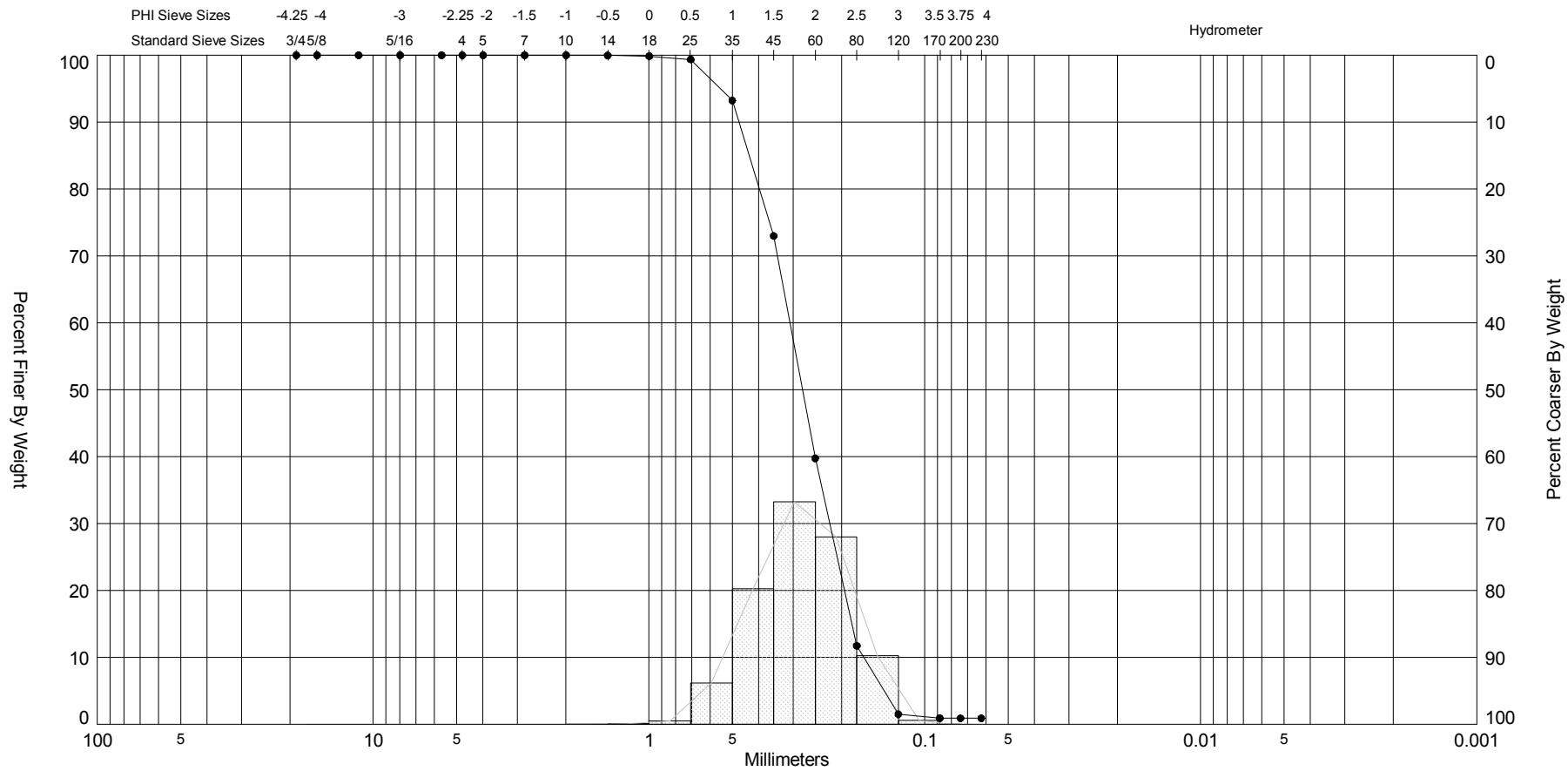

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 006 MTL	—●—	0.2	SP	#200 - 0.90 #230 - 0.90			1.85	1.83	-0.19	2.89	0.56

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-10-13
Analyzed By:	ATP
Easting (X, ft):	2,183,812
Northing (Y, ft):	54,241
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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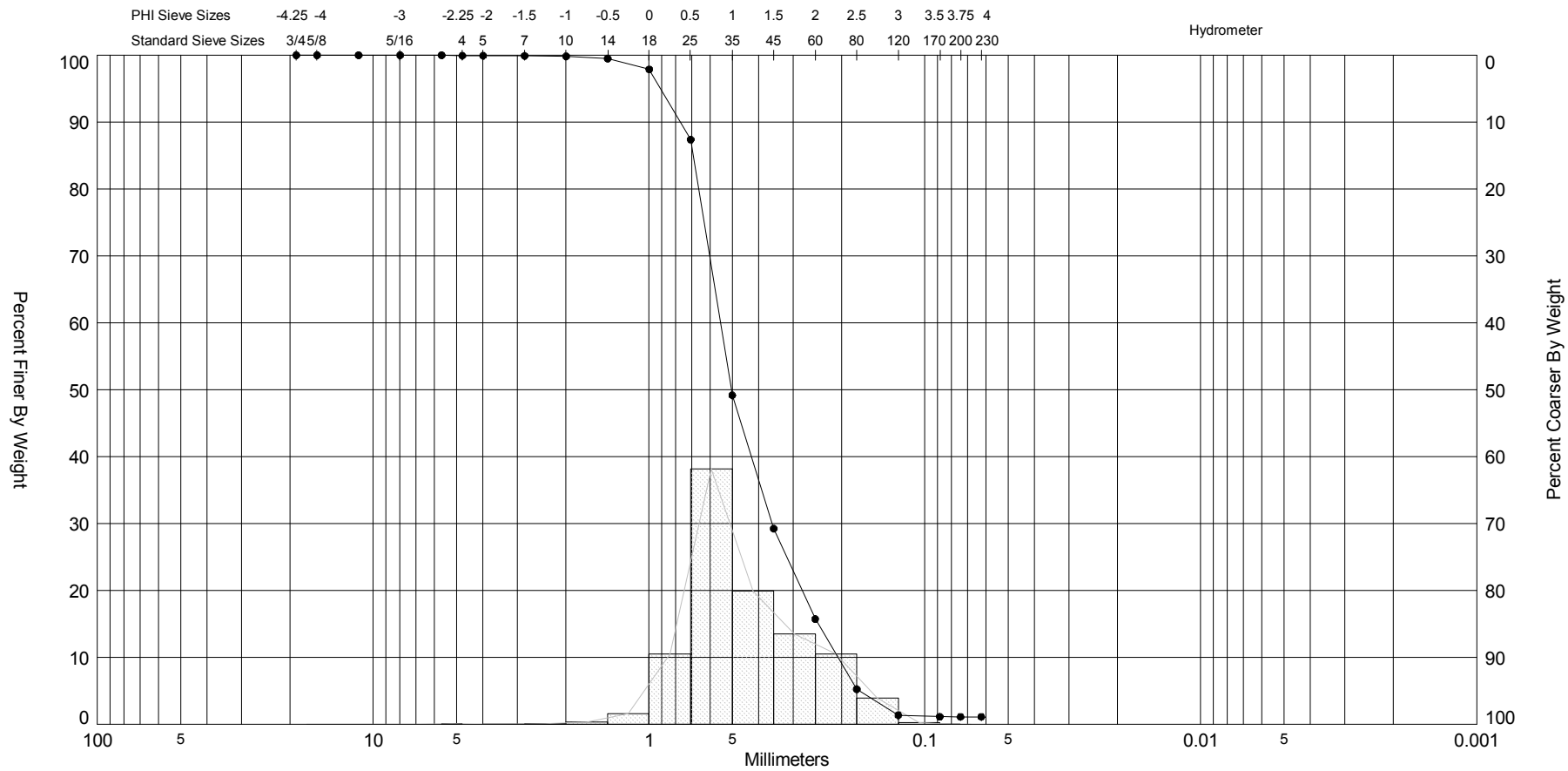

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 007 MLW	—●—	-3.1	SP	#200 - 1.12 #230 - 1.12			0.99	1.15	0.37	3.31	0.71

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-12-13
Analyzed By:	ATP
Easting (X, ft):	2,183,837
Northing (Y, ft):	54,097
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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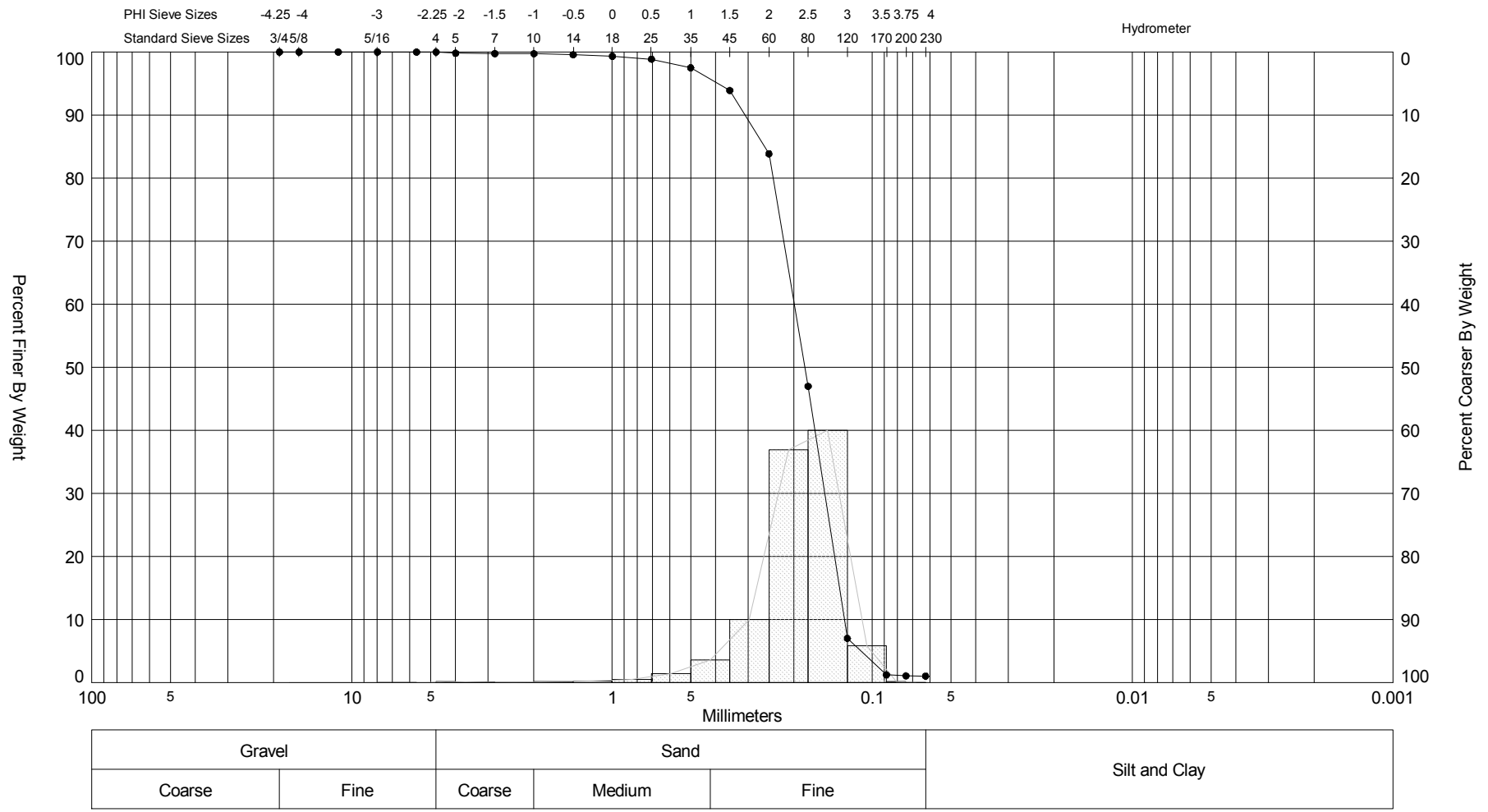

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 008TROUGH	—●—	-5.0	SP	#200 - 1.06 #230 - 1.03			2.46	2.37	-2.24	14.06	0.58

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-12-13
Analyzed By:	ATP
Easting (X, ft):	2,183,841
Northing (Y, ft):	54,044
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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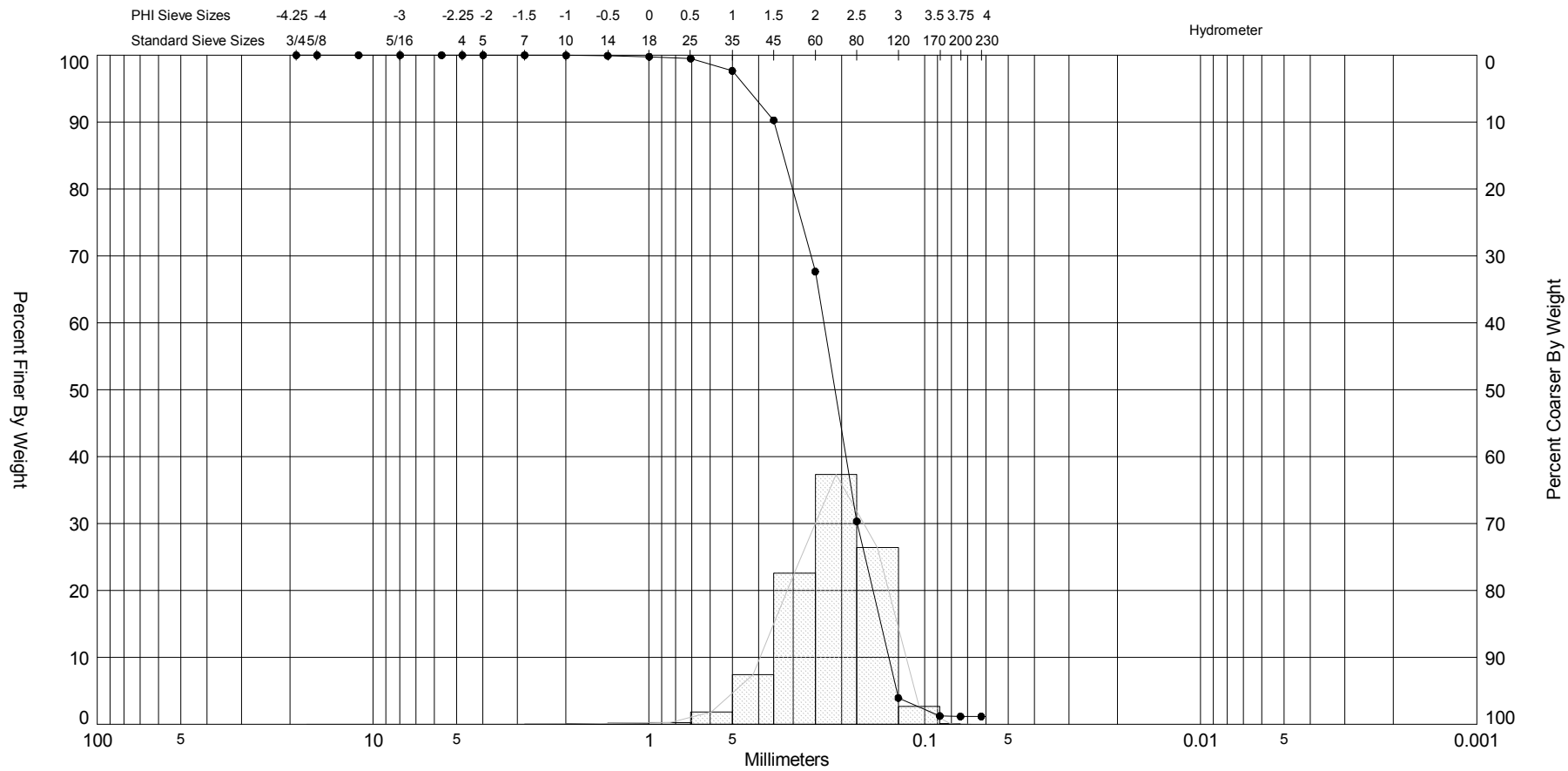

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 009BarCrest	—●—	-6.5	SP	#200 - 1.17 #230 - 1.17			2.24	2.18	-0.74	4.47	0.54

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-04-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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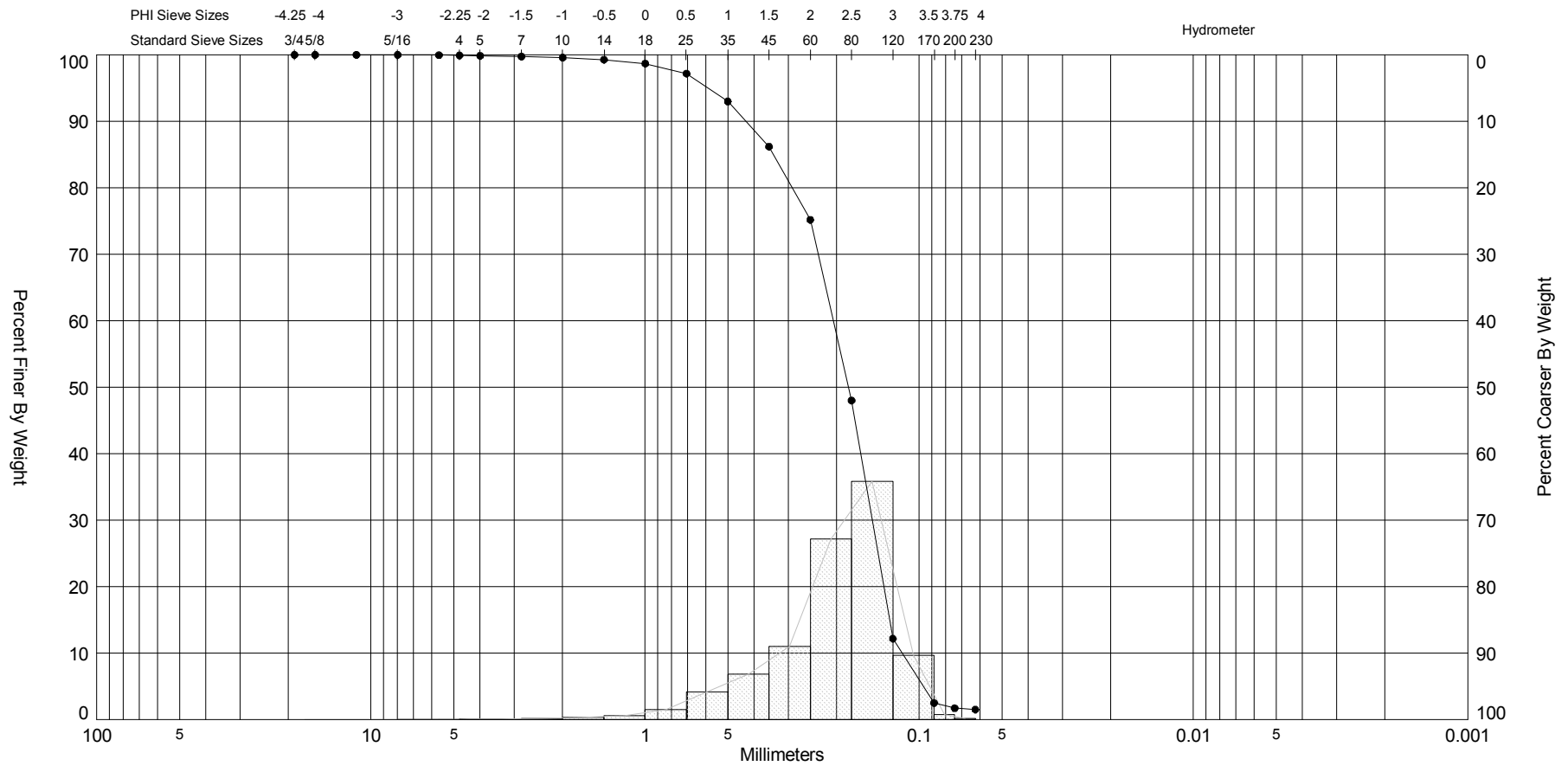

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 010 (-8.75 ft)	—●—	-8.8	SP	#200 - 1.71 #230 - 1.52			2.46	2.28	-1.52	6.97	0.77

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,183,895
Northing (Y, ft):	53,791
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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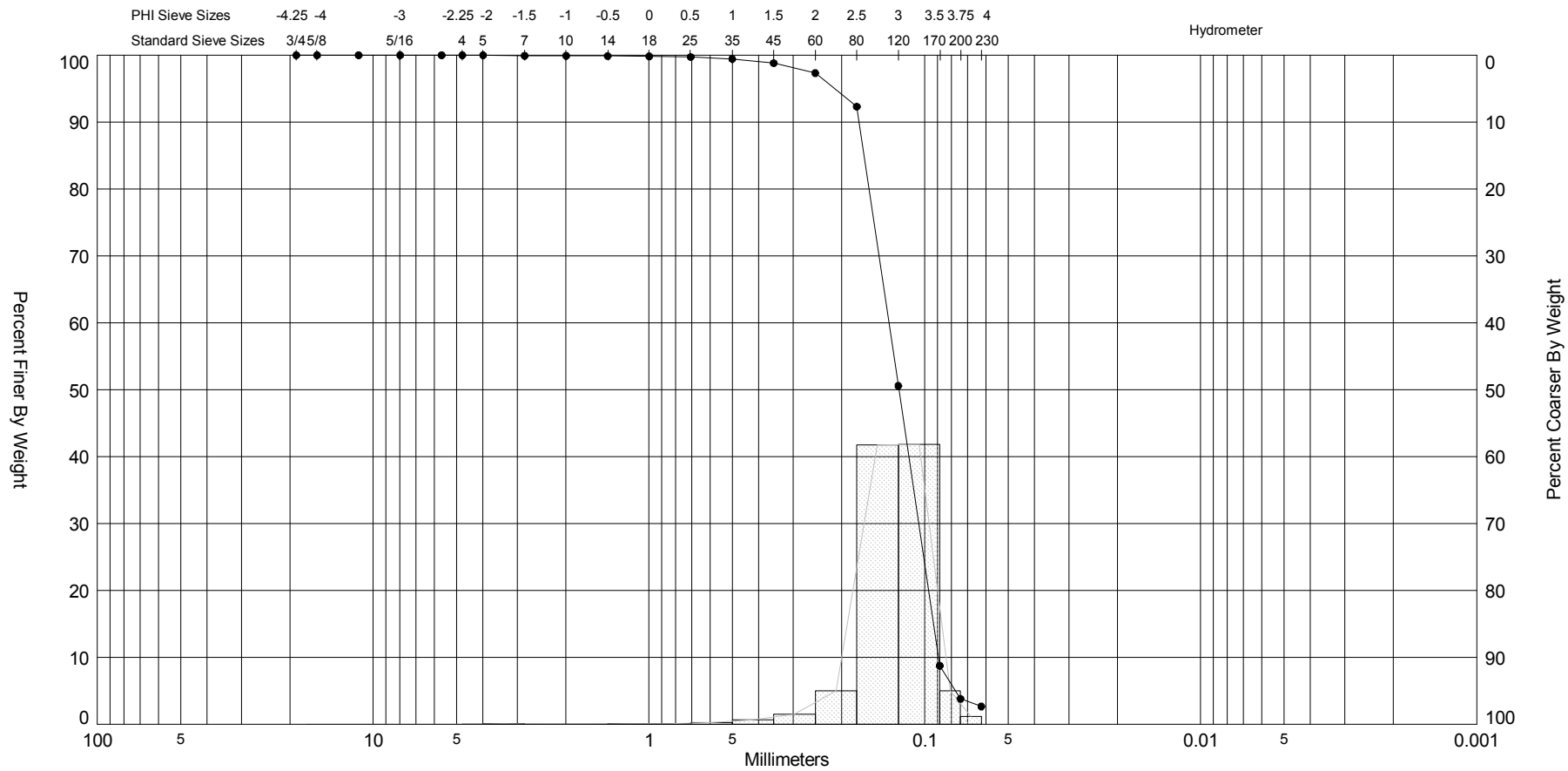

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 011 (-12.5 ft)	—●—	-12.5	SP	#200 - 3.80 #230 - 2.66			3.01	2.96	-2.4	18.93	0.45

Comments:

Depths and elevations based on measured values

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Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,183,919
Northing (Y, ft):	53,540
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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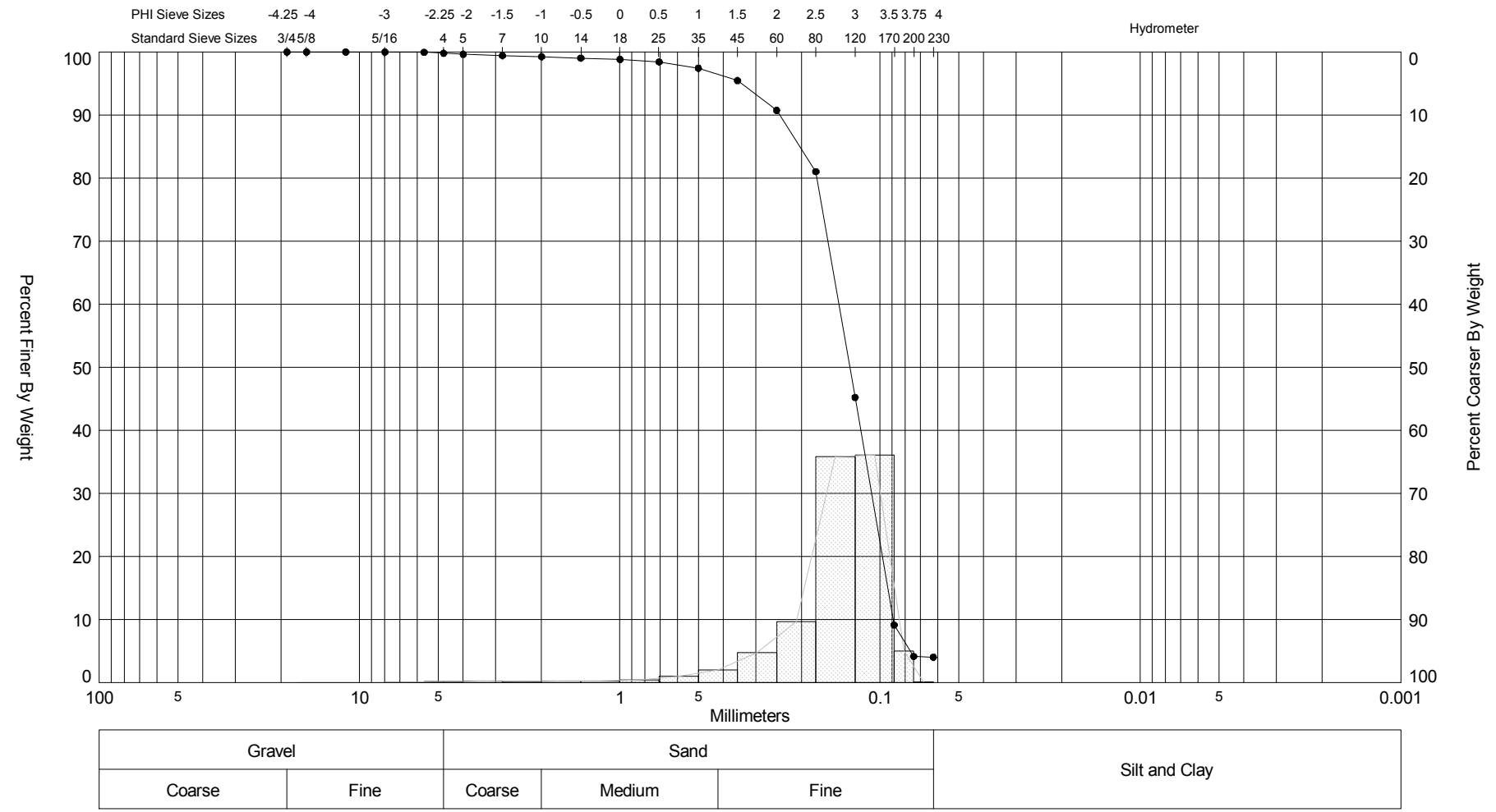

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 012 (-16.25 ft)	—●—	-16.3	SP	#200 - 4.15 #230 - 4.03			2.93	2.77	-3.01	17.19	0.74

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,183,968
Northing (Y, ft):	53,188
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

Comments:

Depths and elevations based on measured values

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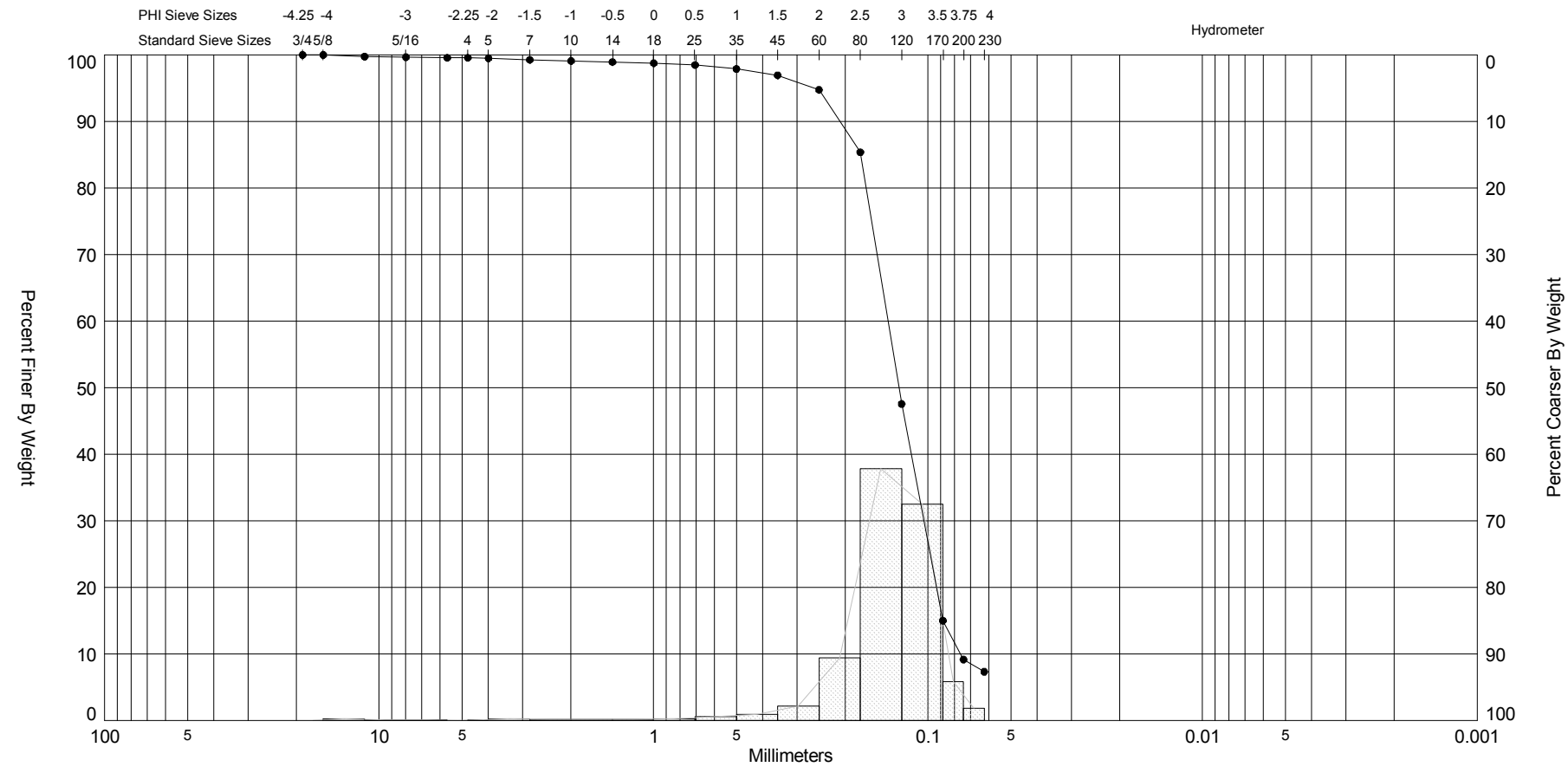

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 013 (-20 ft)	—●—	-20.0	SP-SM	#200 - 9.17 #230 - 7.33			2.97	2.83	-4.17	29.95	0.77

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,183,667
Northing (Y, ft):	52,664
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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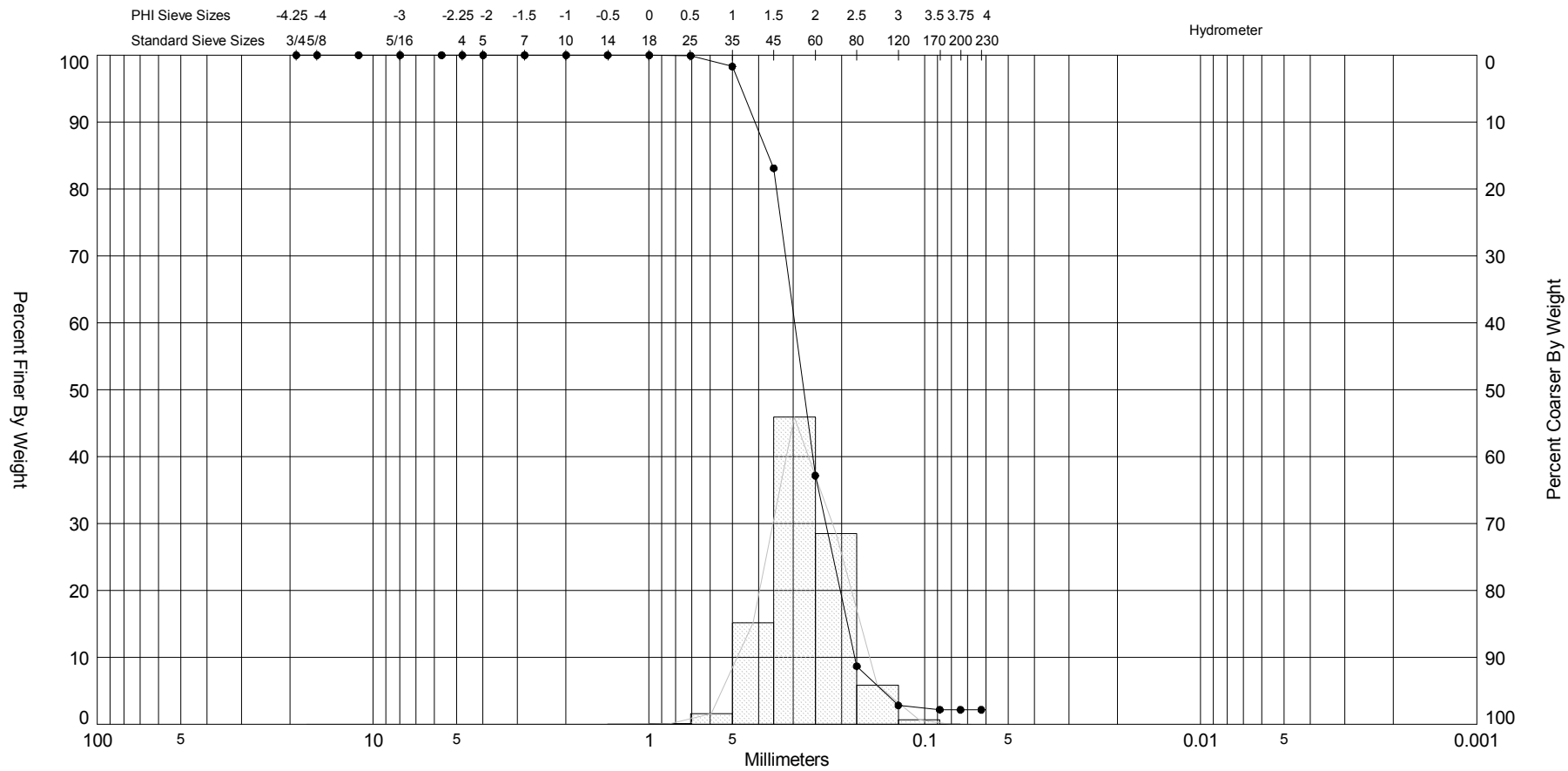

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 001 DUNE	—●—	9.5	SP	#200 - 2.17 #230 - 2.17			1.86	1.87	0.12	3.4	0.44

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-12-13
Analyzed By:	ATP
Easting (X, ft):	2,182,428
Northing (Y, ft):	53,833
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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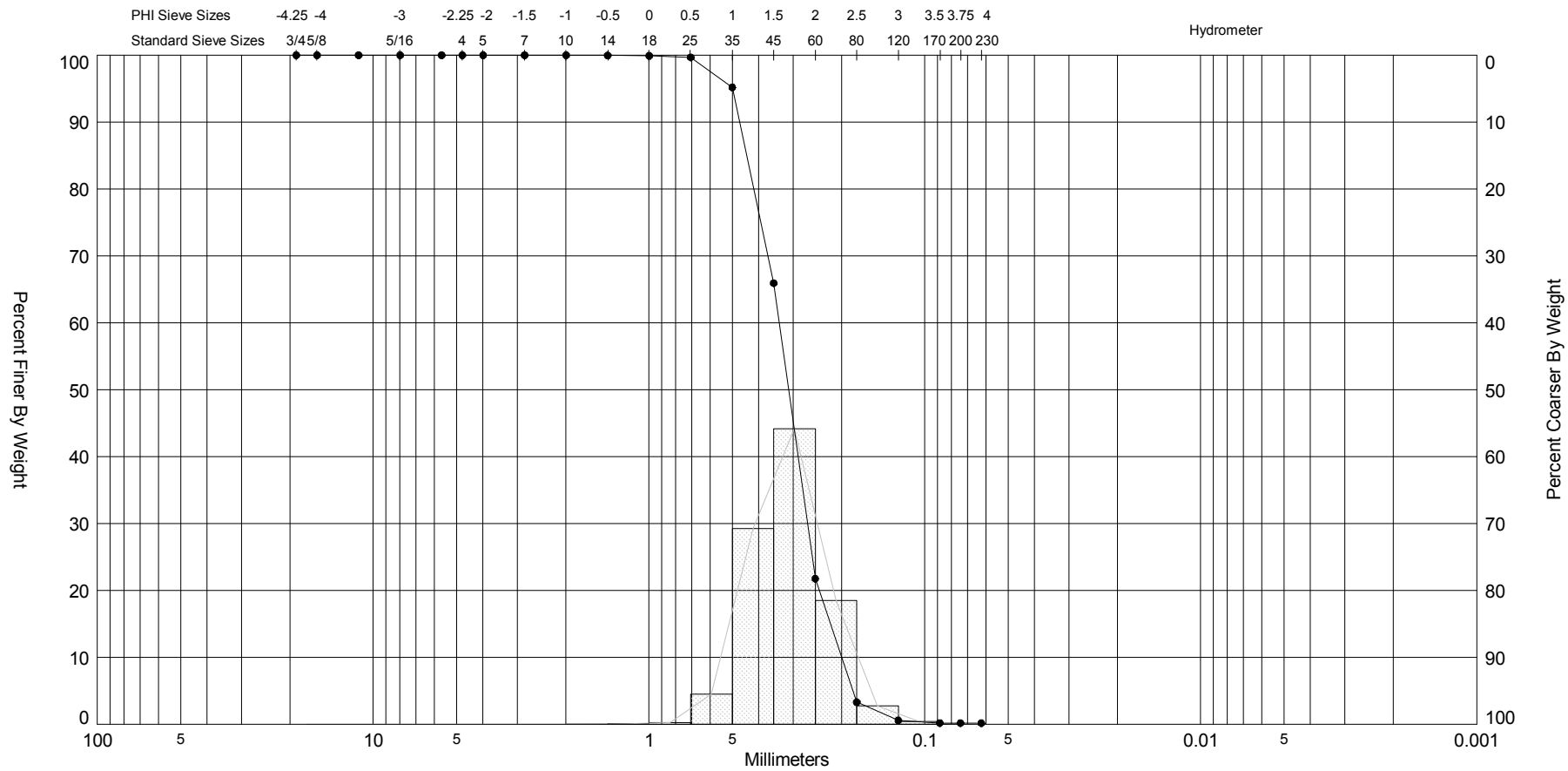

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 002TOD	—●—	8.3	SP	#200 - 0.18 #230 - 0.18			1.68	1.68	0.1	3.67	0.45

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-12-13
Analyzed By:	ATP
Easting (X, ft):	2,182,434
Northing (Y, ft):	53,827
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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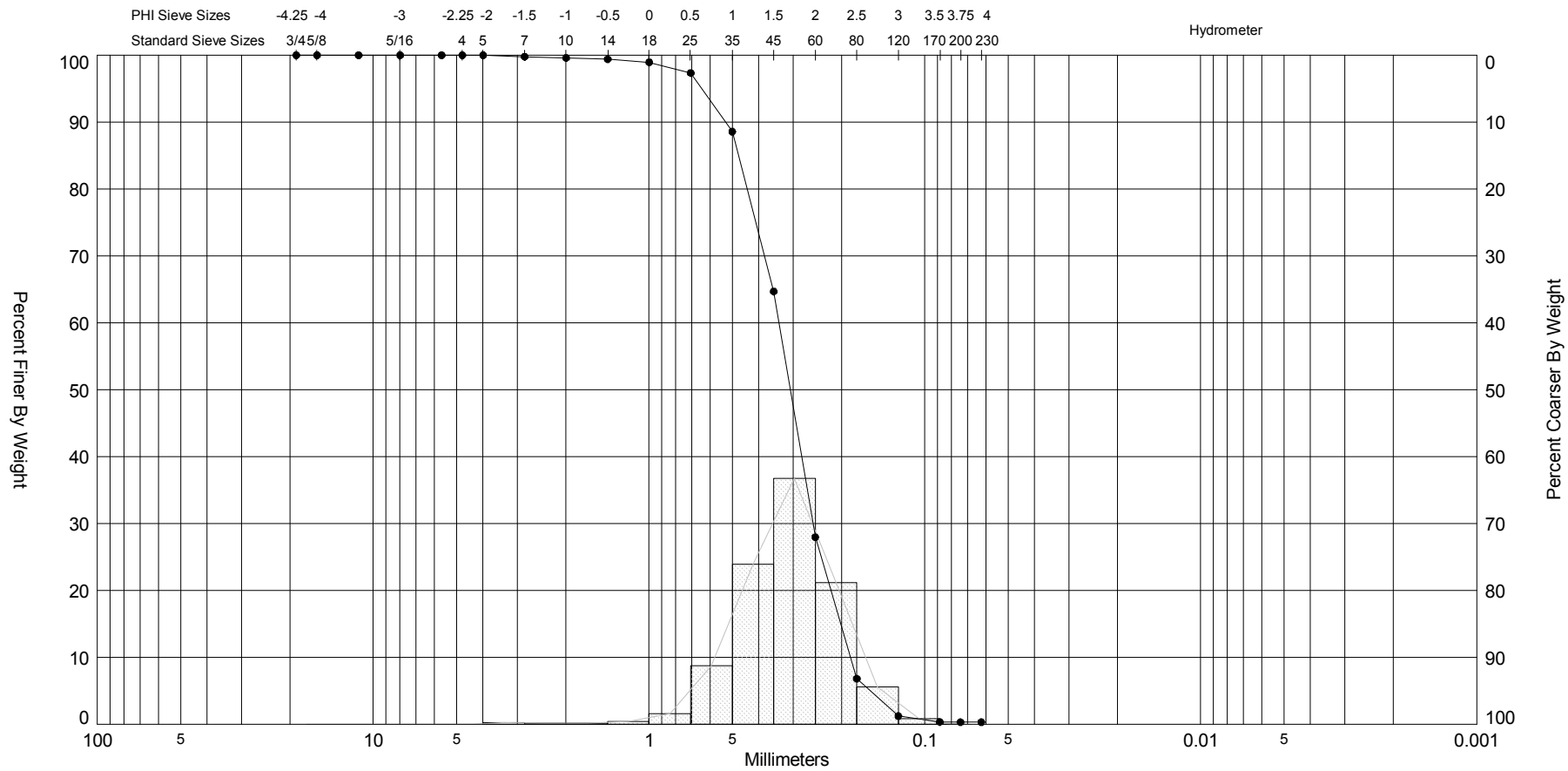

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 003MIDBERM	—●—	6.2	SP	#200 - 0.31 #230 - 0.31			1.7	1.67	-0.74	5.92	0.62

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-12-13
Analyzed By:	ATP
Easting (X, ft):	2,182,436
Northing (Y, ft):	53,817
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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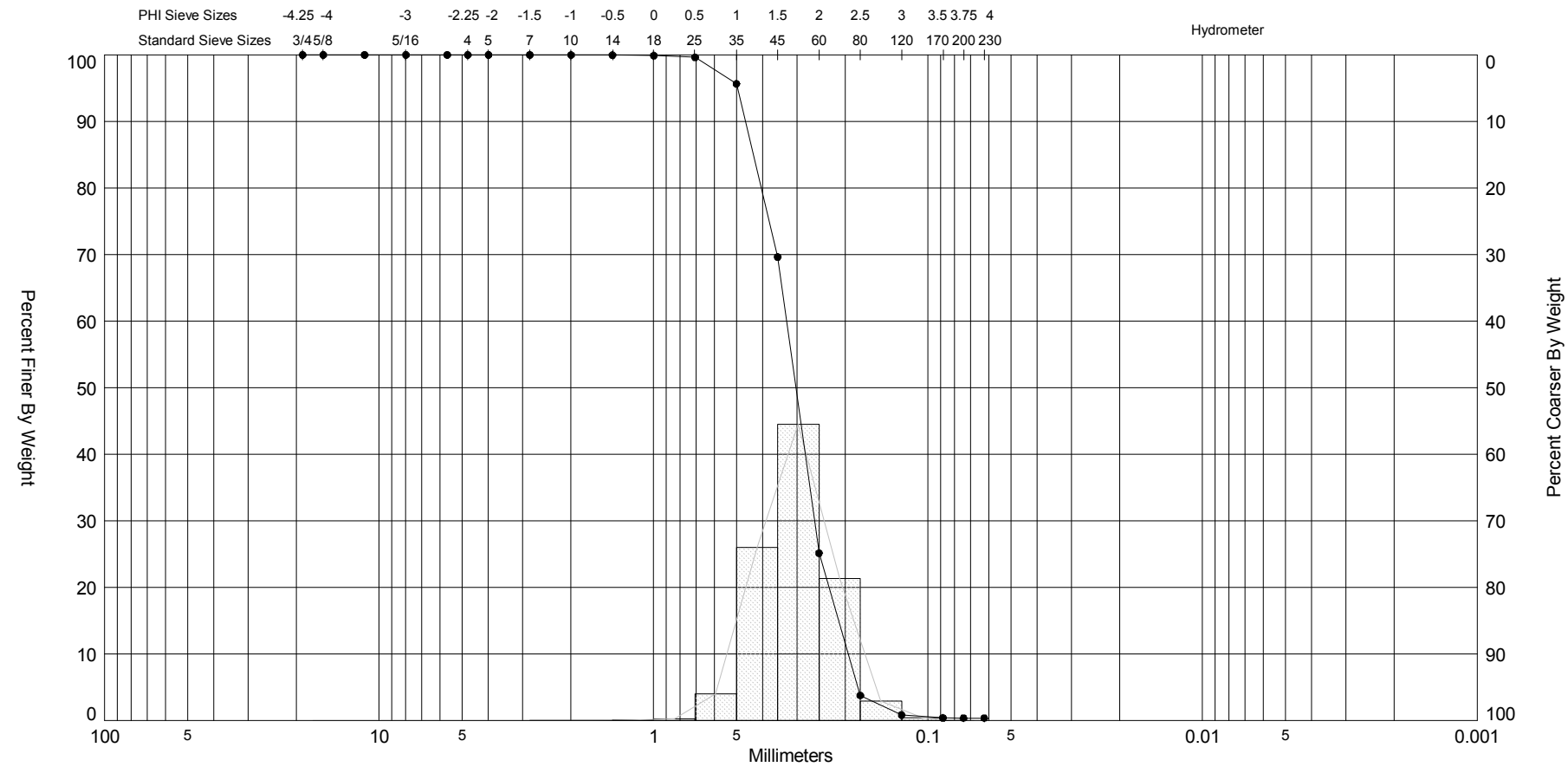

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 004BERMCRST	—●—	3.6	SP	#200 - 0.37 #230 - 0.37			1.72	1.72	0	3.8	0.46

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-12-13
Analyzed By:	ATP
Easting (X, ft):	2,182,437
Northing (Y, ft):	53,798
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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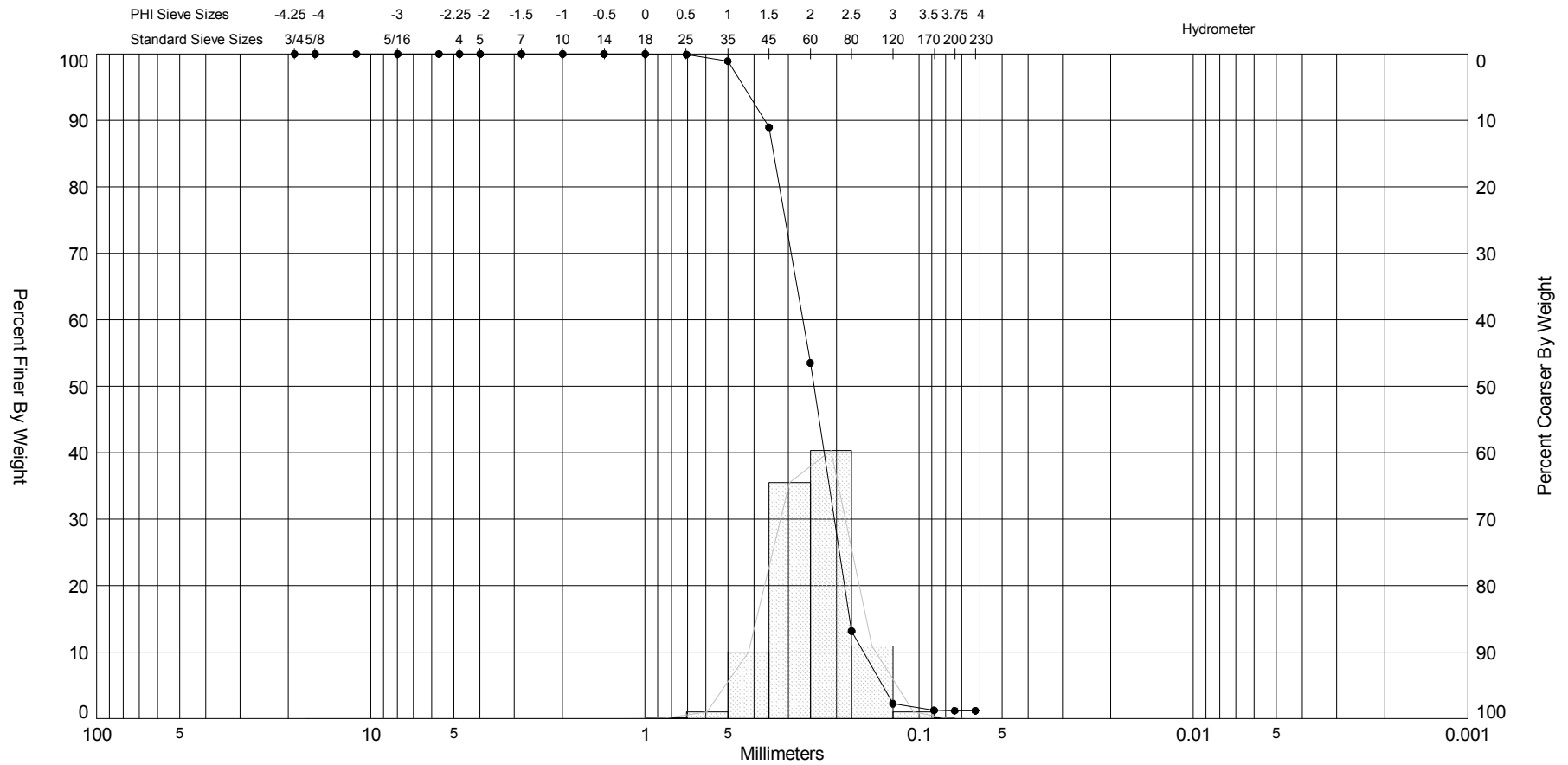

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 005 MHW	—●—	1.2	SP	#200 - 1.19 #230 - 1.19			2.04	2.02	-0.09	3.21	0.45

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-04-14
Analyzed By:	TM
Easting (X, ft):	2,182,434
Northing (Y, ft):	53,827
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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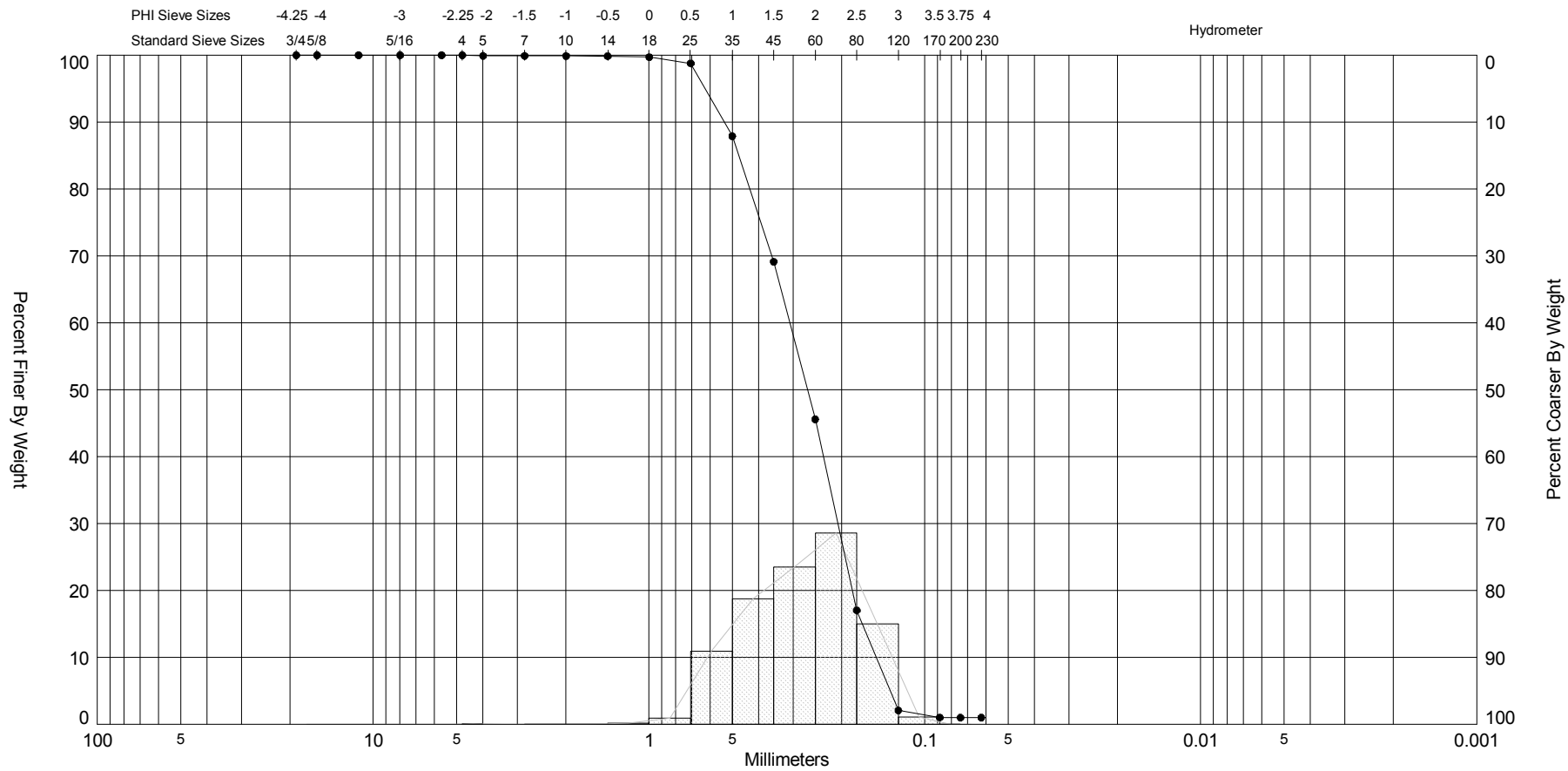

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 006 MTL	—●—	0.2	SP	#200 - 0.99 #230 - 0.99			1.91	1.84	-0.45	3.56	0.67

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-15-13
Analyzed By:	ATP
Easting (X, ft):	2,182,445
Northing (Y, ft):	53,759
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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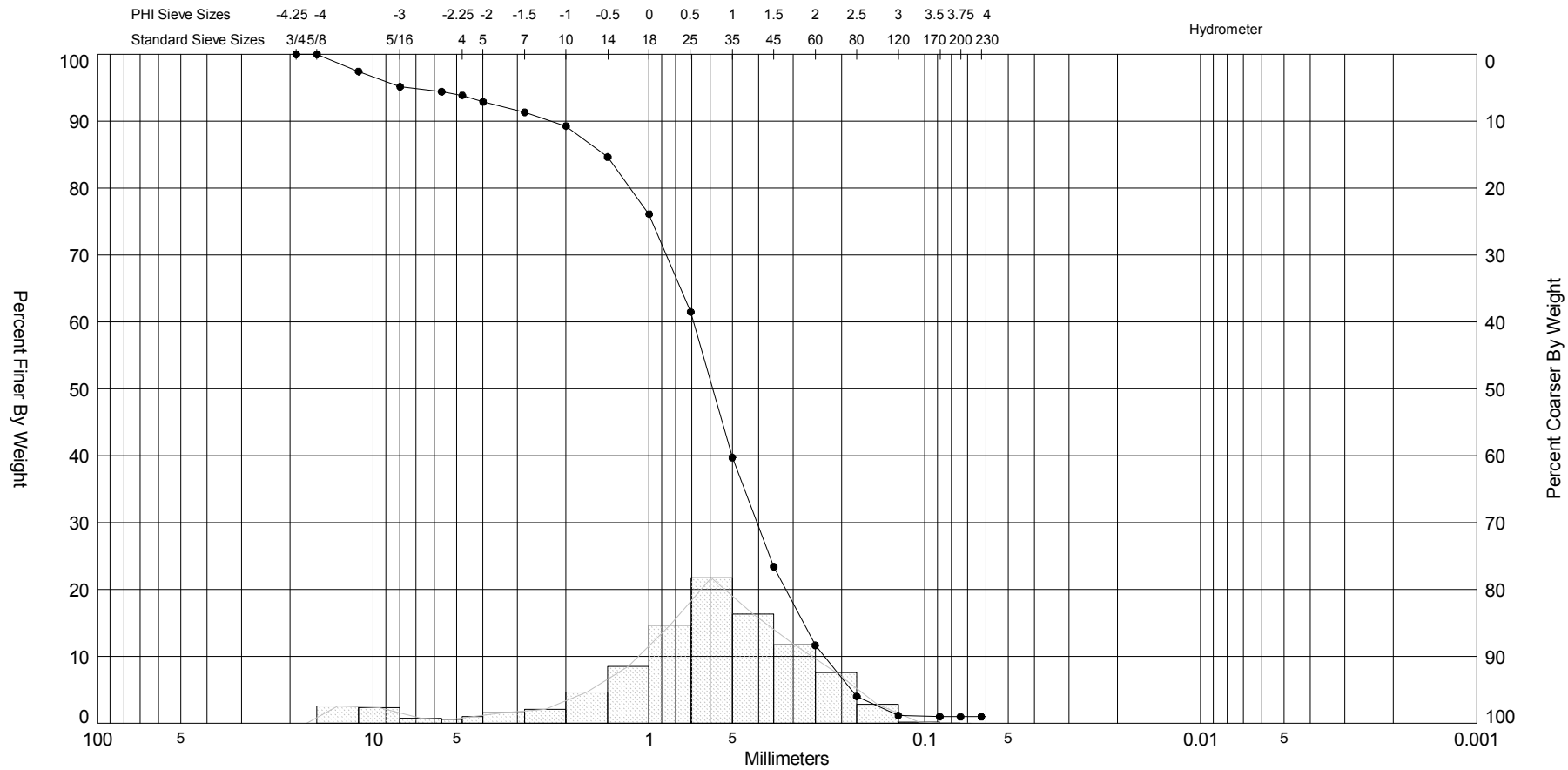

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 007 MLW	—●—	-3.2	SW	#200 - 0.97 #230 - 0.97			0.76	0.54	-1.22	4.71	1.39

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-15-13
Analyzed By:	ATP
Easting (X, ft):	2,182,460
Northing (Y, ft):	53,620
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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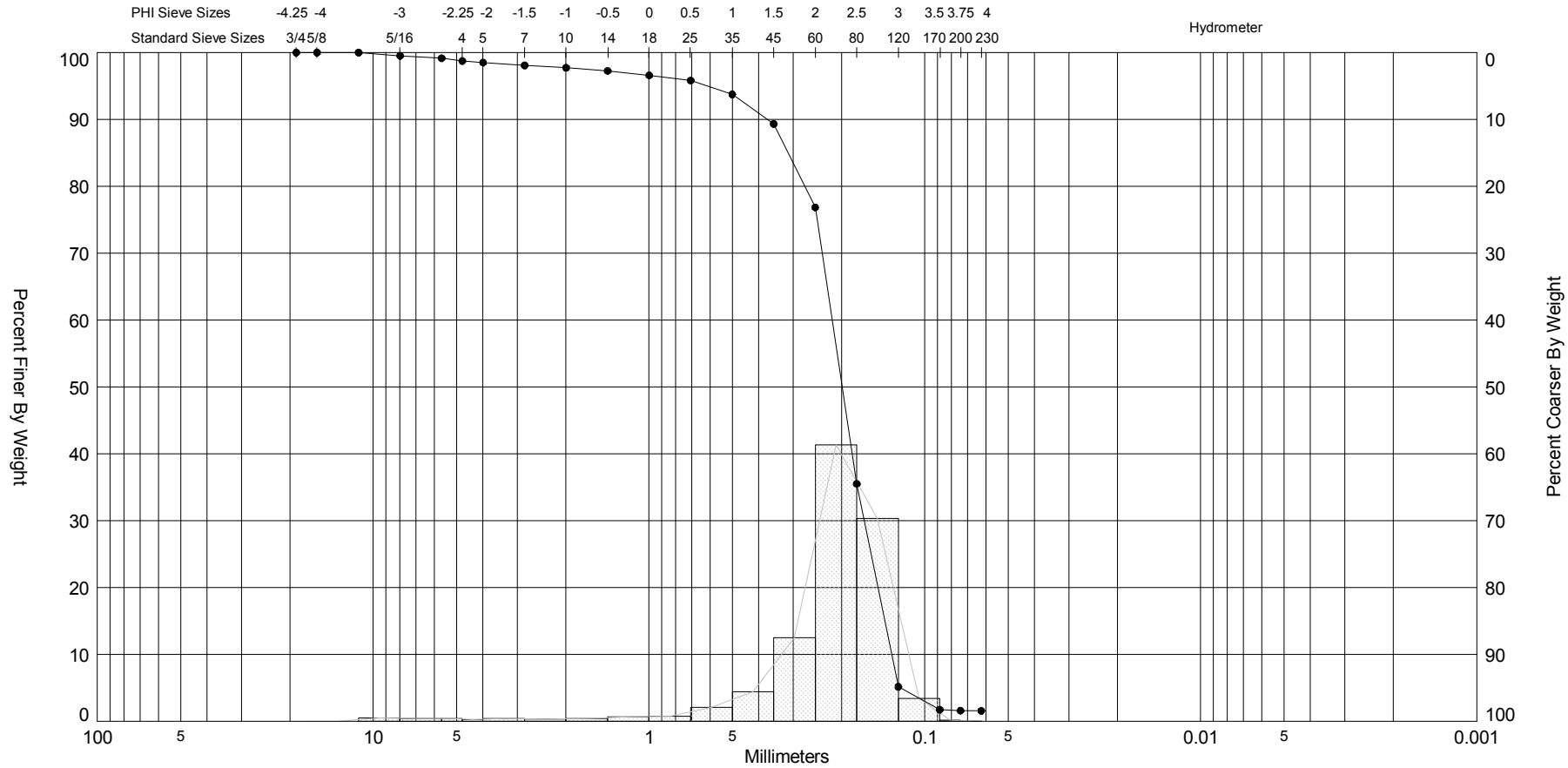

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 008TROUGH	—●—	-5.1	SW	#200 - 1.60 #230 - 1.57			2.32	2.15	-3.17	16.05	0.91

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-15-13
Analyzed By:	ATP
Easting (X, ft):	2,182,467
Northing (Y, ft):	53,590
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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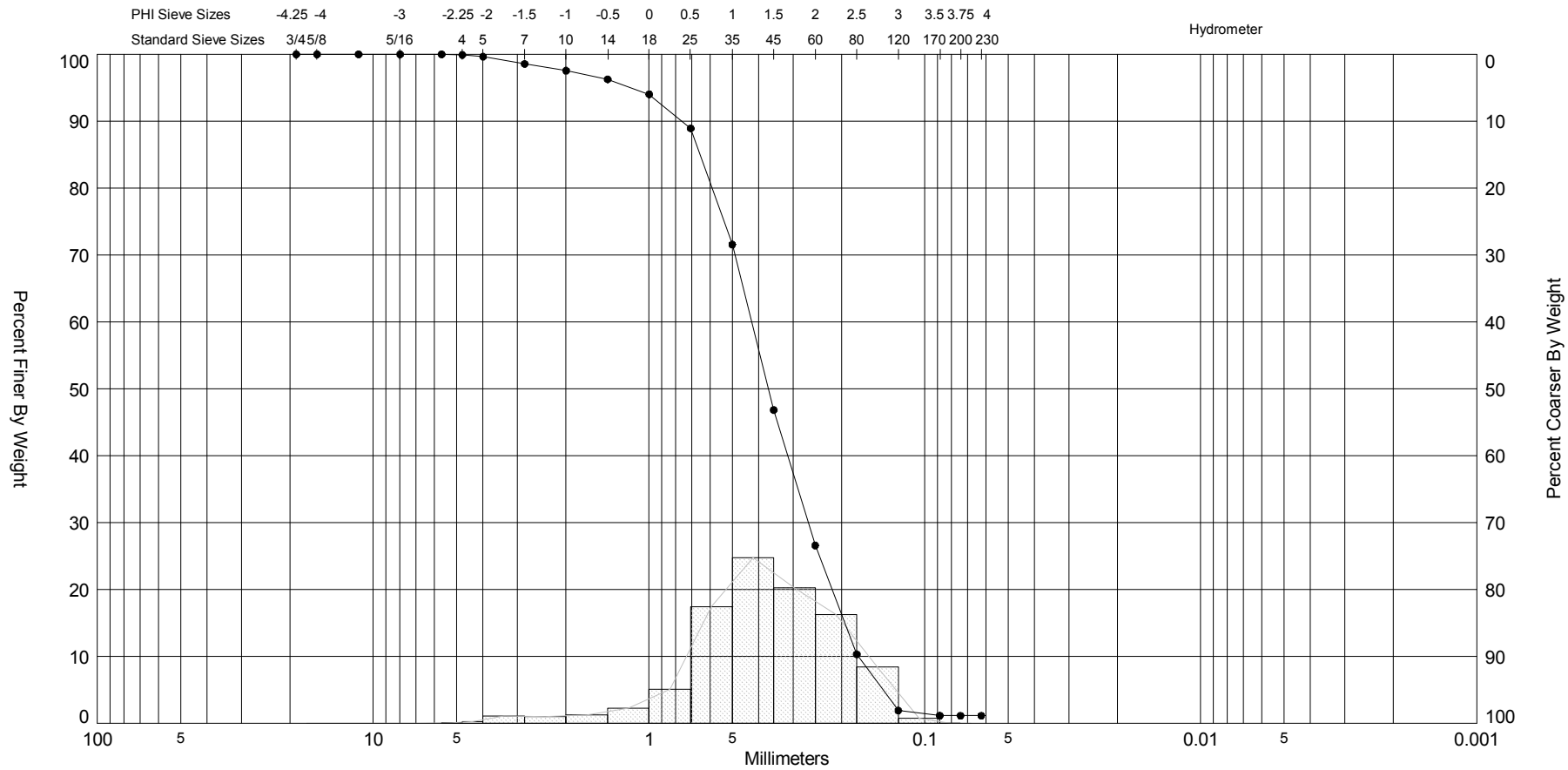

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 009BarCrest	—●—	-6.5	SW	#200 - 1.13 #230 - 1.13			1.44	1.39	-0.89	4.71	0.91

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	03-17-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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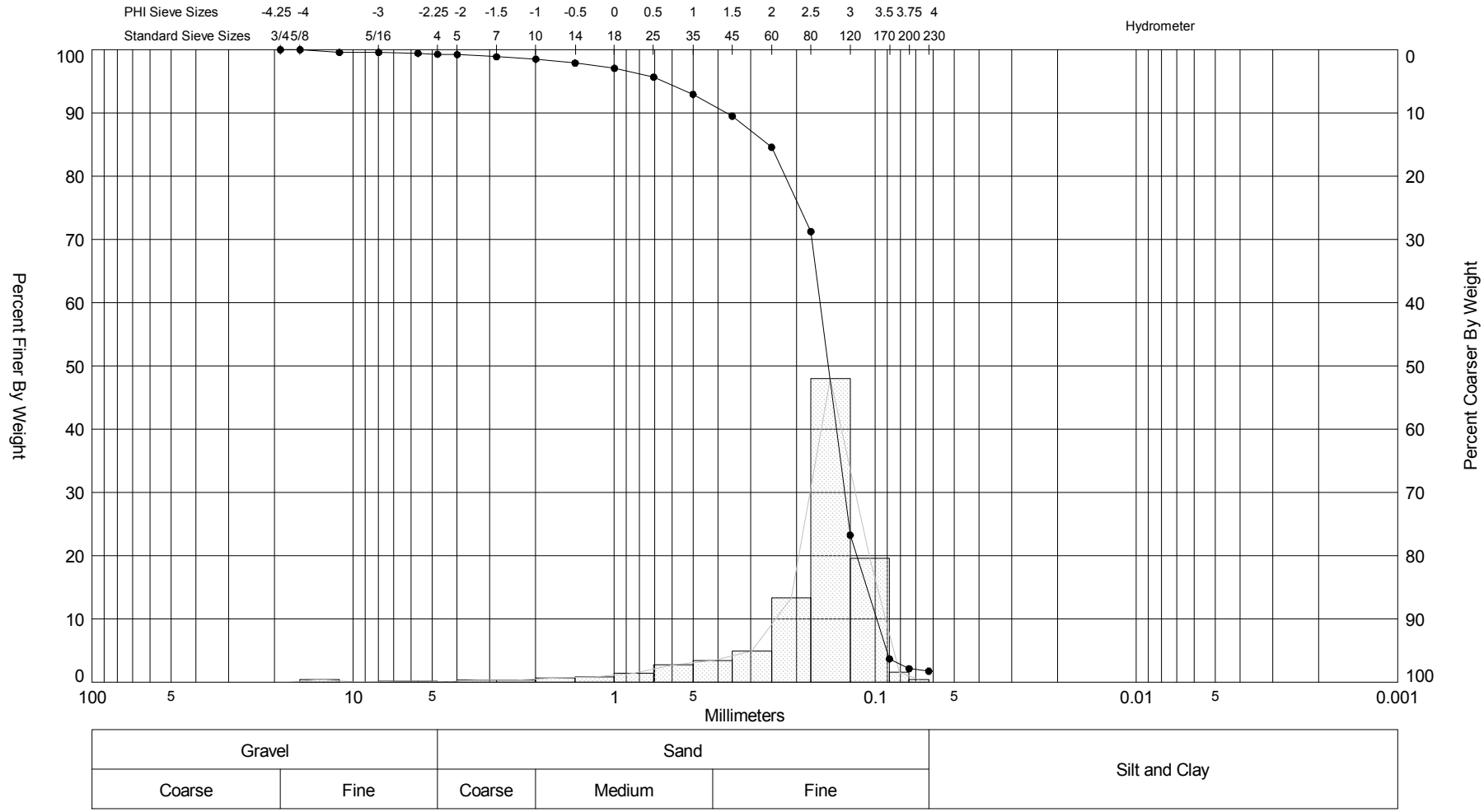

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 010 (-8.75 ft)	—●—	-8.8	SW	#200 - 2.13 #230 - 1.74			2.72	2.48	-2.92	14.76	0.96

Comments:

Depths and elevations based on measured values

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Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,182,420
Northing (Y, ft):	53,308
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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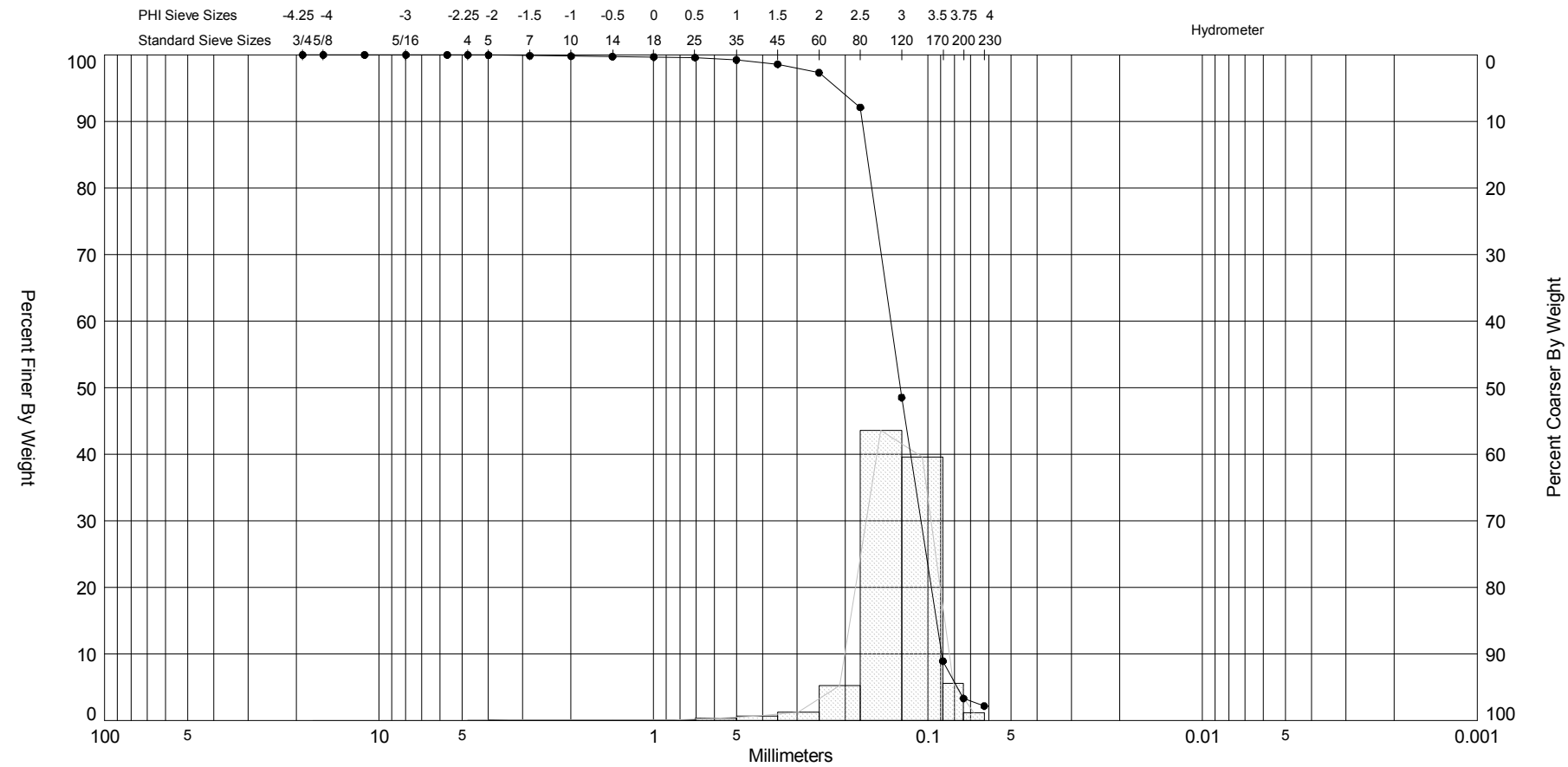

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 011 (-12.5 ft)	—●—	-12.5	SP	#200 - 3.32 #230 - 2.18			2.98	2.94	-2.89	23.47	0.48

Comments:

Depths and elevations based on measured values

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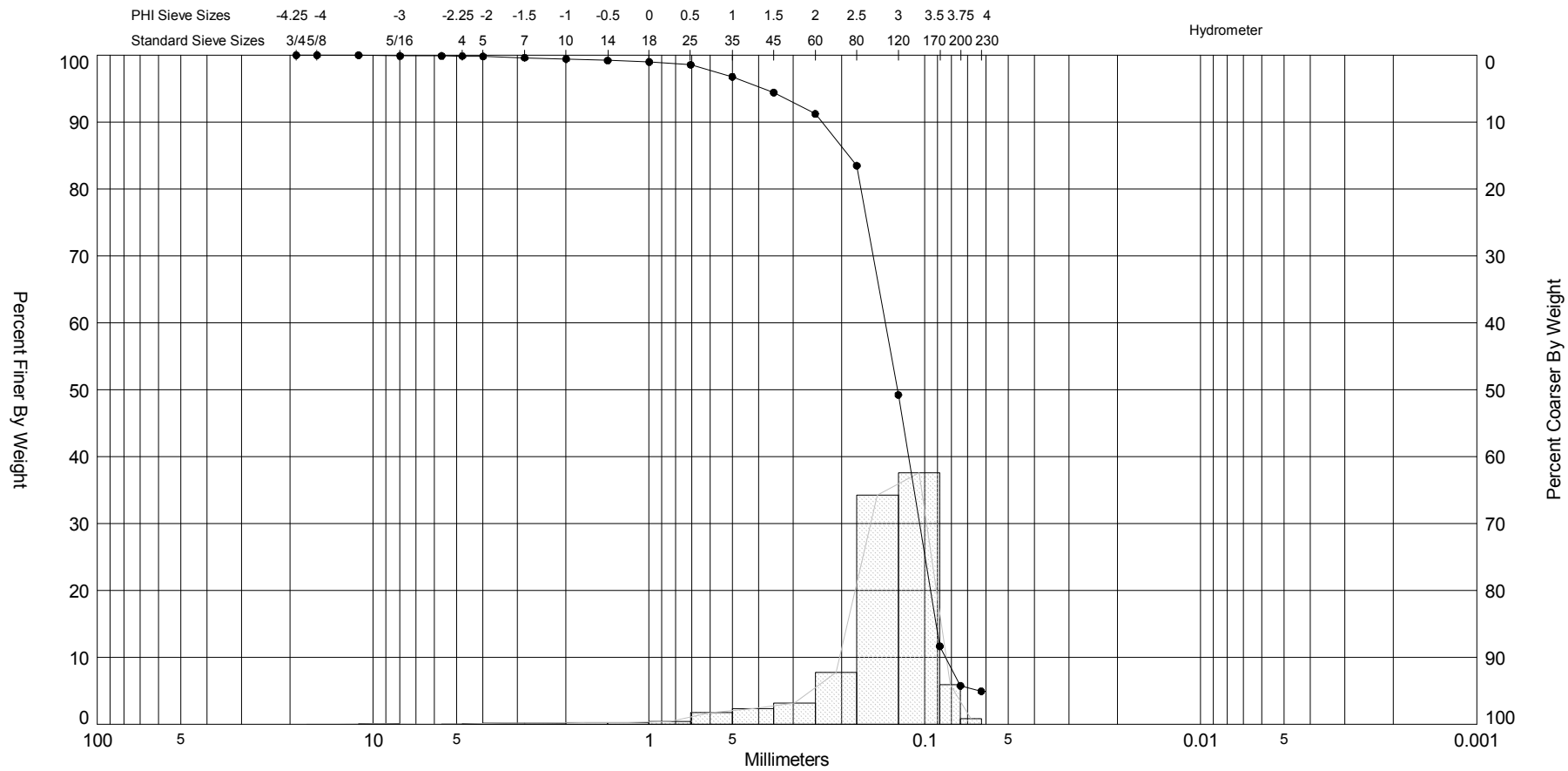
Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,182,471
Northing (Y, ft):	53,111
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

SIEVE ANALYSIS OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 012 (-16.25 ft)	—●—	-16.3	SP-SM	#200 - 5.76 #230 - 4.93			2.99	2.81	-2.85	16.01	0.74

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-14-13
Analyzed By:	ATP
Easting (X, ft):	2,182,508
Northing (Y, ft):	52,882
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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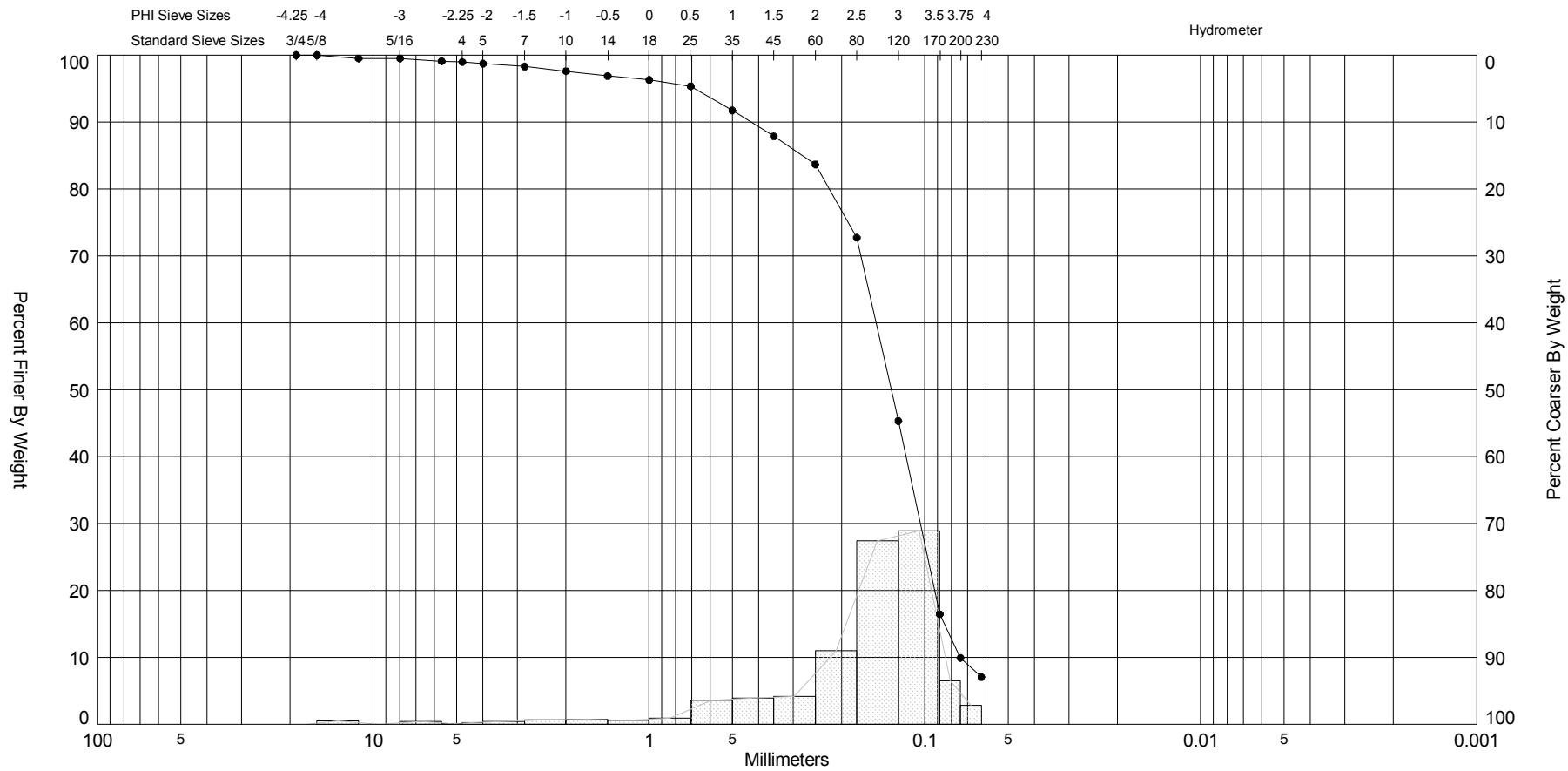

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 013 (-20 ft)	—●—	-20.0	SW-SM	#200 - 9.93 #230 - 7.06			2.91	2.56	-2.46	10.81	1.15

Comments:

Depths and elevations based on measured values

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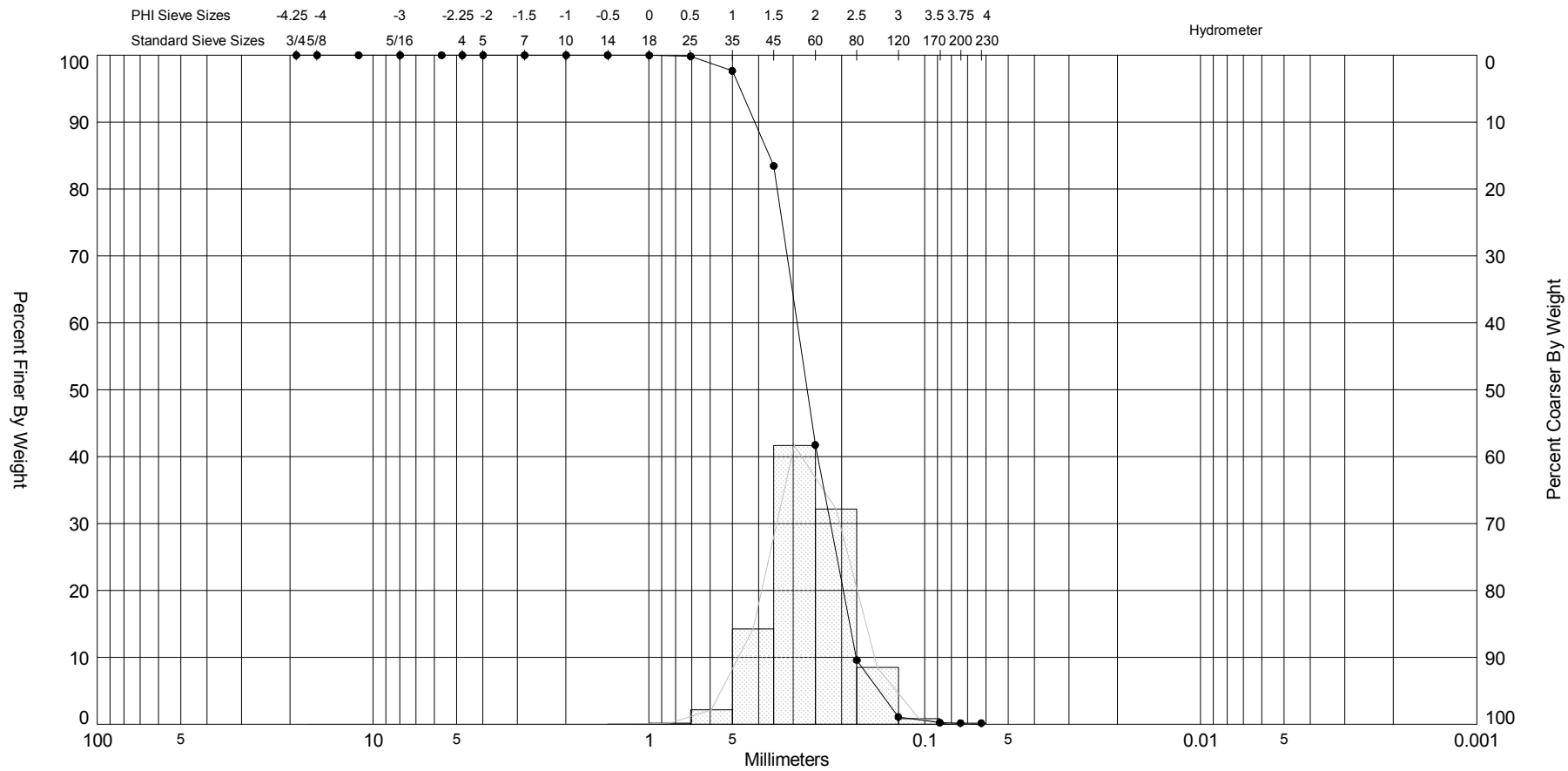
Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-17-13
Analyzed By:	ATP
Easting (X, ft):	2,182,578
Northing (Y, ft):	52,461
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

SIEVE ANALYSIS OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB040 001 DUNE	—●—	-0.5	SP	#200 - 0.19 #230 - 0.18			1.9	1.91	-0.01	3.3	0.47

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	03-17-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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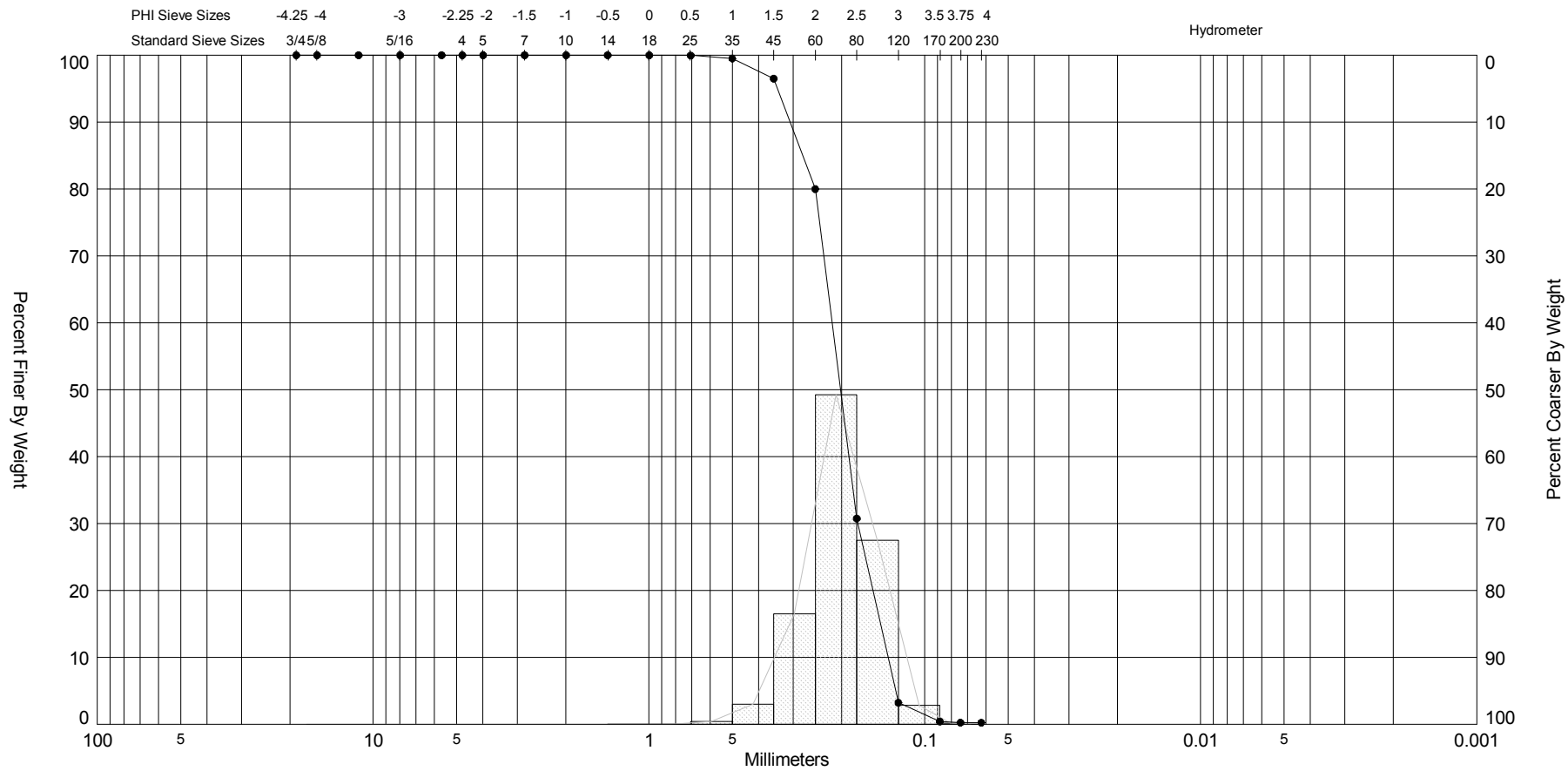

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 001 DUNE	—●—	12.2	SP	#200 - 0.24 #230 - 0.23			2.3	2.3	-0.37	3.82	0.43

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-12-13
Analyzed By:	ATP
Easting (X, ft):	2,179,202
Northing (Y, ft):	52,836
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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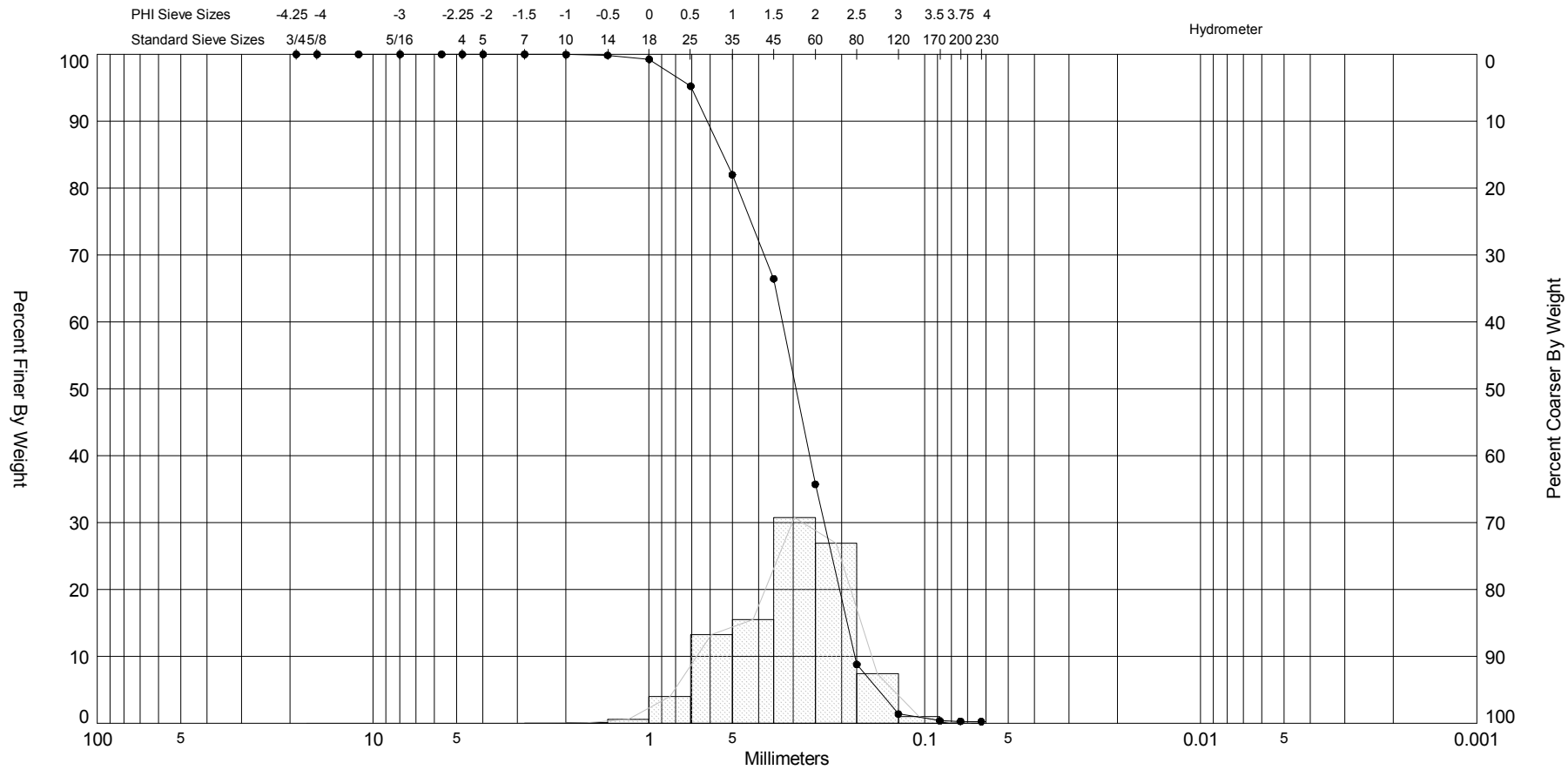

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 002 TOD	—●—	9.0	SP	#200 - 0.29 #230 - 0.26			1.77	1.69	-0.41	2.98	0.68

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-15-13
Analyzed By:	ATP
Easting (X, ft):	2,179,206
Northing (Y, ft):	52,825
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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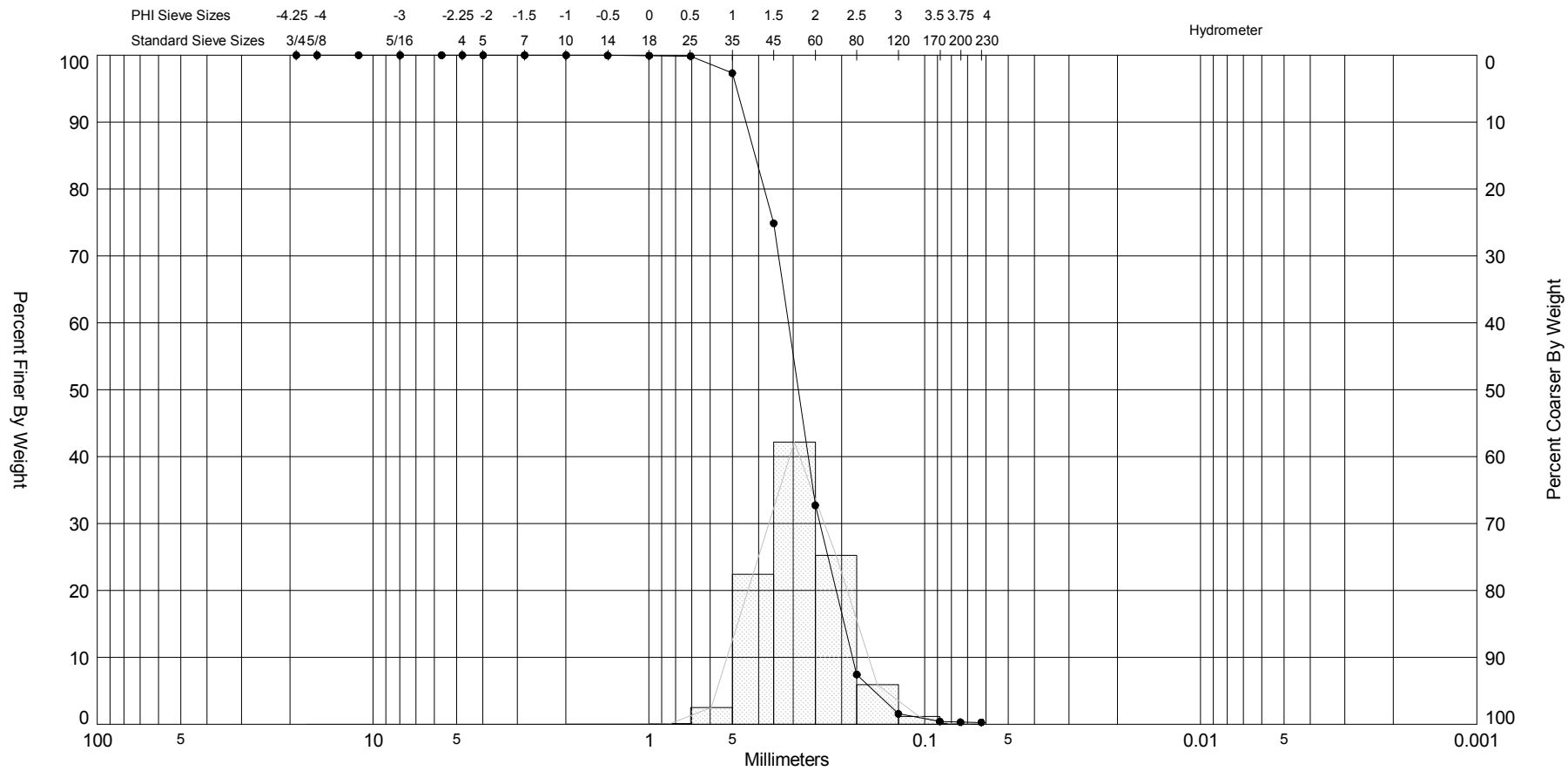

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 003MIDBERM	—●—	7.7	SP	#200 - 0.31 #230 - 0.29			1.8	1.81	0.25	3.58	0.49

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-15-13
Analyzed By:	ATP
Easting (X, ft):	2,179,212
Northing (Y, ft):	52,796
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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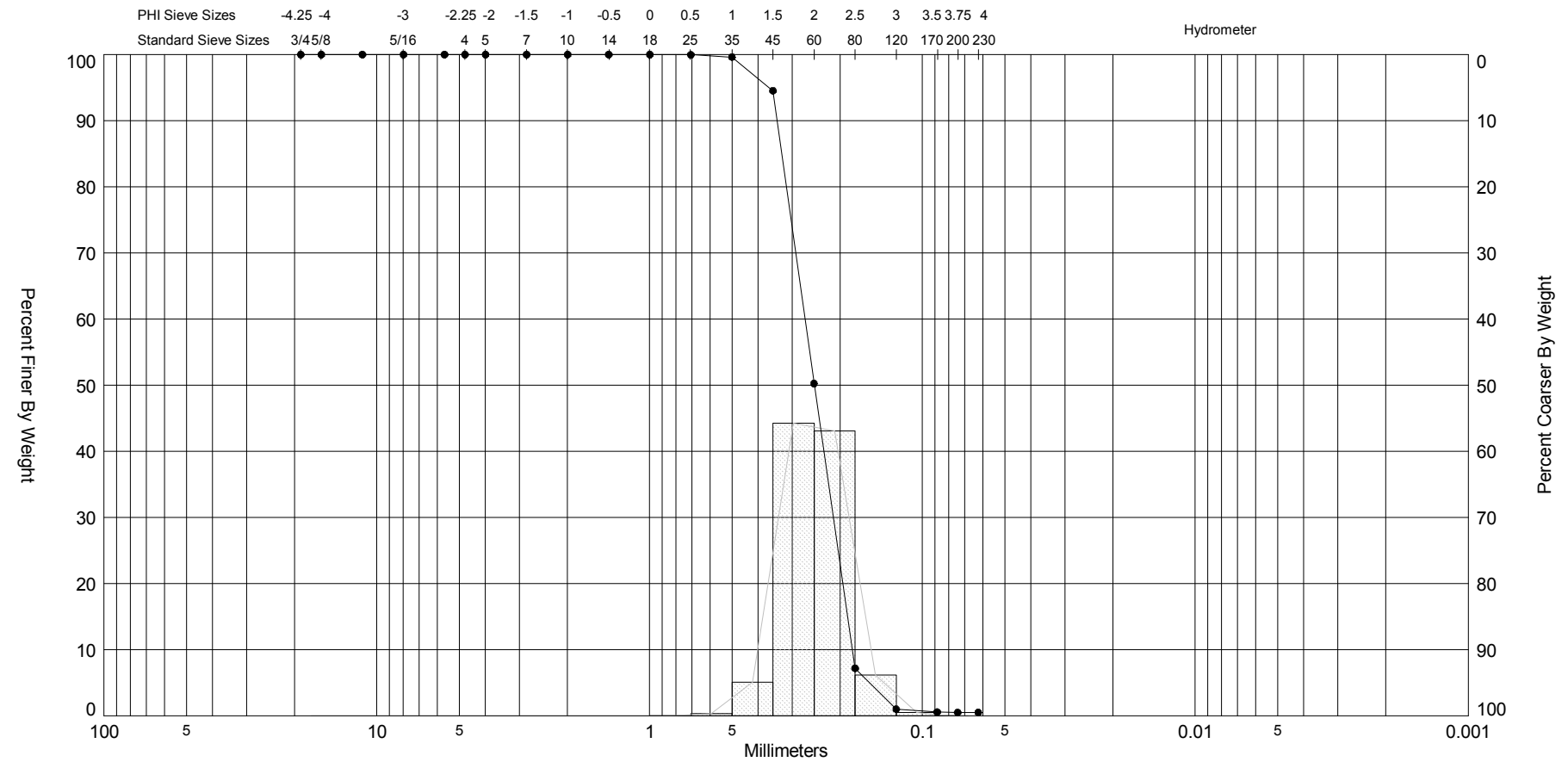

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 004BERMCRST	—●—	3.5	SP	#200 - 0.52 #230 - 0.52			2	2.01	0.08	3.67	0.37

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-15-13
Analyzed By:	ATP
Easting (X, ft):	2,179,228
Northing (Y, ft):	52,745
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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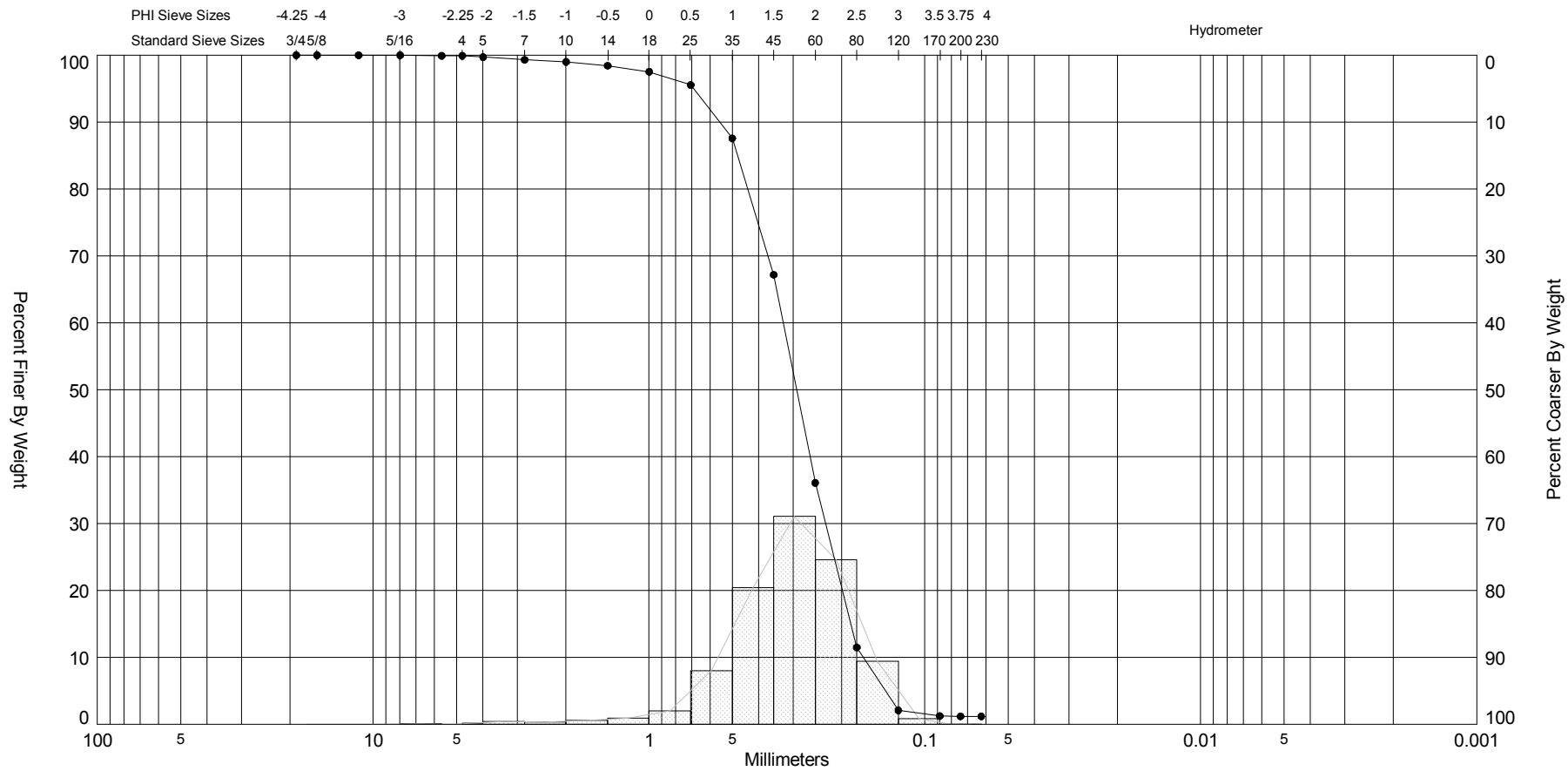

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 005 MHW	—●—	1.3	SP	#200 - 1.19 #230 - 1.18			1.78	1.7	-1.34	7.48	0.74

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-04-14
Analyzed By:	TM
Easting (X, ft):	2,179,244
Northing (Y, ft):	52,732
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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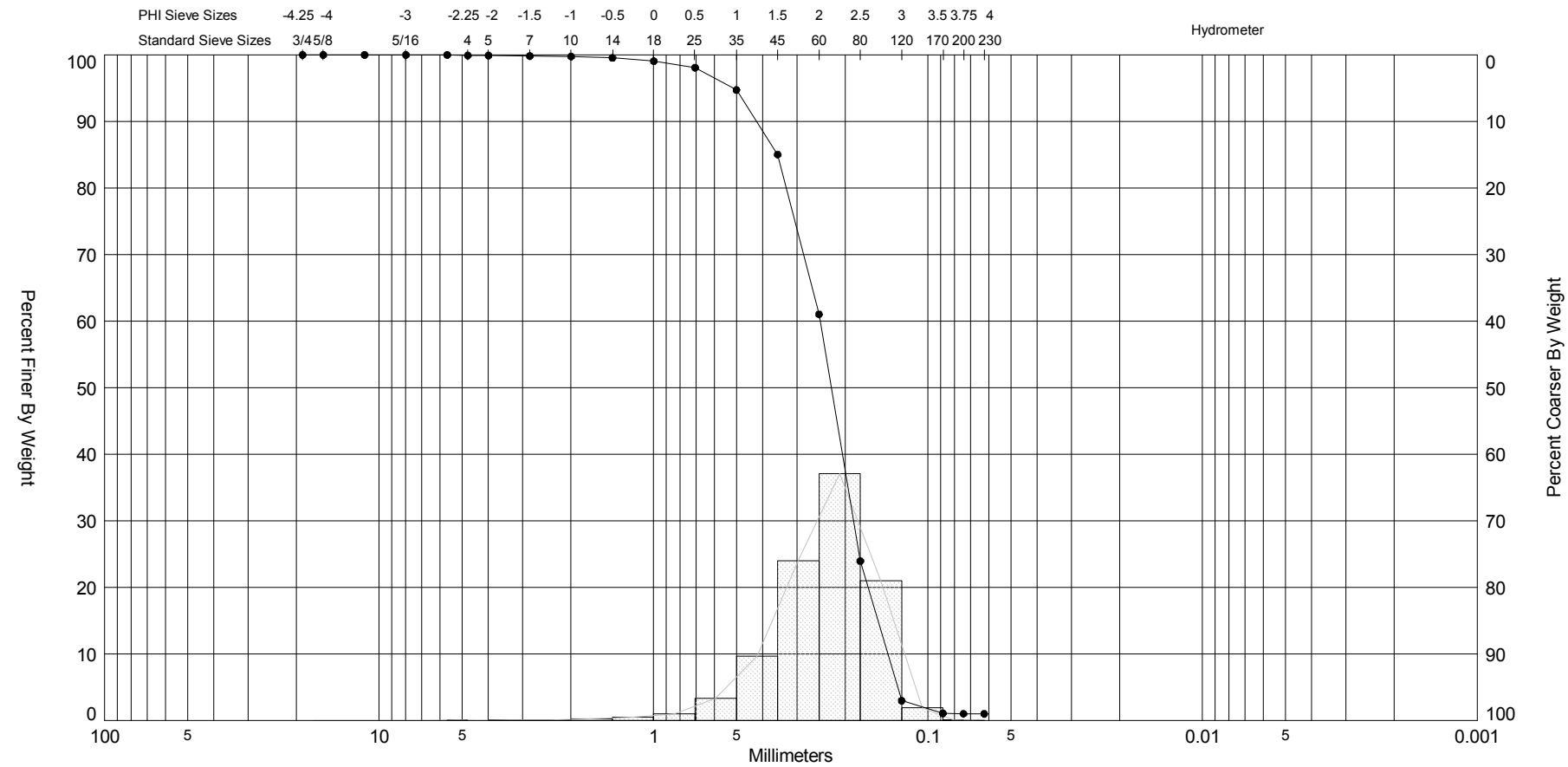

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 006 MTL	—●—	0.0	SP	#200 - 1.02 #230 - 1.01			2.15	2.06	-1.33	7.5	0.63

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-16-13
Analyzed By:	ATP
Easting (X, ft):	2,179,248
Northing (Y, ft):	52,691
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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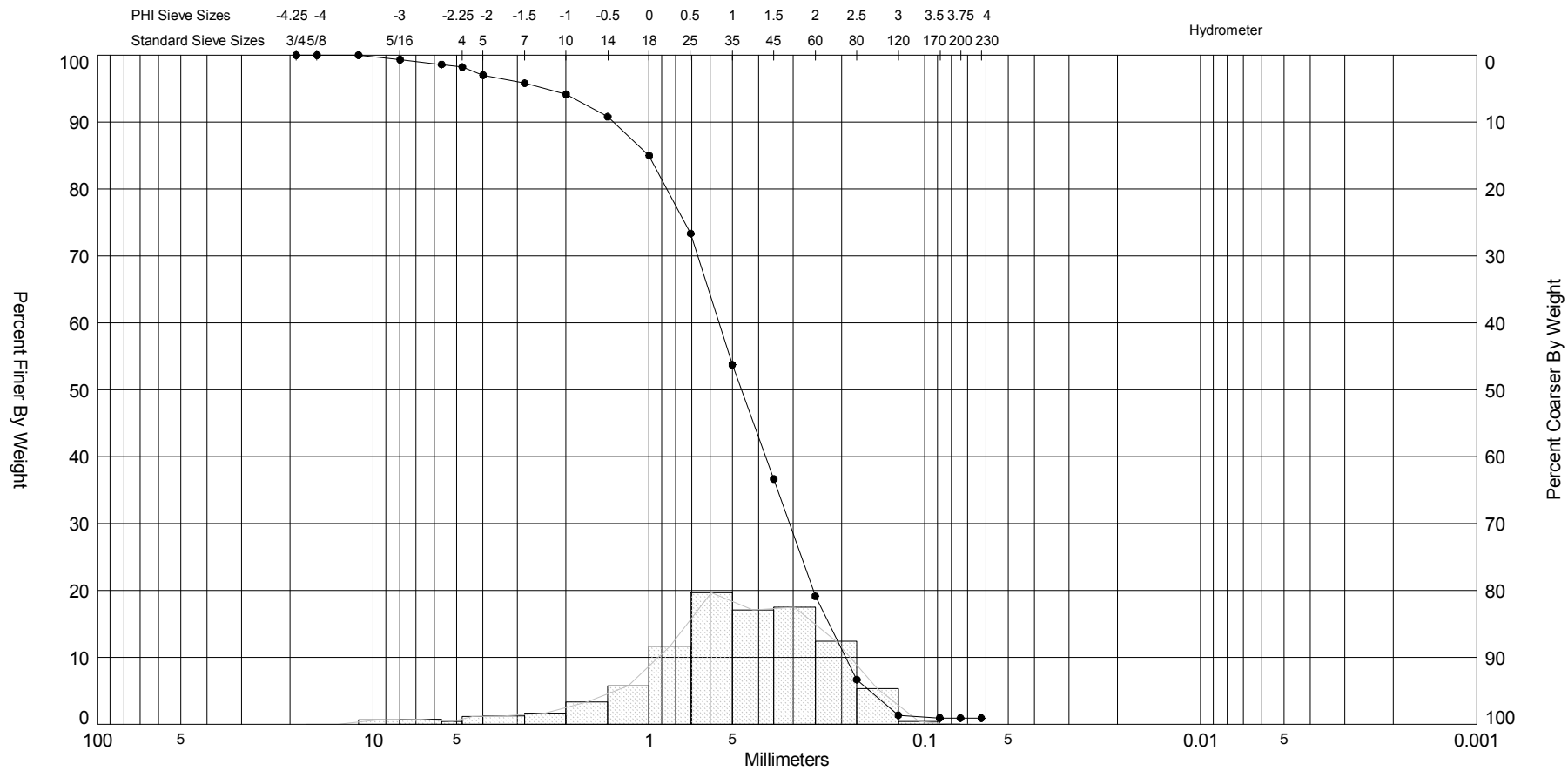

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 007 MLW	—●—	-3.0	SW	#200 - 0.93 #230 - 0.93			1.11	0.99	-0.98	4.42	1.15

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-16-13
Analyzed By:	ATP
Easting (X, ft):	2,179,287
Northing (Y, ft):	52,524
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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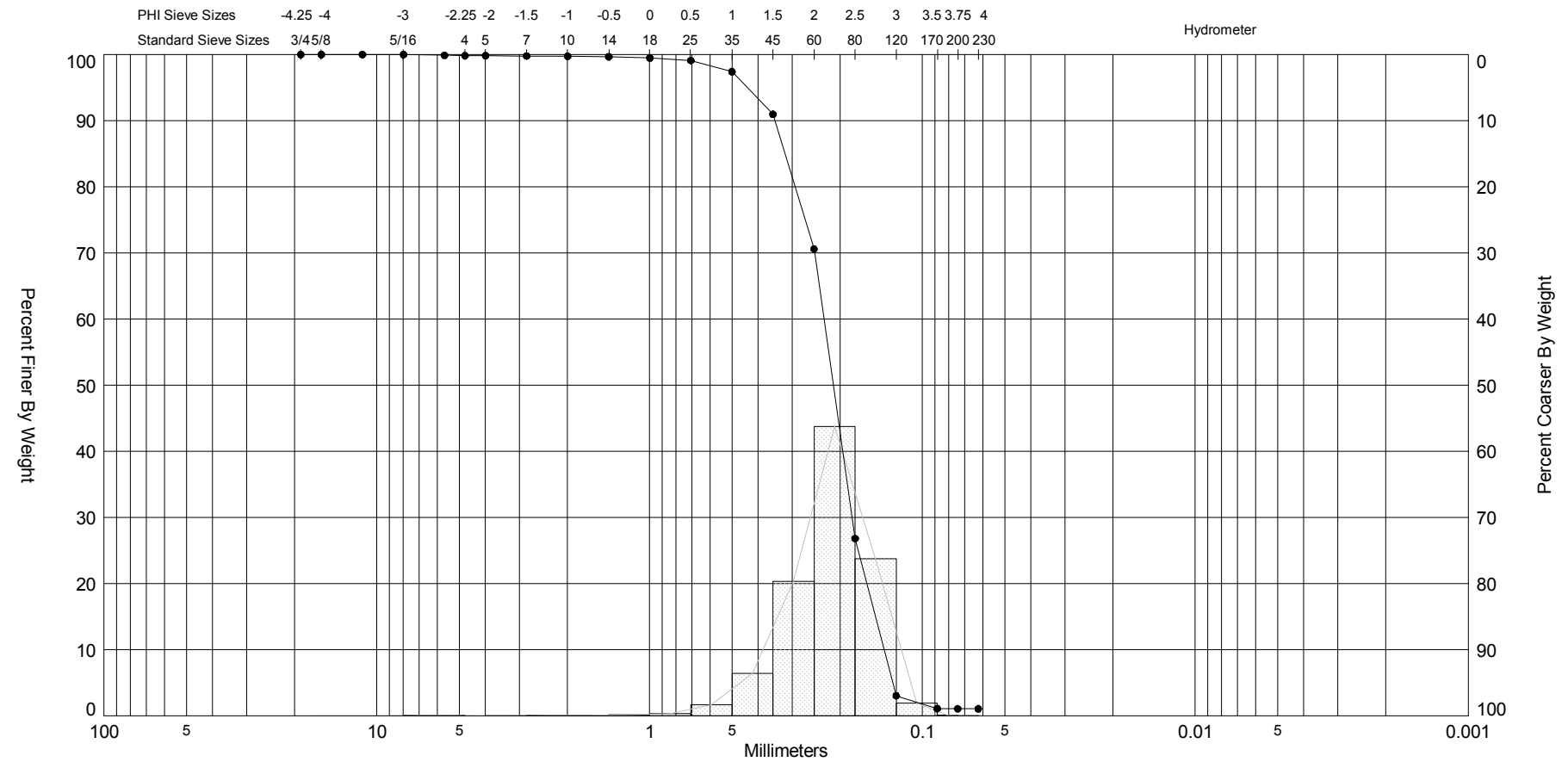

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 008TROUGH	—●—	-5.1	SP	#200 - 1.06 #230 - 1.05			2.24	2.17	-1.94	14.13	0.56

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	04-16-13
Analyzed By:	ATP
Easting (X, ft):	2,179,299
Northing (Y, ft):	52,478
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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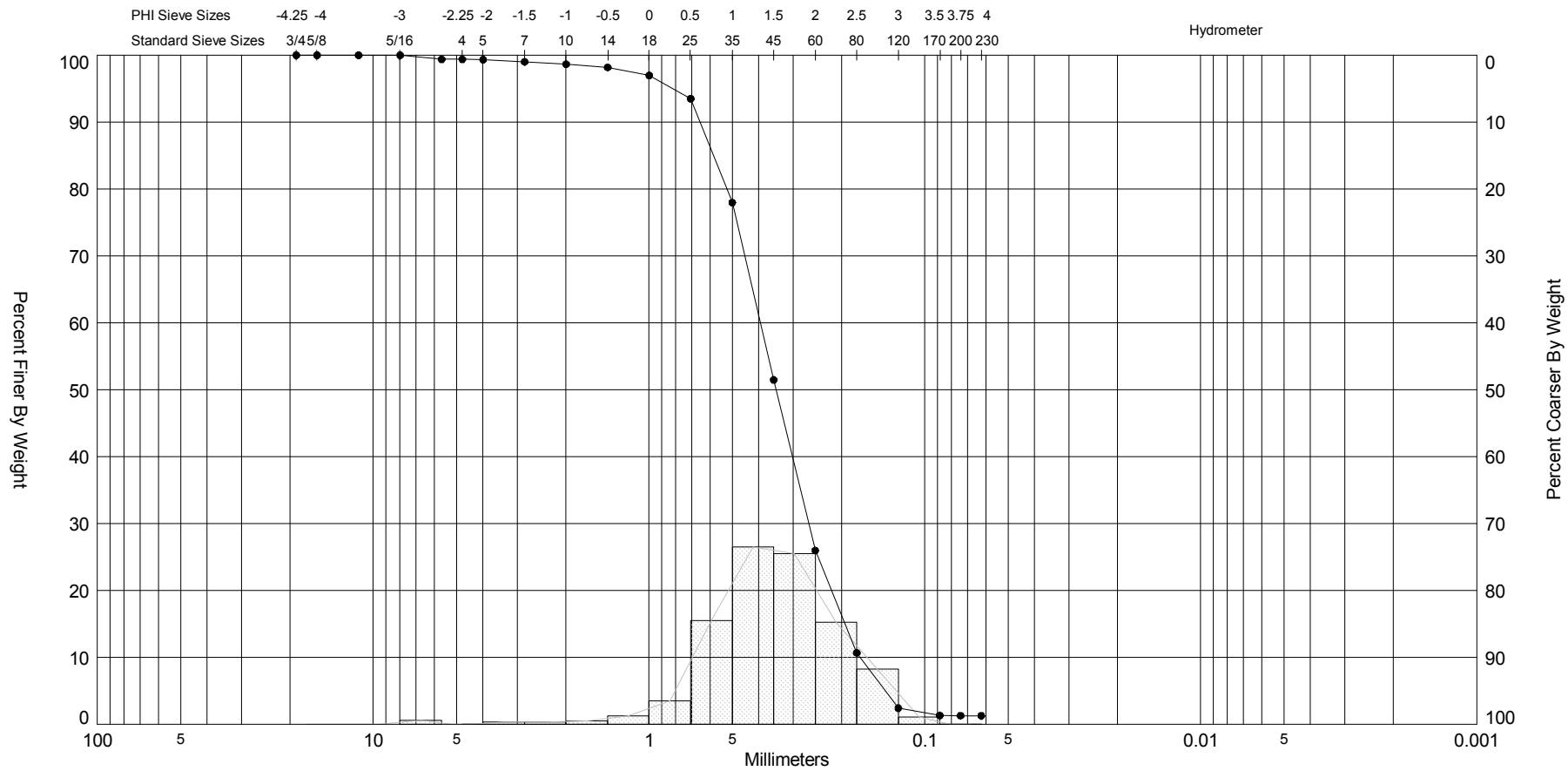

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 009BarCrest	—●—	-6.5	SP	#200 - 1.29 #230 - 1.28			1.53	1.5	-1.17	7.55	0.82

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-04-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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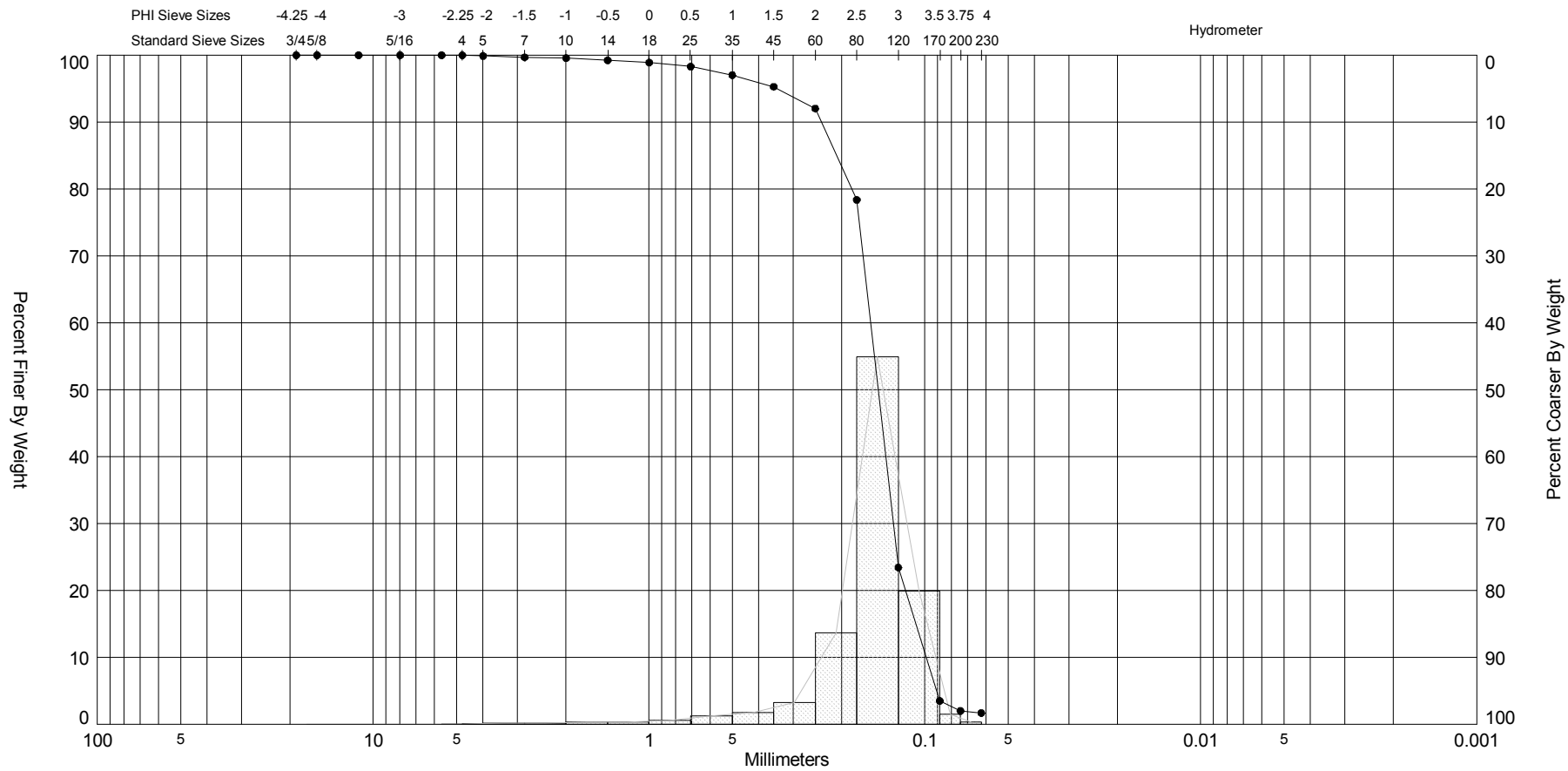

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 010 -8.75 ft	—●—	-8.8	SP	#200 - 2.00 #230 - 1.69			2.76	2.66	-2.93	16.55	0.64

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-17-13
Analyzed By:	ATP
Easting (X, ft):	2,179,361
Northing (Y, ft):	52,216
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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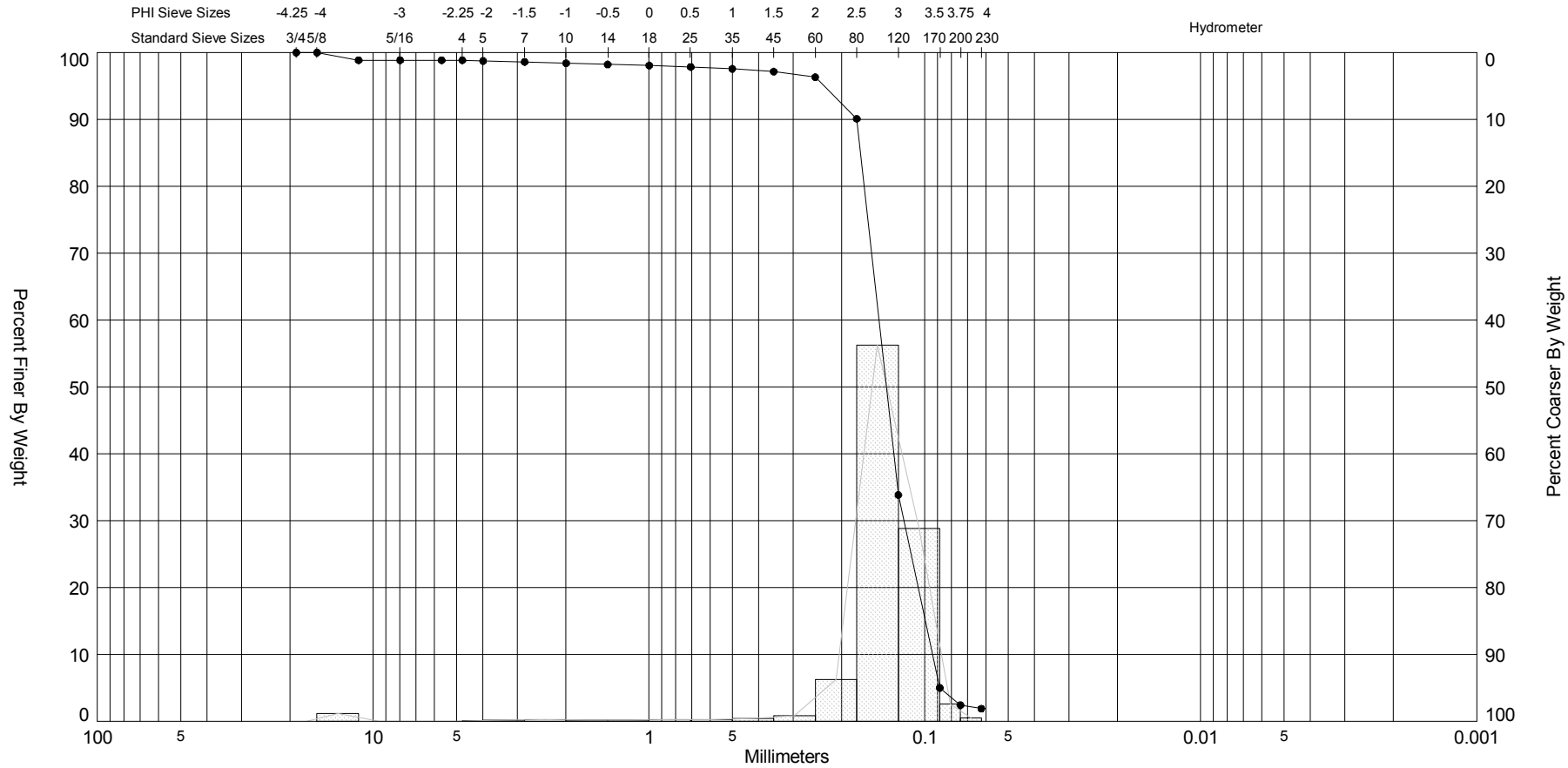

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 011 -12.5 ft	—●—	-12.5	SW	#200 - 2.41 #230 - 1.88			2.86	2.76	-5.51	38.75	0.88

Comments:

Depths and elevations based on measured values

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Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-17-13
Analyzed By:	ATP
Easting (X, ft):	2,179,376
Northing (Y, ft):	52,149
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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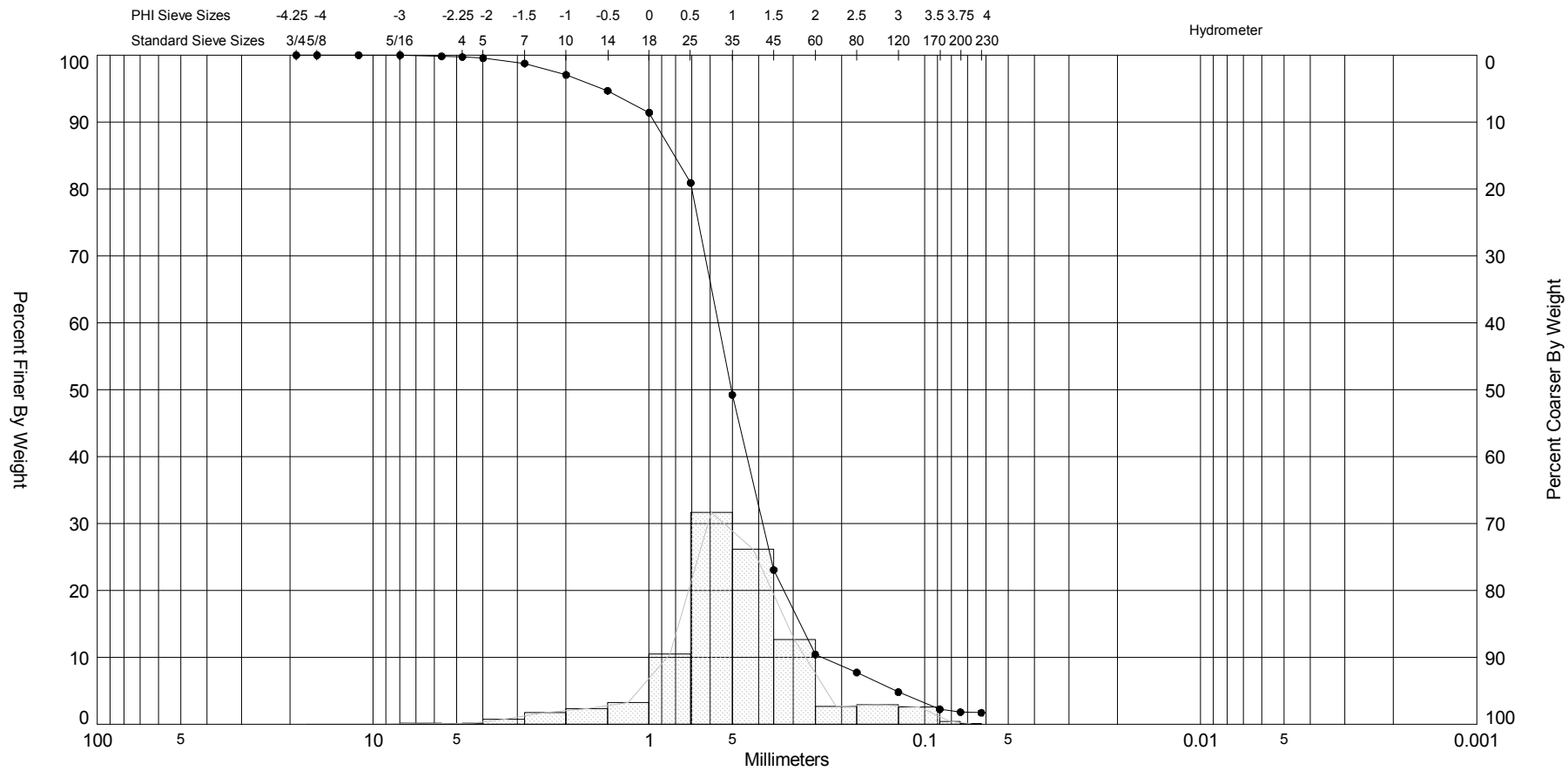

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 012 -16.25 ft	—●—	-16.3	SW	#200 - 1.82 #230 - 1.71			0.99	1	-0.17	5.01	0.9

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-18-13
Analyzed By:	ATP
Easting (X, ft):	2,179,421
Northing (Y, ft):	51,924
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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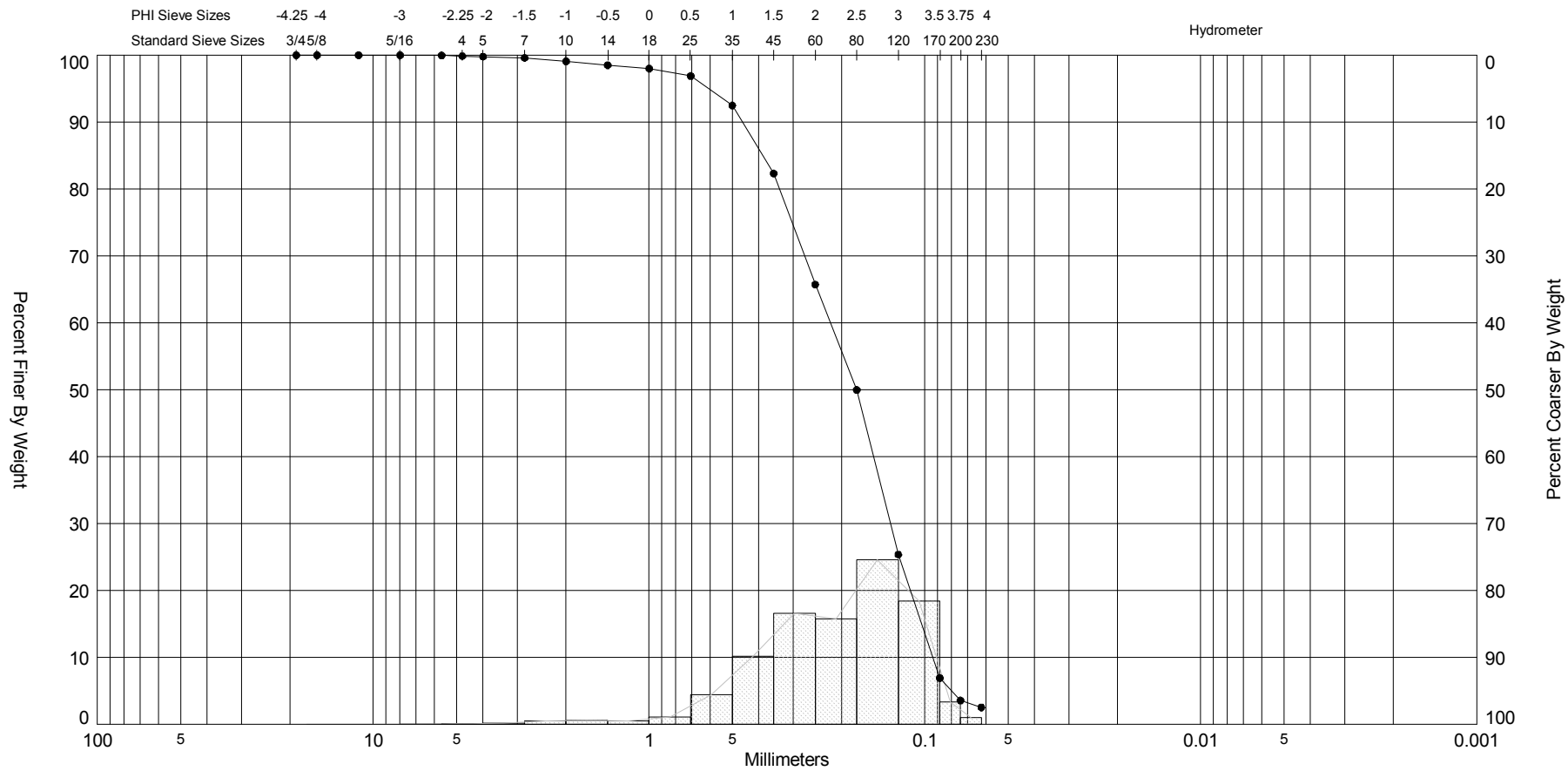

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 013 -20 ft	—●—	-20.0	SW	#200 - 3.55 #230 - 2.53			2.5	2.28	-1.11	5.28	0.93

Comments:

Depths and elevations based on measured values

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Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	06-18-13
Analyzed By:	ATP
Easting (X, ft):	2,179,464
Northing (Y, ft):	51,631
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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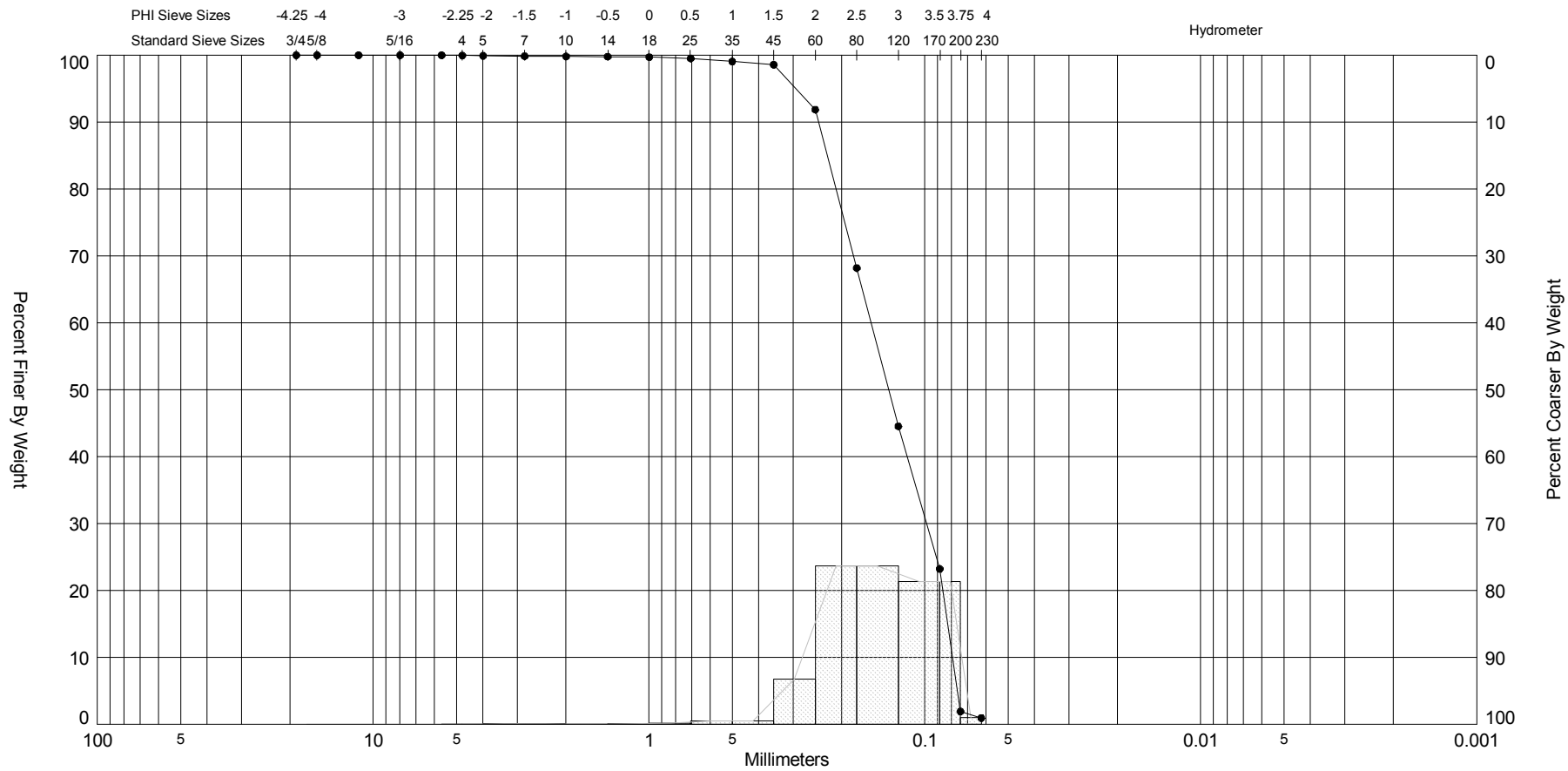

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #001	—●—	7.0	SP	#200 - 1.92 #230 - 0.95		4	2.88	2.84	-1.12	7.59	0.67

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,062
Northing (Y, ft):	53,511
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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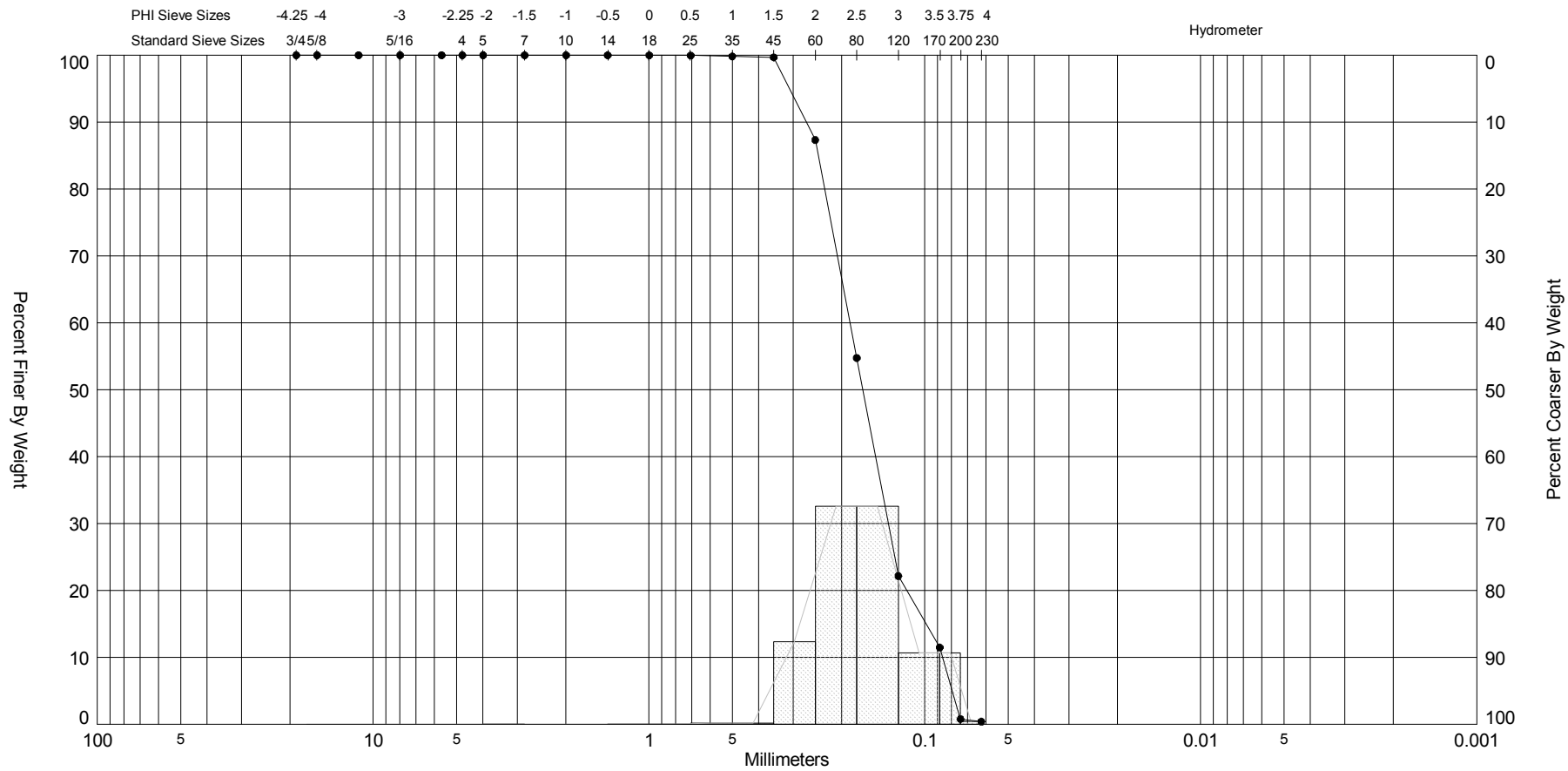

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #002	—●—	5.0	SP	#200 - 0.78 #230 - 0.39		1	2.57	2.61	0.18	2.93	0.56

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,064
Northing (Y, ft):	53,496
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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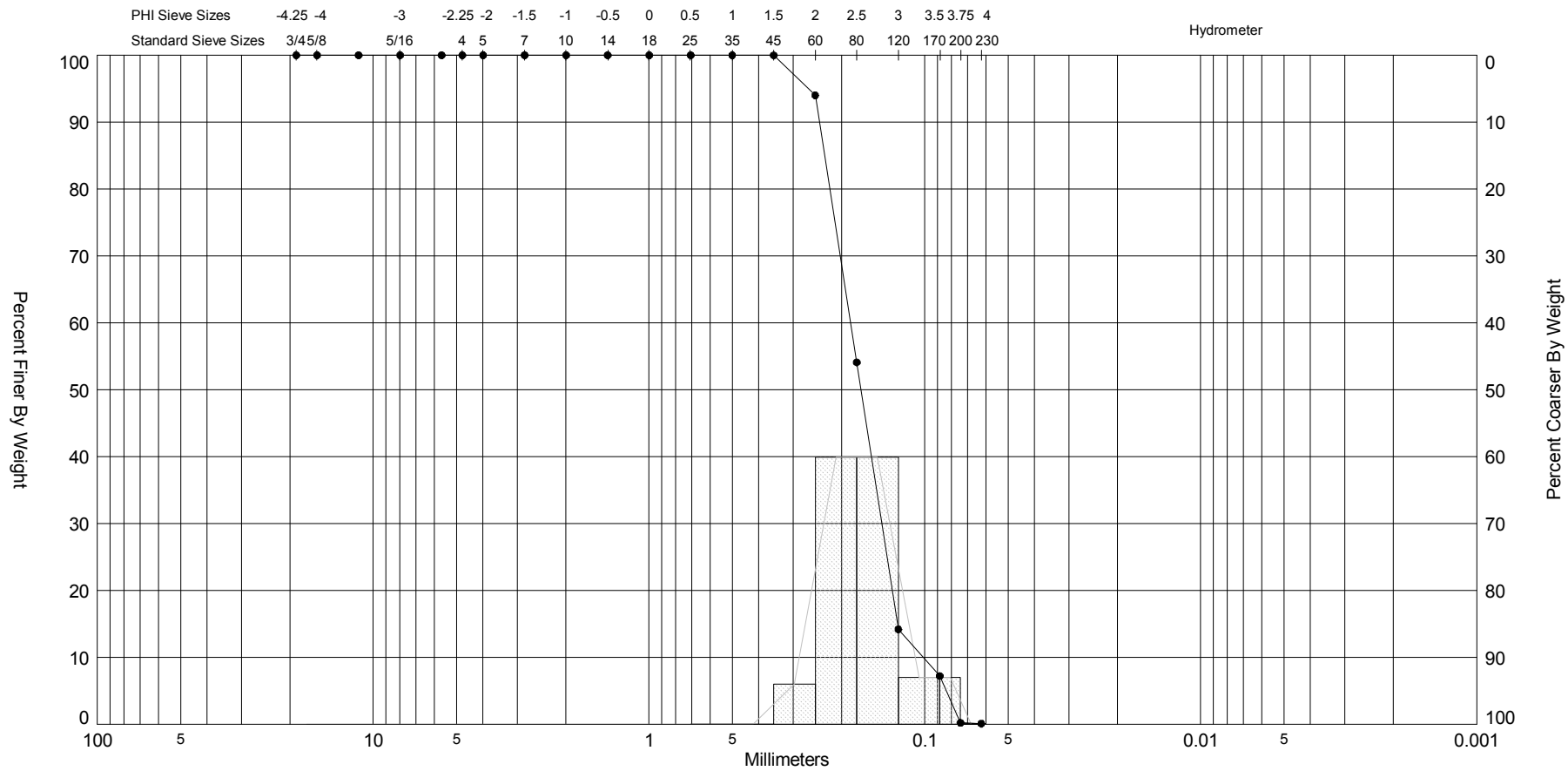

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #003	—●—	3.0	SP	#200 - 0.22 #230 - 0.11		1	2.55	2.59	0.55	3.14	0.45

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-03
Analyzed By:	ATP
Easting (X, ft):	2,181,075
Northing (Y, ft):	53,428
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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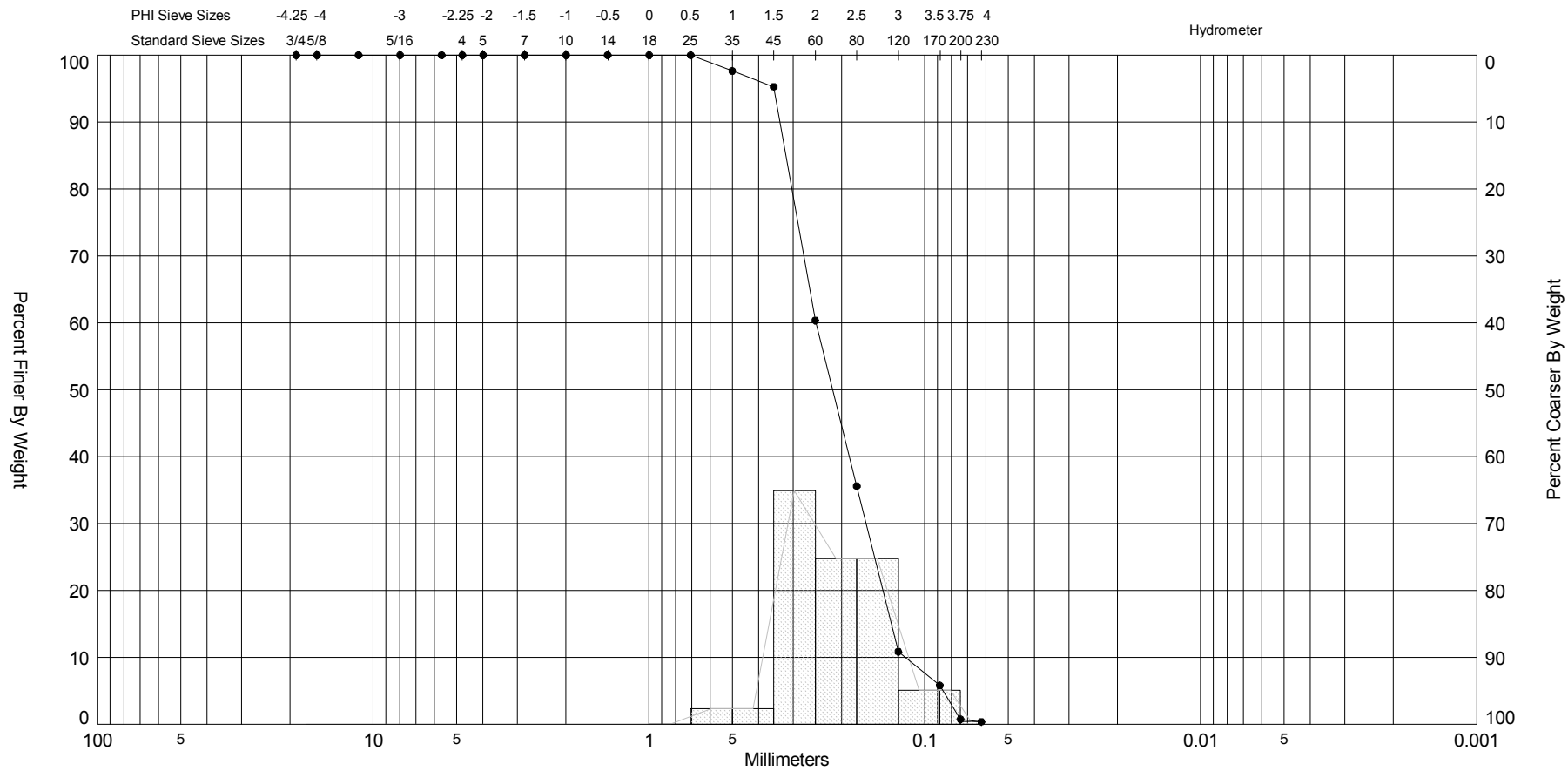

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #004	—●—	1.0	SP	#200 - 0.75 #230 - 0.37		1	2.21	2.27	0.27	2.97	0.62

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,078
Northing (Y, ft):	53,407
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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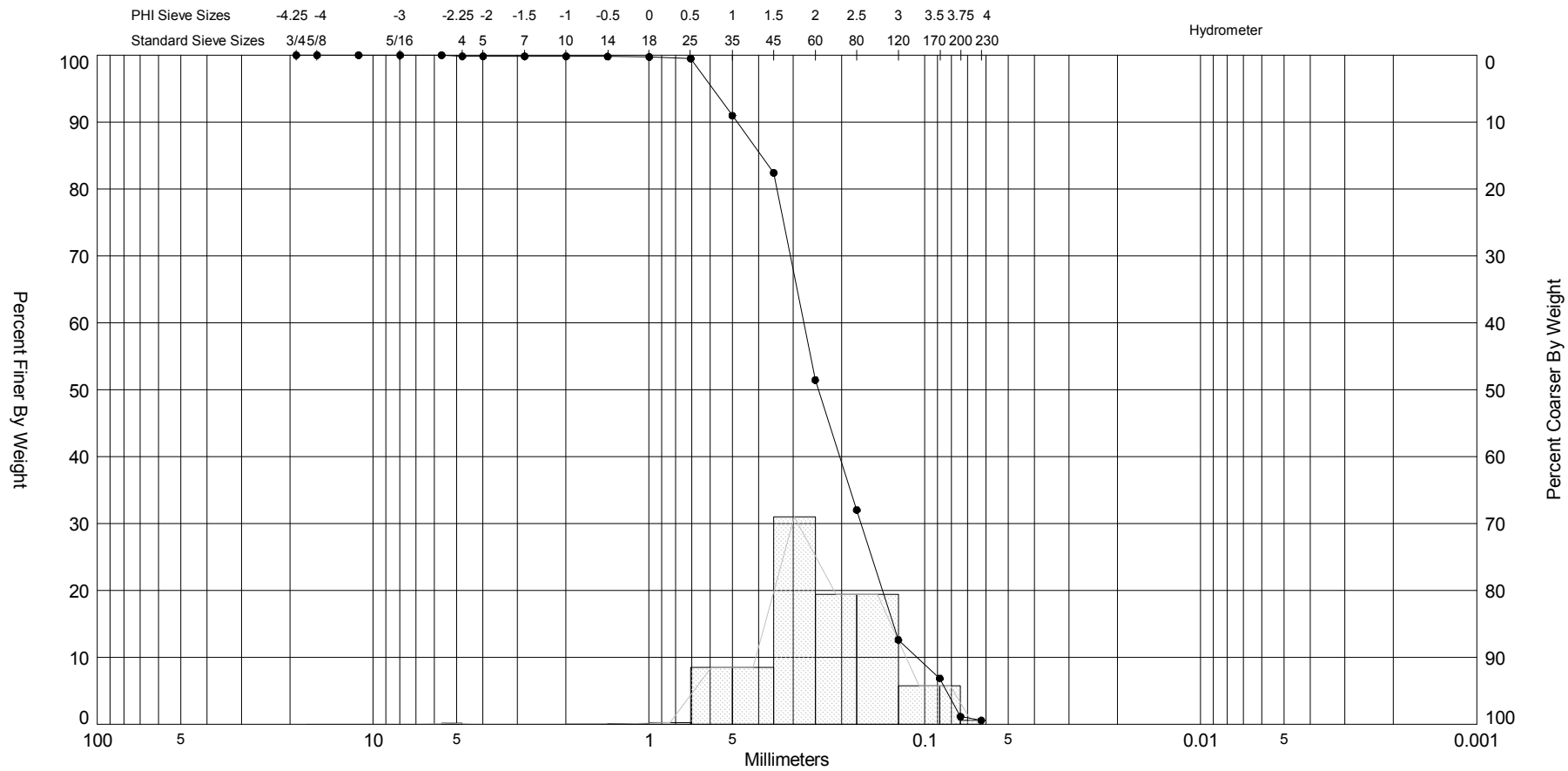

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #005	—●—	-1.0	SP	#200 - 1.14 #230 - 0.57		1	2.04	2.11	-0.2	4.14	0.79

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,084
Northing (Y, ft):	53,369
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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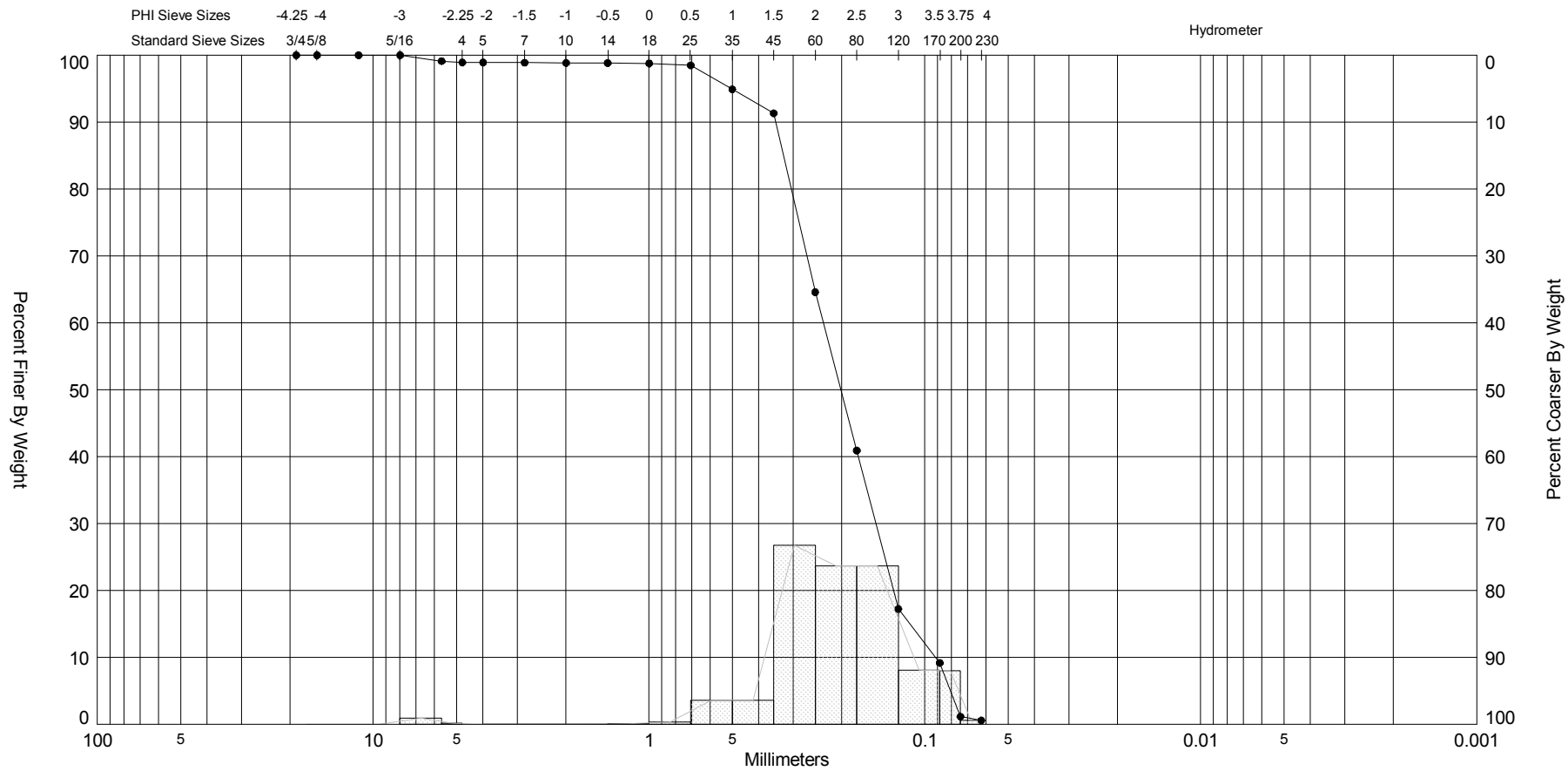

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #006	—●—	-3.0	SW	#200 - 1.15 #230 - 0.57		8	2.31	2.28	-1.88	12.23	0.88

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,092
Northing (Y, ft):	53,315
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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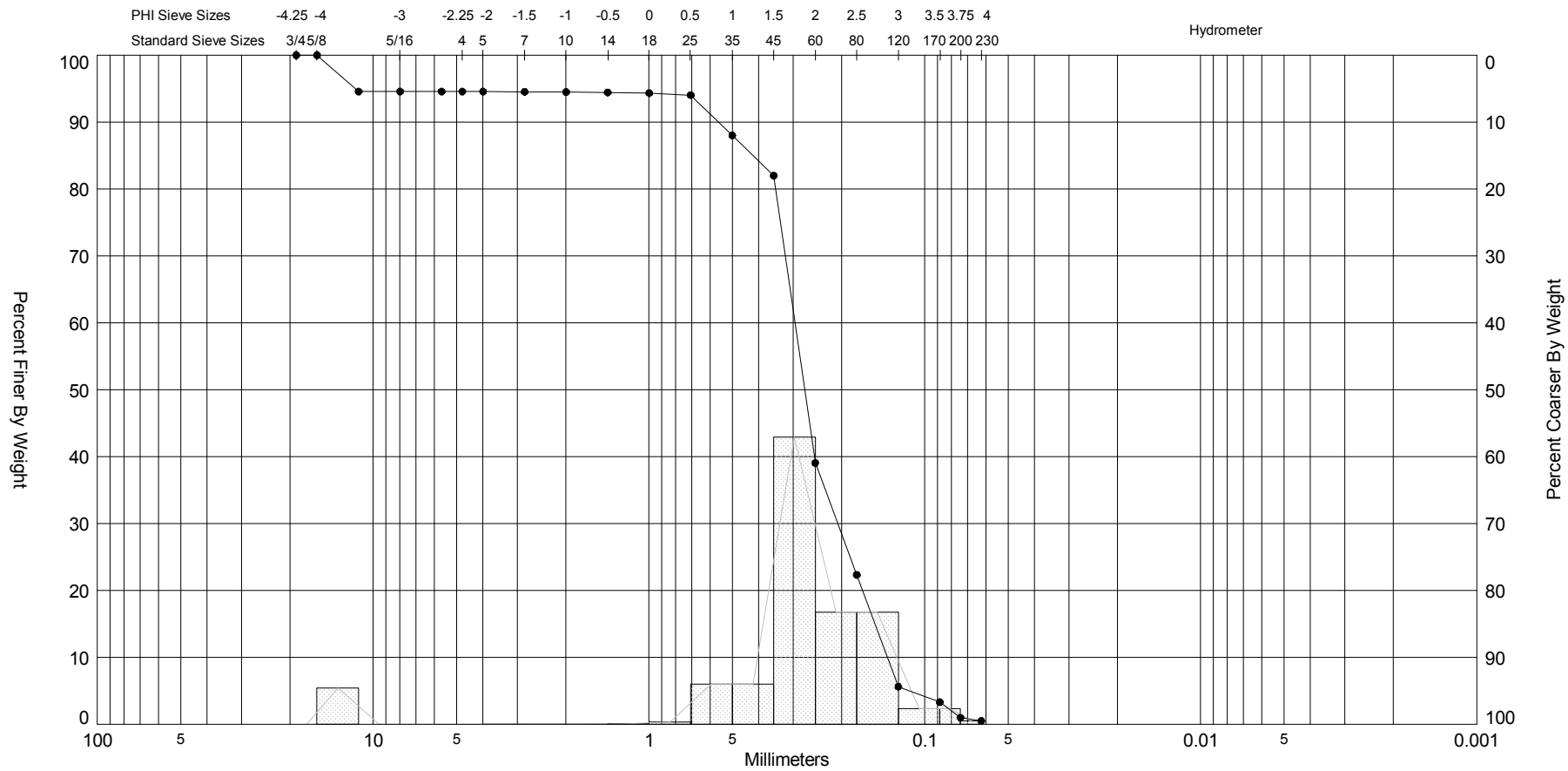

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #007	—●—	-5.0	SW	#200 - 0.98 #230 - 0.49		14	1.87	1.69	-2.72	10.94	1.45

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,097
Northing (Y, ft):	53,282
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

Comments:

Depths and elevations based on measured values

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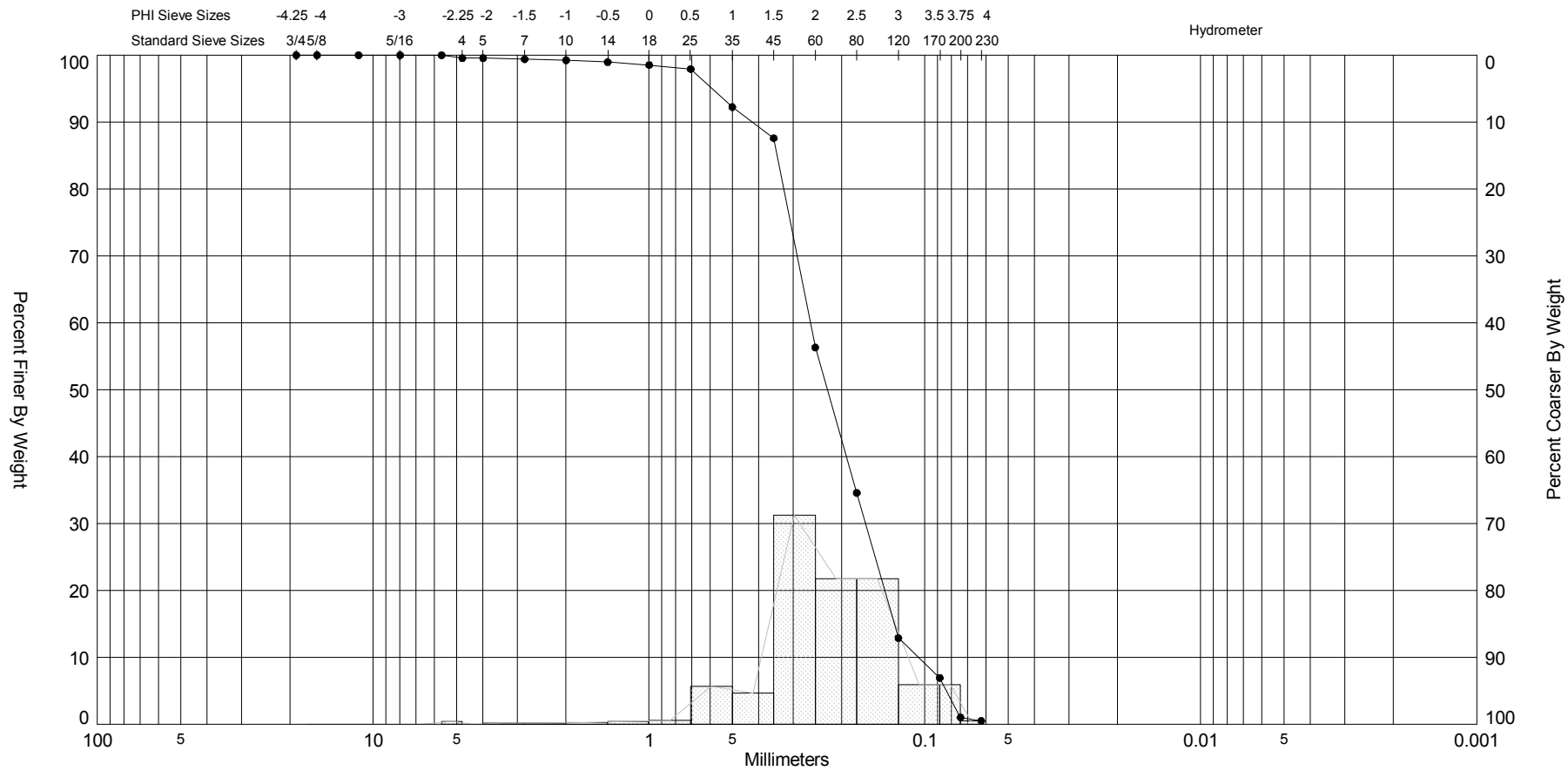

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #008	—●—	-7.0	SP	#200 - 1.03 #230 - 0.51		5	2.15	2.16	-1.05	7.28	0.84

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,127
Northing (Y, ft):	53,089
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

Comments:

Depths and elevations based on measured values

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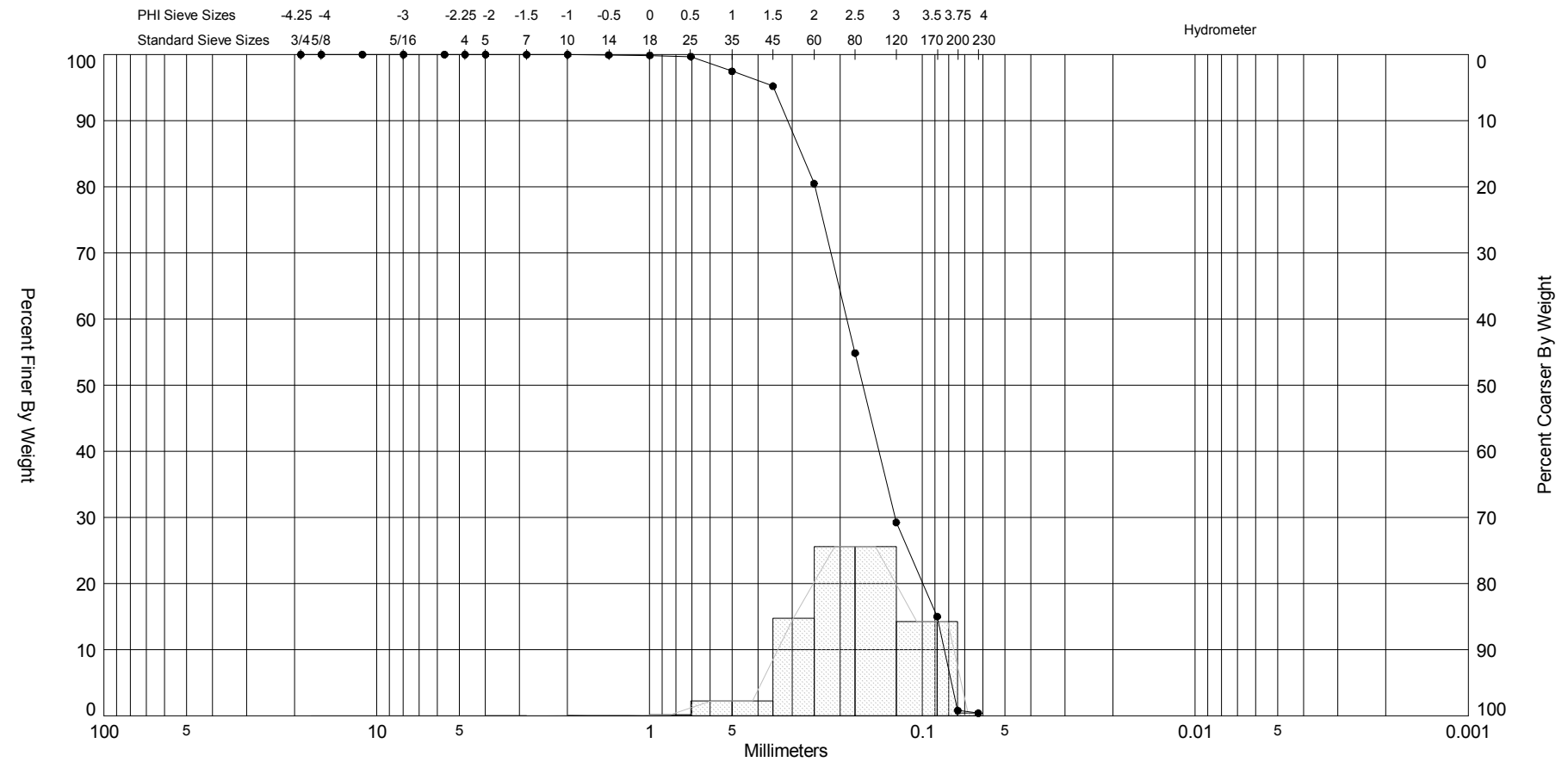

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #009	—●—	-9.0	SP	#200 - 0.80 #230 - 0.40		1	2.59	2.59	-0.4	3.19	0.71

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-15-13
Analyzed By:	ATP
Easting (X, ft):	2,181,137
Northing (Y, ft):	53,027
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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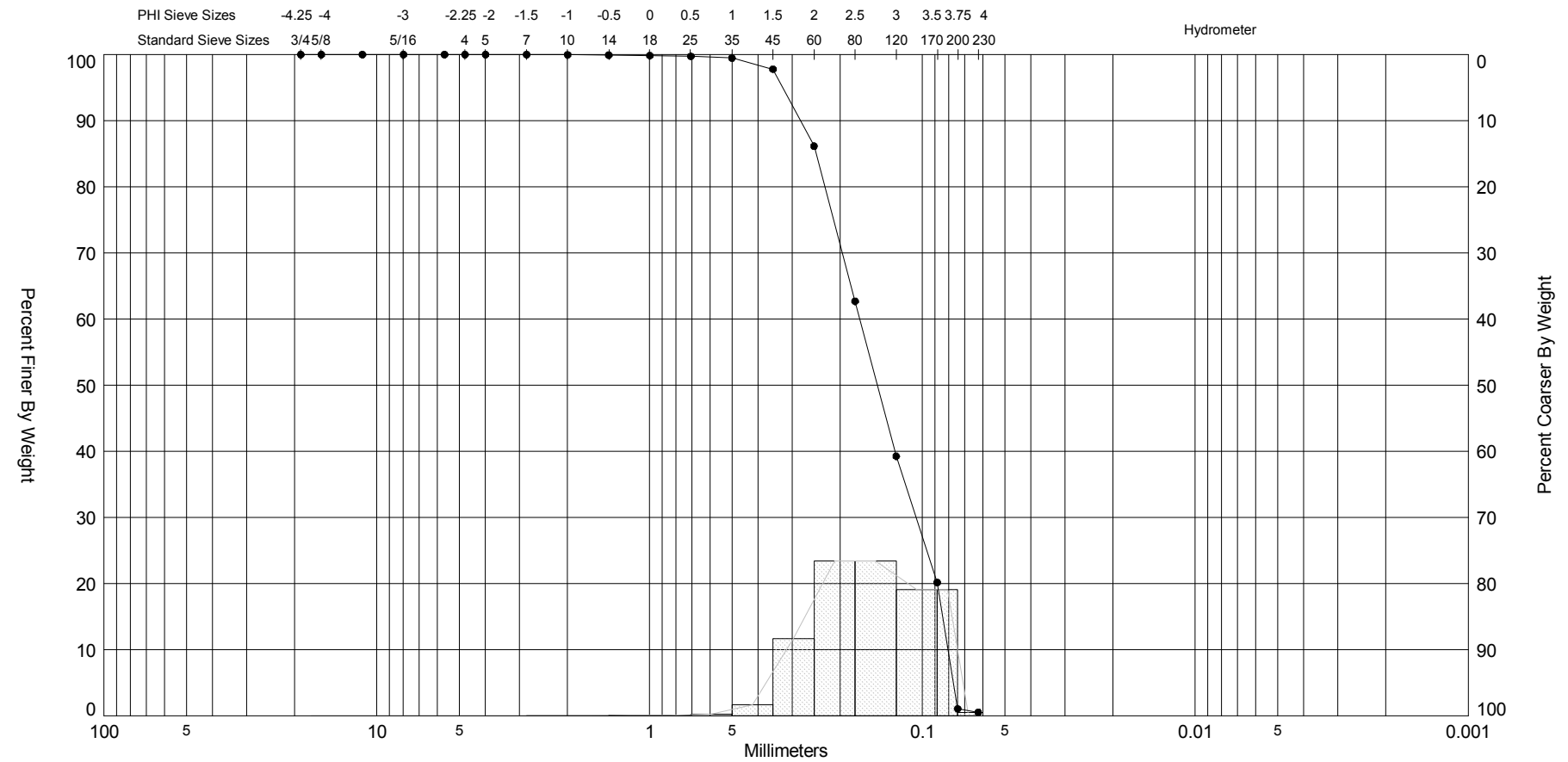

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #010	—●—	-11.0	SP	#200 - 1.07 #230 - 0.53		1	2.77	2.75	-0.46	3.23	0.67

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,149
Northing (Y, ft):	52,951
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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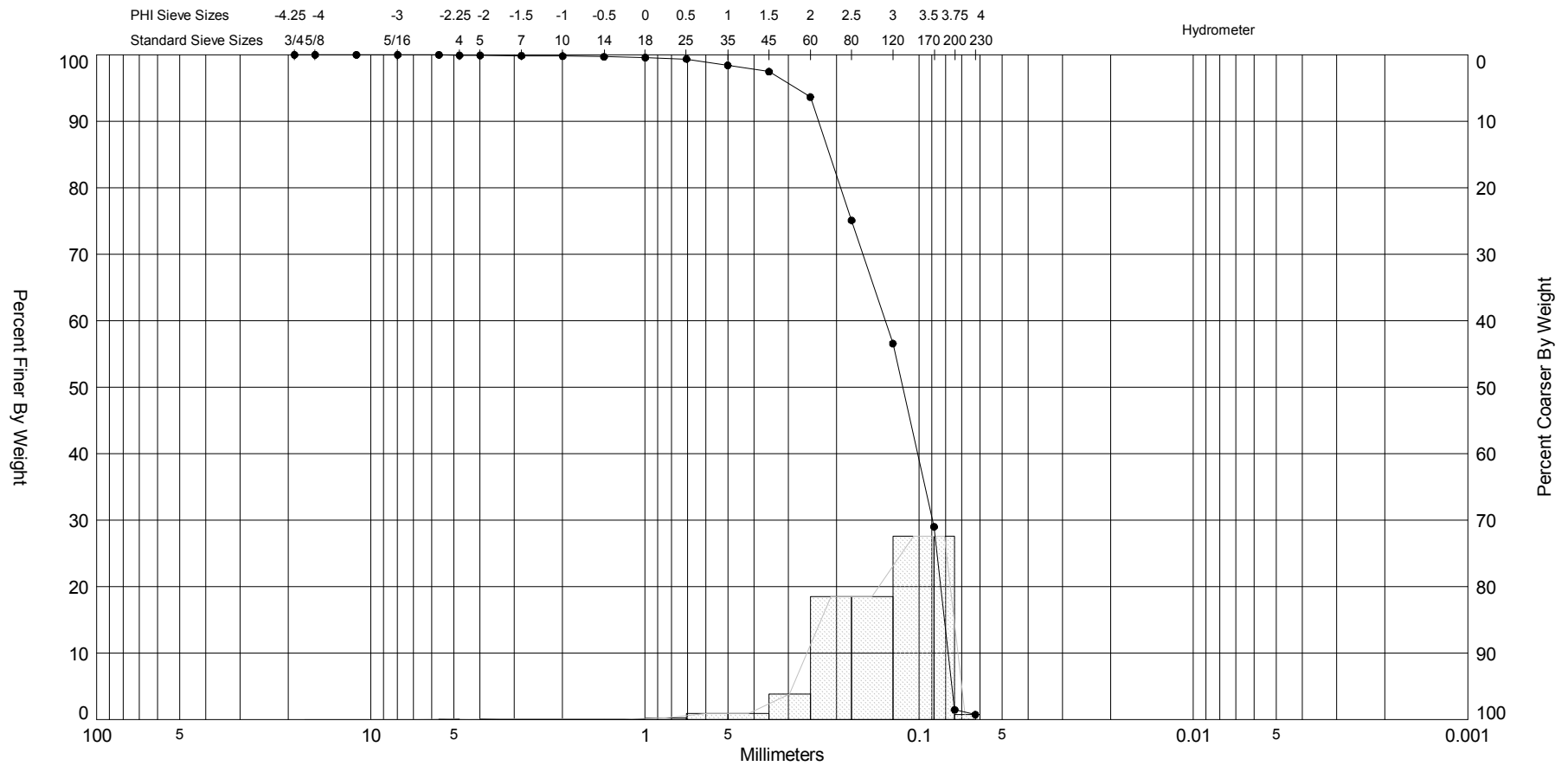

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #011	—●—	-13.0	SP	#200 - 1.46 #230 - 0.73			3.12	2.95	-1.67	9.11	0.69

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	08-05-13
Analyzed By:	ATP
Easting (X, ft):	2,181,202
Northing (Y, ft):	52,603
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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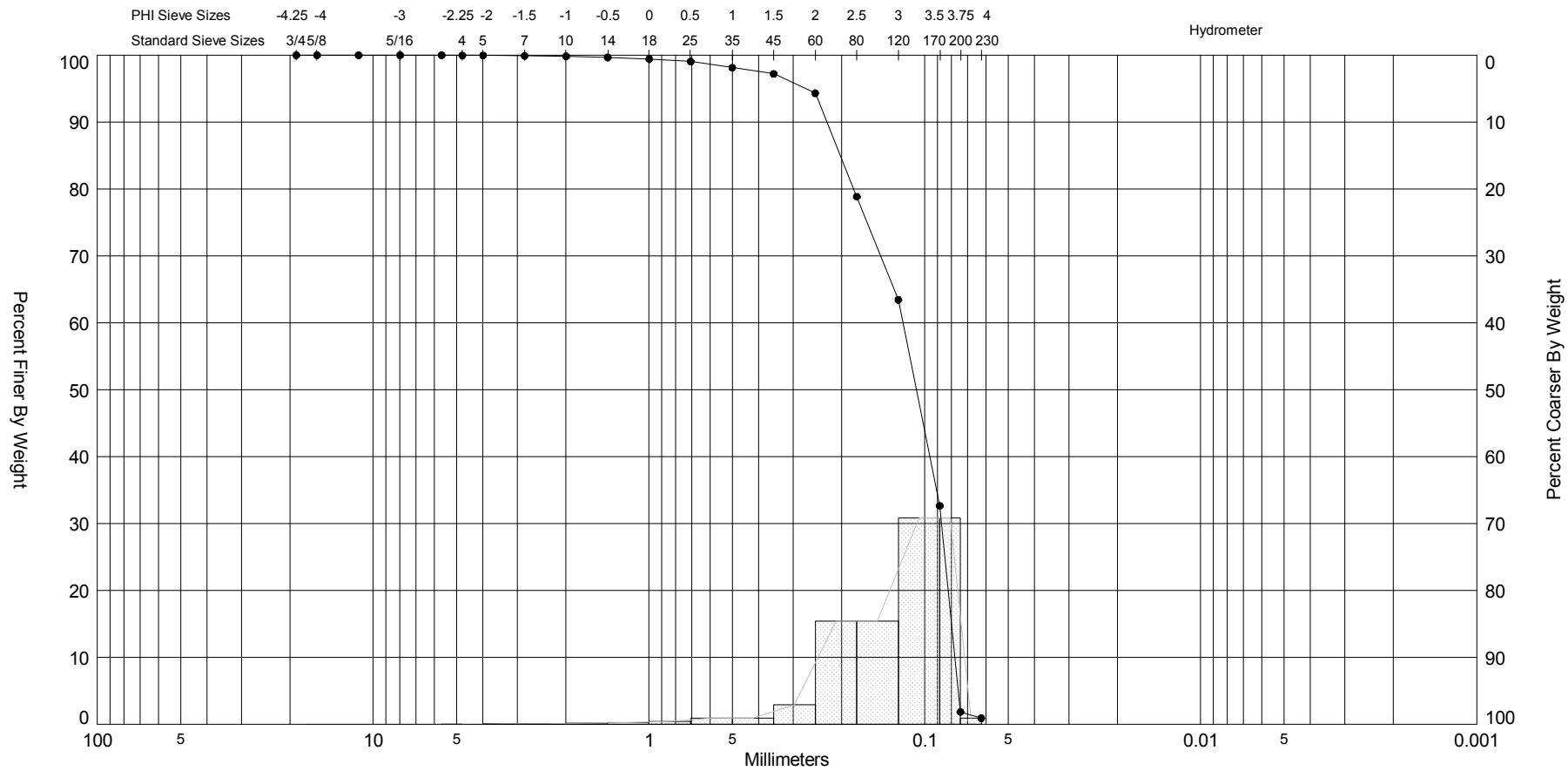

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #012	—●—	-15.0	SP	#200 - 1.85 #230 - 0.92		1	3.22	3.02	-1.94	9.55	0.69

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,222
Northing (Y, ft):	52,475
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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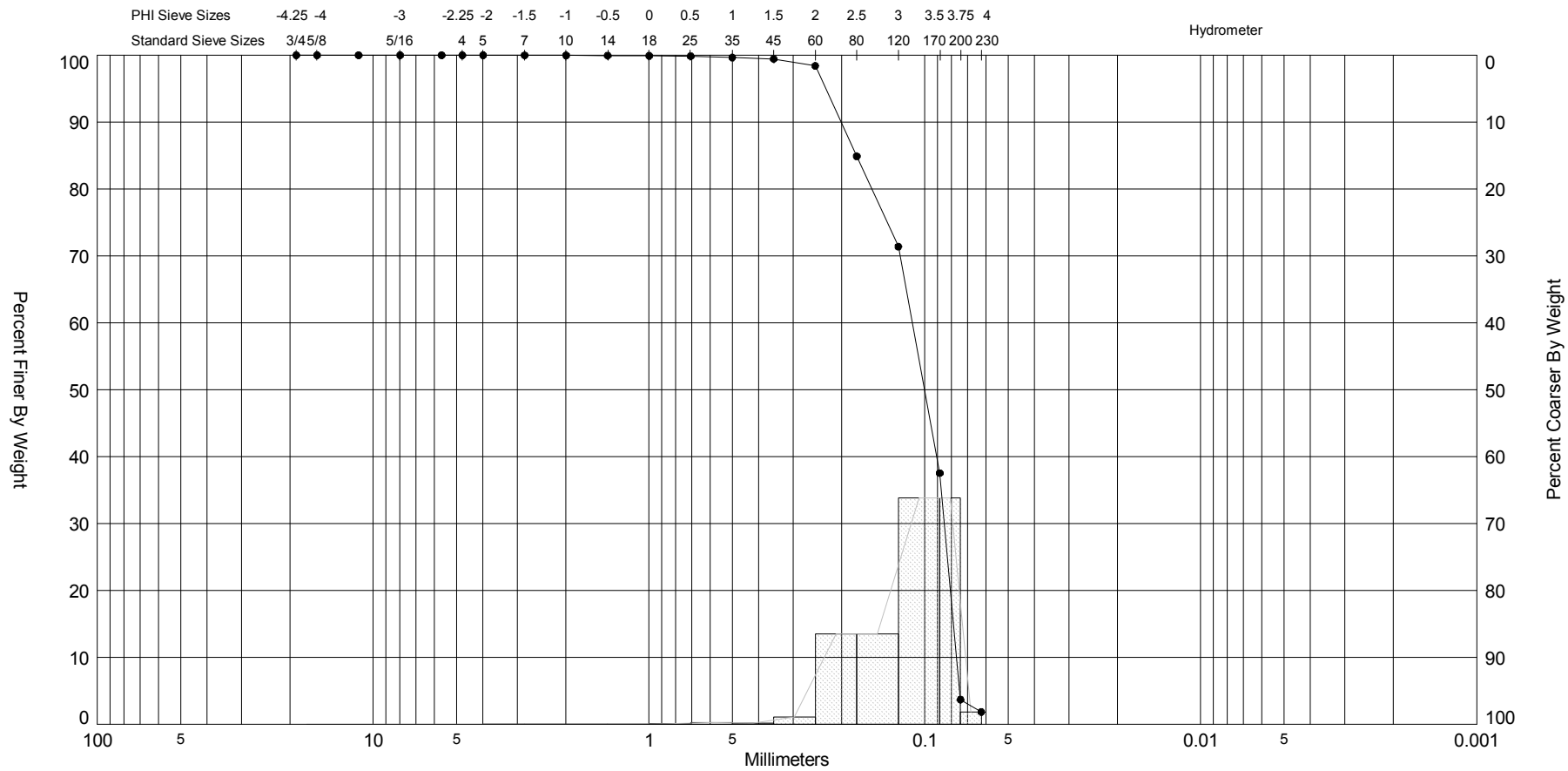

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #013	—●—	-17.0	SP	#200 - 3.70 #230 - 1.85			3.32	3.15	-1.41	6.77	0.53

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	08-05-13
Analyzed By:	ATP
Easting (X, ft):	2,181,244
Northing (Y, ft):	52,332
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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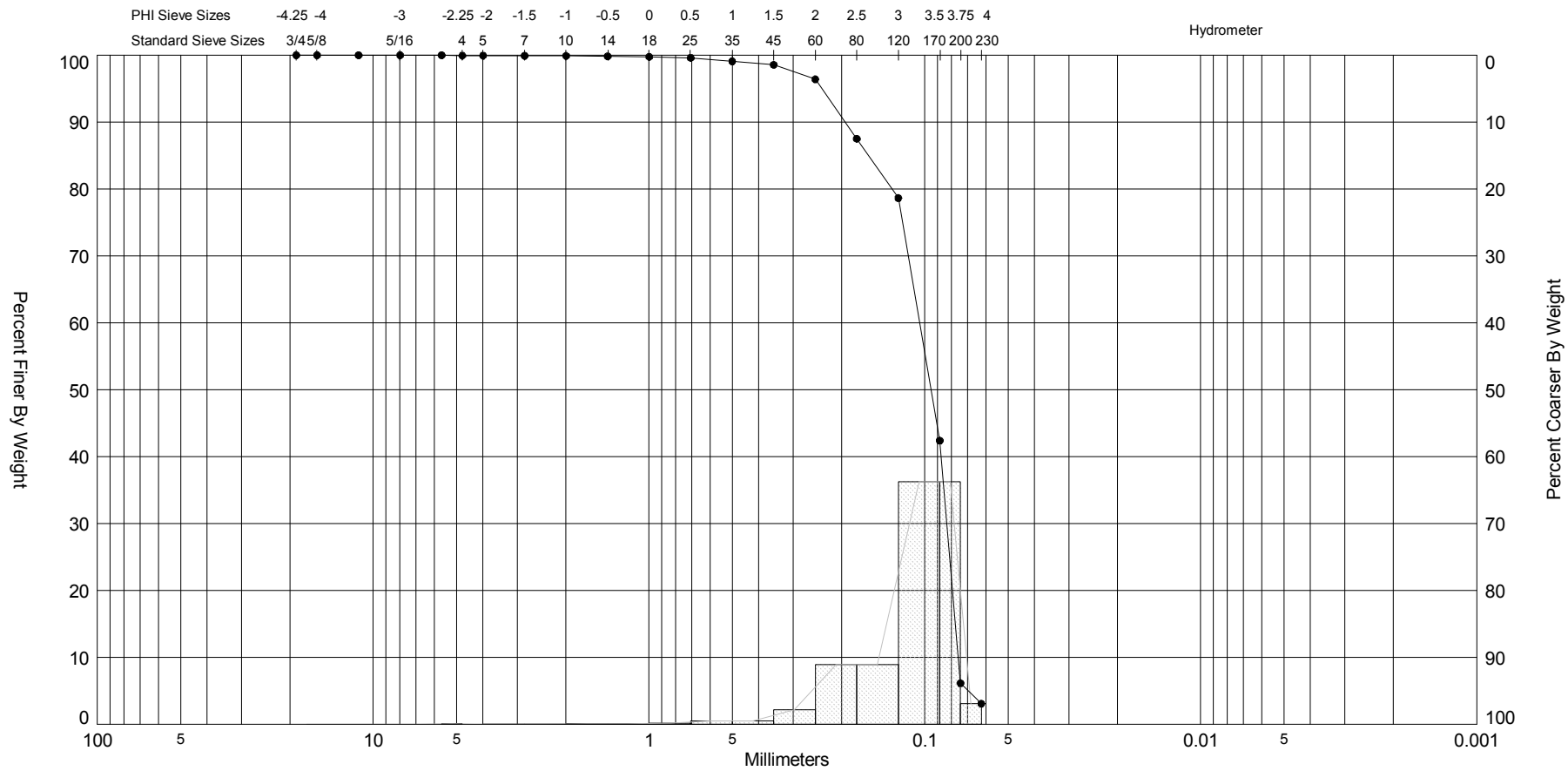

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #014	—●—	-19.0		#200 - 6.14 #230 - 3.07		2	3.4	3.2	-2.43	13.58	0.59

Comments:

Depths and elevations based on measured values

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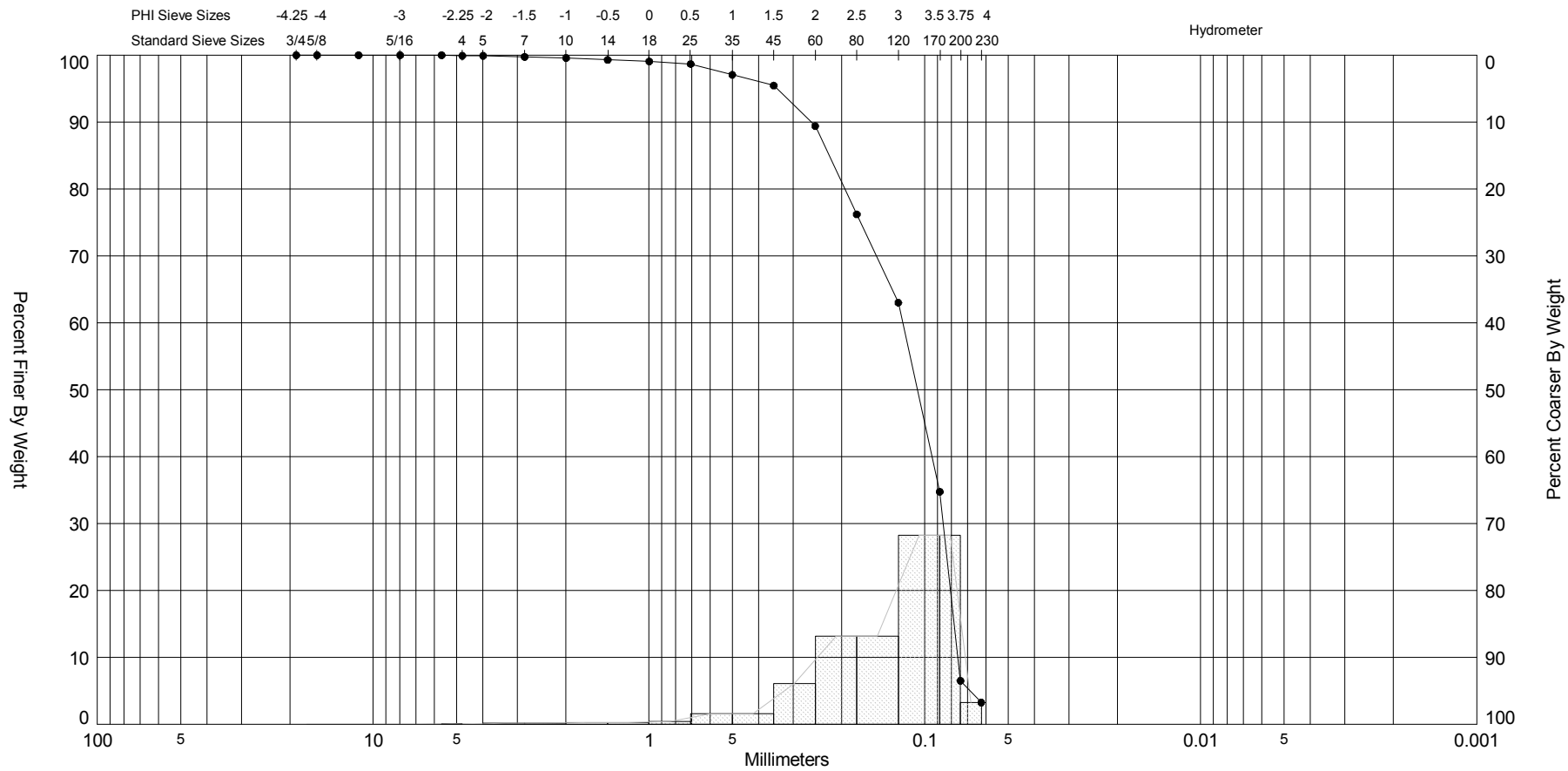
Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,265
Northing (Y, ft):	52,201
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

SIEVE ANALYSIS OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
USACE OIB040 #015	—●—	-21.0		#200 - 6.50 #230 - 3.25		2	3.23	2.95	-1.91	8.71	0.82

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	2,181,290
Northing (Y, ft):	52,037
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

Comments:

Depths and elevations based on measured values

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SIEVE ANALYSIS OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/18/14

APPENDIX 4
BEACH COMPOSITE SUMMARY TABLES

PROFILE LINE COMPOSITE SUMMARY TABLE
OCEAN ISLE BEACH 2013 NATIVE BEACH SAMPLES

PROFILE	MEAN (mm)	PHI MEAN	PHI SORTING	SILT (%)	WET MUNSELL VALUE	DRY MUNSELL VALUE	CARBONATE (%)
OIB000 COMPOSITE	0.24	2.05	0.86	1.23	5	7	5
OIB010 COMPOSITE	0.23	2.10	0.78	1.64	5	7	5
OIB025 COMPOSITE	0.26	1.94	1.05	1.93	5	7	7
OIB040 COMPOSITE	0.17	2.54	0.89	0.94	-	-	-
OIB060 COMPOSITE	0.26	1.92	0.91	1.12	5	7	-
DUNE COMPOSITE	0.23	2.13	0.46	0.69	6	8	
TOE OF DUNE COMPOSITE	0.23	2.12	0.72	0.33	7	7	
MID BERM COMPOSITE	0.26	1.96	0.79	0.23	6	7	
BERM CREST COMPOSITE	0.24	2.03	0.72	0.22	6	7	
MHW COMPOSITE	0.23	2.15	0.56	0.70	5	7	
MTL COMPOSITE	0.26	1.95	0.67	0.78	5	7	
MLW COMPOSITE	0.37	1.45	1.13	0.80	5	7	
TROUGH COMPOSITE	0.25	2.02	1.03	0.88	5	7	
BAR CREST COMPOSITE	0.27	1.88	0.84	1.03	5	6	
-8.75 NAVD COMPOSITE	0.20	2.34	0.86	1.13	5	6	
-12.5 NAVD COMPOSITE	0.14	2.86	0.60	1.75	4	6	
-16.25 NAVD COMPOSITE	0.13	2.93	0.65	2.97	4	6	
-20.0 NAVD COMPOSITE	0.14	2.83	0.92	4.30	4	6	
TOTAL BEACH COMPOSITE	0.23	2.11	0.92	1.34	5	7	6

(-) indicates value not tested.

PROFILE LINE COMPOSITE DATA TABLE
OCEAN ISLE BEACH 2013 NATIVE BEACH SAMPLES

PROFILE	MEAN (mm)	PHI MEAN	PHI SORTING	% SILT	WET MUNSELL VALUE	DRY MUNSELL VALUE	CUMULATIVE PERCENT RETAINED (SIEVES EXPRESSED IN PHI)																					% CARBONATE
							GRAVEL						GRANULAR			SAND											FINES	
							-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.5	-1.0	-0.5	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.75	4.0	PAN	
OIB000 COMPOSITE	0.24	2.05	0.86	1.23	5	7	0.00	0.00	0.14	0.17	0.25	0.27	0.32	0.44	0.57	0.80	1.31	3.12	10.22	22.36	41.89	64.91	89.21	97.89	98.66	98.80	99.97	5
OIB010 COMPOSITE	0.23	2.10	0.78	1.64	5	7	0.00	0.00	0.02	0.03	0.04	0.06	0.10	0.15	0.20	0.31	0.58	1.76	7.36	20.72	44.71	66.06	86.43	96.78	98.10	98.36	99.96	5
OIB025 COMPOSITE	0.26	1.94	1.05	1.93	5	7	0.00	0.00	0.27	0.49	0.62	0.72	0.87	1.20	1.58	2.22	3.29	5.33	11.51	25.27	47.46	67.52	85.82	96.15	97.69	98.09	99.94	7
OIB040 COMPOSITE	0.17	2.54	0.89	0.94	-	-	0.00	0.00	0.45	0.45	0.53	0.61	0.61	0.64	0.68	0.73	0.81	1.00	3.56	6.12	23.84	46.26	68.67	83.50	98.33	99.16	100.00	-
OIB060 COMPOSITE	0.26	1.92	0.91	1.12	5	7	0.00	0.00	0.09	0.14	0.27	0.33	0.48	0.73	1.13	1.76	2.80	5.50	13.37	26.04	48.00	72.31	91.81	98.07	98.72	98.88	99.96	-
TOTAL BEACH COMPOSITE	**0.23**	**2.11**	**0.92**	**1.34**	**5**	**7**	**0.00**	**0.00**	**0.19**	**0.25**	**0.34**	**0.40**	**0.48**	**0.64**	**0.83**	**1.17**	**1.76**	**3.34**	**9.21**	**20.10**	**41.18**	**63.41**	**84.39**	**94.48**	**98.30**	**98.66**	**99.97**	**6**

(-) indicates value not tested.

CUMULATIVE PERCENTS AND COMPUTED DISTRIBUTION FOR PROFILE LINES
OCEAN ISLE BEACH 2013 NATIVE BEACH SAMPLES (1 of 2)

SAMPLE I. D. (NAVD88, FT)	MEAN (mm)	PHI MEAN	PHI SORTING	% SILT	WET MUNSELL VALUE	DRY MUNSELL VALUE	CUMULATIVE PERCENT RETAINED (SIEVES EXPRESSED IN PHI)																				
							GRAVEL						GRANULAR			SAND											FINES
							-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.5	-1.0	-0.5	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.75	4.0	PAN
OIB000 Dune	0.23	2.12	0.39	0.10	7	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.16	3.46	37.26	85.63	98.53	99.82	99.89	99.90	99.99
OIB000 Dune Toe	0.30	1.75	0.50	0.14	7	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.65	6.18	28.57	69.80	94.54	99.09	99.80	99.85	99.86	99.98
OIB000 Mid Berm	0.40	1.32	0.66	0.08	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.22	1.03	8.92	35.04	61.41	84.57	95.94	99.36	99.89	99.92	99.92	99.96
OIB000 Berm Crest	0.35	1.50	0.55	0.14	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.09	0.12	0.19	1.11	16.93	51.94	82.61	96.14	99.41	99.82	99.85	99.86	99.97
OIB000 MHW	0.24	2.04	0.50	1.30	5	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.18	0.72	3.15	10.55	42.38	83.93	97.79	98.67	98.70	98.70	99.73
OIB000 MTL	0.24	2.04	0.62	1.00	4	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.10	0.37	4.41	20.99	45.17	73.28	96.01	98.89	98.99	99.00	99.99
OIB000 MLW	0.40	1.31	0.86	0.94	6	7	0.00	0.00	0.00	0.34	0.34	0.34	0.43	0.68	0.99	1.85	4.30	12.64	37.59	58.25	76.88	91.40	98.37	99.04	99.06	99.06	100.00
OIB000 Trough	0.26	1.92	1.07	0.93	6	7	0.00	0.00	0.00	0.00	0.77	0.93	1.31	2.06	2.74	3.92	5.87	8.38	14.36	25.02	41.41	64.90	92.52	98.83	99.04	99.07	100.00
OIB000 Bar Crest	0.22	2.17	0.66	1.08	5	6	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.18	0.33	0.55	0.86	1.87	5.20	13.04	31.29	65.98	95.34	98.72	98.90	98.92	99.98
OIB000 -8.75 NAVD	0.18	2.46	0.69	1.51	5	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.14	0.35	0.75	1.71	4.41	9.39	18.32	39.11	82.80	97.25	98.24	98.49	100.00
OIB000 -12.5 NAVD	0.14	2.79	0.46	2.20	5	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.12	0.24	0.44	0.99	1.91	3.46	13.85	71.60	95.26	97.38	97.80	100.00
OIB000 -16.25 NAVD	0.14	2.86	0.43	3.09	4	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.05	0.09	0.21	0.46	0.91	2.54	12.70	60.66	93.64	96.66	96.91	100.00
OIB000 -20 NAVD	0.17	2.56	1.14	3.08	4	6	0.00	0.00	1.85	1.85	2.16	2.19	2.35	2.66	2.92	3.12	3.27	3.50	4.03	5.26	8.91	26.42	68.20	92.91	96.13	96.92	100.00
OIB000 COMPOSITE	**0.24**	**2.05**	**0.86**	**1.23**	**5**	**7**	**0.00**	**0.00**	**0.14**	**0.17**	**0.25**	**0.27**	**0.32**	**0.44**	**0.57**	**0.80**	**1.31**	**3.12**	**10.22**	**22.36**	**41.89**	**64.91**	**89.21**	**97.89**	**98.66**	**98.80**	**99.97**
OIB010 Dune	0.22	2.21	0.49	0.28	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.15	6.39	32.62	72.65	95.32	99.29	99.64	99.72	99.92
OIB010 Dune Toe	0.31	1.69	0.43	0.35	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.12	0.22	4.25	30.86	79.70	96.90	99.18	99.63	99.65	99.65	99.91
OIB010 Mid Berm	0.32	1.64	0.40	0.23	5	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.04	0.20	4.12	34.78	84.64	98.65	99.64	99.76	99.77	99.77	99.99
OIB010 Berm Crest	0.34	1.57	0.47	0.23	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.24	1.07	9.88	41.92	84.63	98.34	99.59	99.76	99.77	99.77	99.96
OIB010 MHW	0.28	1.85	0.45	0.45	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.05	0.31	2.61	19.18	64.71	93.31	99.24	99.53	99.55	99.55	99.97
OIB010 MTL	0.28	1.83	0.56	0.90	4	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.14	0.63	6.77	27.02	60.25	88.27	98.49	99.09	99.10	99.10	100.00
OIB010 MLW	0.45	1.15	0.71	1.12	5	7	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.10	0.16	0.51	2.12	12.62	50.82	70.76	84.28	94.76	98.64	98.87	98.88	98.88	99.94
OIB010 Trough	0.19	2.37	0.58	1.03	4	7	0.00	0.00	0.00	0.00	0.01	0.01	0.20	0.25	0.27	0.44	0.67	1.13	2.51	6.10	16.14	53.02	92.98	98.78	98.94	98.97	100.00
OIB010 Bar Crest	0.22	2.18	0.54	1.17	5	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.22	0.51	2.34	9.72	32.33	69.67	96.06	98.76	98.83	98.83	99.85
OIB010 -8.75 NAVD	0.21	2.28	0.77	1.52	5	6	0.00	0.00	0.00	0.00	0.04	0.08	0.14	0.25	0.41	0.72	1.31	2.81	7.00	13.80	24.81	52.00	87.82	97.51	98.29	98.48	100.00
OIB010 -12.5 NAVD	0.13	2.96	0.45	2.66	4	6	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.09	0.12	0.17	0.27	0.56	1.19	2.67	7.69	49.42	91.24	96.20	97.34	100.00
OIB010 -16.25 NAVD	0.15	2.77	0.74	4.03	4	6	0.00	0.00	0.00	0.00	0.04	0.20	0.36	0.57	0.73	0.96	1.17	1.57	2.55	4.53	9.26	18.96	54.79	90.87	95.85	95.97	100.00
OIB010 -20.0 NAVD	0.14	2.83	0.77	7.33	4	6	0.00	0.00	0.25	0.33	0.43	0.43	0.49	0.73	0.90	1.07	1.23	1.52	2.11	3.05	5.23	14.62	52.45	84.99	90.83	92.67	100.00
OIB010 COMPOSITE	**0.23**	**2.10**	**0.78**	**1.64**	**5**	**7**	**0.00**	**0.00**	**0.02**	**0.03**	**0.04**	**0.06**	**0.10**	**0.15**	**0.20**	**0.31**	**0.58**	**1.76**	**7.36**	**20.72**	**44.71**	**66.06**	**86.43**	**96.78**	**98.10**	**98.36**	**99.96**
OIB025 Dune	0.27	1.87	0.44	2.17	6	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.09	1.69	16.89	62.83	91.31	97.18	97.81	97.83	97.83	99.92
OIB025 Dune Toe	0.31	1.68	0.45	0.18	7	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.32	4.80	34.06	78.23	96.70	99.42	99.80	99.82	99.82	100.00
OIB025 Mid Berm	0.31	1.67	0.62	0.31	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.40	0.60	1.05	2.65	11.41	35.30	72.04	93.19	98.78	99.65	99.69	99.69	100.00
OIB025 Berm Crest	0.30	1.72	0.46	0.37	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.11	0.37	4.35	30.36	74.86	96.23	99.17	99.61	99.63	99.63	99.92
OIB025 MHW	0.25	2.02	0.45	1.19	5	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	1.07	11.04	46.50	86.83	97.74	98.76	98.81	98.81	99.88
OIB025 MTL	0.28	1.84	0.67	0.99	5	7	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.12	0.14	0.29	1.21	12.11	30.87	54.41	82.97	97.93	98.98	99.01	99.01	100.00
OIB025 MLW	0.69	0.54	1.39	0.97	5	7	0.00	0.00	2.55	4.85	5.58	6.13	7.11	8.66	10.71	15.36	23.88	38.52	60.28	76.59	88.36	95.98	98.85	99.02	99.03	99.03	99.89
OIB025 Trough	0.23	2.15	0.91	1.57	4	7	0.00	0.00	0.00	0.47	0.85	1.26	1.48	1.92	2.28	2.73	3.40	4.18	6.26	10.66	23.15	64.48	94.84	98.27	98.40	98.43	99.92
OIB025 Bar Crest	0.38	1.39	0.91	1.13	5	6	0.00	0.00	0.00	0.00	0.00	0.08	0.35	1.43	2.45	3.73	5.97	11.06	28.45	53.16	73.41	89.69	98.10	98.86	98.87	98.87	99.92
OIB025 -8.75 NAVD	0.18	2.48	0.96	1.74	4	6	0.00	0.00	0.43	0.43	0.57	0.71	0.77	1.12	1.48	2.11	2.95	4.34	7.05	10.50	15.42	28.75	76.75	96.32	97.87	98.26	99.99
OIB025 -12.5 NAVD	0.13	2.94	0.48	2.18	4	6	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12	0.19	0.25	0.30	0.40	0.74	1.40	2.67	7.88	51.47	91.06	96.68	97.82	100.00
OIB025 -16.25 NAVD	0.14	2.81	0.74	4.93	4	6	0.00	0.00	0.00	0.11	0.11	0.13	0.19	0.38	0.56	0.79	1.00	1.44	3.22	5.58	8.78	16.52	50.77	88.33	94.24	95.07	99.79
OIB025 -20.0 NAVD	0.17	2.56	1.15	7.06	4	6	0.00	0.00	0.47	0.47	0.90	1.02	1.26	1.70	2.38	3.12	3.70	4.64	8.24	12.12	16.30	27.28	54.66	83.54	90.07	92.94	100.00
OIB025 COMPOSITE	**0.26**	**1.94**	**1.05**	**1.93**	**5**	**7**	**0.00**	**0.00**	**0.27**	**0.49**	**0.62**	**0.72**	**0.87**	**1.20**	**1.58**	**2.22**	**3.29**	**5.33**	**11.51**	**25.27**	**47.46**	**67.52**	**85.82**	**96.15**	**97.69**	**98.09**	**99.94**

CUMULATIVE PERCENTS AND COMPUTED DISTRIBUTION FOR PROFILE LINES
OCEAN ISLE BEACH 2013 NATIVE BEACH SAMPLES (2 of 2)

USACE SAMPLE I. D. (NAVD88, FT)	MEAN (mm)	PHI MEAN(1)	PHI SORTING(1)	% SILT	WET MUNSELL VALUE	DRY MUNSELL VALUE	CUMULATIVE PERCENT RETAINED (SIEVES EXPRESSED IN PHI)																				
							GRAVEL						GRANULAR			SAND											FINES
							-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.5	-1.0	-0.5	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.75	4.0	PAN
OIB040 Dune	0.27	1.91	0.47	0.18	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.16	2.33	16.54	58.24	90.4	98.9	99.75	99.81	99.82	99.94
OIB040 Dune Toe	0.14	2.84	0.67	0.95	-	-	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.12	0.19	0.21	0.29	0.48	0.95	1.41	8.13	31.80	55.46	76.78	98.09	99.05	100.00
OIB040 Mid Berm	0.16	2.61	0.56	0.39	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.18	0.32	12.66	45.25	77.84	88.53	99.22	99.61	100.00
OIB040 Berm Crest	0.17	2.59	0.45	0.11	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	5.99	45.90	85.80	92.79	99.78	99.89	100.00
OIB040 MHW	0.21	2.27	0.62	0.37	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.36	4.71	39.64	64.39	89.14	94.20	99.25	99.63	100.00
OIB040 MTL	0.23	2.11	0.79	0.57	-	-	0.00	0.00	0.00	0.00	0.00	0.17	0.17	0.17	0.17	0.18	0.23	0.50	9.04	17.58	48.55	67.97	87.39	93.13	98.86	99.43	100.00
OIB040 MLW	0.21	2.28	0.88	0.57	-	-	0.00	0.00	0.00	0.00	0.88	1.08	1.08	1.12	1.15	1.18	1.26	1.52	5.10	8.68	35.42	59.09	82.76	90.81	98.85	99.43	100.00
OIB040 Trough	0.31	1.69	1.45	0.49	-	-	0.00	0.00	5.43	5.43	5.43	5.43	5.43	5.47	5.51	5.61	5.75	5.96	11.98	17.99	60.94	77.66	94.38	96.70	99.02	99.51	99.99
OIB040 Bar Crest	0.22	2.16	0.84	0.51	-	-	0.00	0.00	0.00	0.00	0.00	0.45	0.45	0.60	0.75	0.95	1.30	2.07	7.74	13.40	43.69	65.41	87.12	93.05	98.97	99.49	100.00
OIB040 -9.0 NAVD	0.17	2.59	0.71	0.40	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.06	0.13	0.30	2.54	4.78	19.52	45.14	70.76	84.98	99.20	99.60	99.99
OIB040 -13.0 NAVD	0.13	2.95	0.69	0.73	-	-	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.14	0.20	0.29	0.41	0.63	1.58	2.53	6.36	24.90	43.44	70.99	98.54	99.27	100.00
OIB040 -17.0 NAVD	0.11	3.15	0.53	1.85	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.05	0.08	0.14	0.35	0.55	1.60	15.11	28.62	62.46	96.30	98.15	100.00
OIB040 -19.0 NAVD	0.11	3.20	0.59	3.07	-	-	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.08	0.10	0.19	0.27	0.39	0.92	1.44	3.60	12.48	21.36	57.61	93.86	96.93	100.00
(-) indicates value not tested.																											
Values in RED indicate interpolated values.																											
OIB040 COMPOSITE	**0.17**	**2.54**	**0.89**	**0.94**	**-**	**-**	**0.00**	**0.00**	**0.45**	**0.45**	**0.53**	**0.61**	**0.61**	**0.64**	**0.68**	**0.73**	**0.81**	**1.00**	**3.56**	**6.12**	**23.84**	**46.26**	**68.67**	**83.50**	**98.33**	**99.16**	**100.00**
OIB060 Dune	0.20	2.30	0.43	0.23	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.48	3.50	20.01	69.24	96.78	99.59	99.76	99.77	100.00
OIB060 Dune Toe	0.31	1.69	0.68	0.26	6	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.15	0.73	4.77	18.02	33.55	64.29	91.20	98.62	99.62	99.71	99.74	100.00
OIB060 Mid Berm	0.29	1.81	0.49	0.29	6	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.14	2.68	25.12	67.28	92.55	98.43	99.57	99.69	99.71	100.00
OIB060 Berm Crest	0.25	2.01	0.37	0.52	7	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.38	5.47	49.75	92.80	98.98	99.44	99.48	99.48	99.89
OIB060 MHW	0.31	1.70	0.74	1.18	5	6	0.00	0.00	0.00	0.00	0.09	0.09	0.28	0.69	0.99	1.56	2.47	4.45	12.43	32.82	63.91	88.51	97.91	98.77	98.81	98.82	99.89
OIB060 MTL	0.24	2.06	0.63	1.01	5	7	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.16	0.23	0.45	0.94	1.92	5.28	14.97	38.96	76.04	97.03	98.92	98.98	98.99	100.00
OIB060 MLW	0.50	0.99	1.15	0.93	5	7	0.00	0.00	0.00	0.66	1.38	1.78	2.97	4.18	5.86	9.20	14.99	26.65	46.28	63.33	80.87	93.32	98.65	99.05	99.07	99.07	99.92
OIB060 Trough	0.22	2.17	0.56	1.05	4	7	0.00	0.00	0.00	0.00	0.12	0.17	0.17	0.21	0.26	0.34	0.53	0.90	2.58	9.03	29.40	73.19	96.96	98.89	98.94	98.95	100.00
OIB060 Bar Crest	0.35	1.50	0.82	1.28	5	6	0.00	0.00	0.00	0.00	0.62	0.62	0.66	0.98	1.35	1.82	3.03	6.50	22.04	48.53	74.04	89.32	97.59	98.69	98.71	98.72	99.84
OIB060 -8.75 NAVD	0.16	2.66	0.64	1.69	4	6	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.31	0.44	0.76	1.10	1.70	2.97	4.71	7.96	21.62	76.57	96.51	98.00	98.31	100.00
OIB060 -12.5 NAVD	0.15	2.76	0.88	1.88	4	6	0.00	0.00	1.14	1.14	1.14	1.14	1.25	1.39	1.60	1.78	1.93	2.14	2.43	2.85	3.68	9.90	66.15	95.00	97.59	98.12	100.00
OIB060 -16.25 NAVD	0.50	1.00	0.90	1.71	4	6	0.00	0.00	0.00	0.00	0.16	0.27	0.45	1.23	2.95	5.32	8.59	19.09	50.77	76.93	89.56	92.26	95.20	97.76	98.18	98.29	99.95
OIB060 -20.0 NAVD	0.21	2.28	0.93	2.53	4	6	0.00	0.00	0.00	0.00	0.03	0.13	0.21	0.40	0.91	1.49	1.99	3.11	7.52	17.69	34.29	50.03	74.63	93.08	96.45	97.47	99.99
OIB060 COMPOSITE	**0.26**	**1.92**	**0.91**	**1.12**	**5**	**7**	**0.00**	**0.00**	**0.09**	**0.14**	**0.27**	**0.33**	**0.48**	**0.73**	**1.13**	**1.76**	**2.80**	**5.50**	**13.37**	**26.04**	**48.00**	**72.31**	**91.81**	**98.07**	**98.72**	**98.88**	**99.96**

ELEVATION CUMULATIVE PERCENTS AND COMPUTED DISTRIBUTION
OCEAN ISLE BEACH NATIVE BEACH SAMPLES (1 of 2)

SAMPLE I. D. (NAVD, FT)	MEAN (mm)	PHI MEAN	PHI SORTING	% SILT	WET MUNSELL VALUE	DRY MUNSELL VALUE	CUMULATIVE PERCENT RETAINED (SIEVES EXPRESSED IN PHI)																				
							GRAVEL						GRANULAR			SAND											FINES
							-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.5	-1.0	-0.5	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.75	4.0	PAN
OIB000 Dune	0.23	2.12	0.39	0.10	7	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.16	3.46	37.26	85.63	98.53	99.82	99.89	99.90	99.99
OIB010 Dune	0.22	2.21	0.49	0.28	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.15	6.39	32.62	72.65	95.32	99.29	99.64	99.72	99.92
OIB025 Dune	0.27	1.87	0.44	2.17	6	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.09	1.69	16.89	62.83	91.31	97.18	97.81	97.83	97.83	99.92
OIB060 Dune	0.20	2.30	0.43	0.23	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.48	3.50	20.01	69.24	96.78	99.59	99.76	99.77	100.00
DUNE COMPOSITE	**0.23**	**2.13**	**0.46**	**0.69**	**6**	**8**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.04**	**0.62**	**7.56**	**38.18**	**79.71**	**96.95**	**99.13**	**99.28**	**99.31**	**99.96**
OIB000 Dune Toe	0.30	1.75	0.50	0.14	7	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.65	6.18	28.57	69.80	94.54	99.09	99.80	99.85	99.86	99.98
OIB010 Dune Toe	0.31	1.69	0.43	0.35	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.12	0.22	4.25	30.86	79.70	96.90	99.18	99.63	99.65	99.65	99.91
OIB025 Dune Toe	0.31	1.68	0.45	0.18	7	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.32	4.80	34.06	78.23	96.70	99.42	99.80	99.82	99.82	100.00
OIB040 Dune Toe	0.14	2.84	0.67	0.95	-	-	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.12	0.19	0.21	0.29	0.48	0.95	1.41	8.13	31.80	55.46	76.78	98.09	99.05	100.00
OIB060 Dune Toe	0.31	1.69	0.68	0.26	6	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.15	0.73	4.77	18.02	33.55	64.29	91.20	98.62	99.62	99.71	99.74	100.00
TOE OF DUNE COMPOSITE	**0.23**	**2.12**	**0.72**	**0.33**	**7**	**7**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.02**	**0.05**	**0.08**	**0.27**	**1.29**	**6.84**	**25.69**	**60.03**	**82.23**	**90.35**	**95.13**	**99.42**	**99.62**	**99.98**
OIB000 Mid Berm	0.40	1.32	0.66	0.08	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.22	1.03	8.92	35.04	61.41	84.57	95.94	99.36	99.89	99.92	99.92	99.96
OIB010 Mid Berm	0.32	1.64	0.40	0.23	5	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.04	0.20	4.12	34.78	84.64	98.65	99.64	99.76	99.77	99.77	99.99
OIB025 Mid Berm	0.31	1.67	0.62	0.31	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.40	0.60	1.05	2.65	11.41	35.30	72.04	93.19	98.78	99.65	99.69	99.69	100.00
OIB040 Mid Berm	0.16	2.61	0.56	0.39	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.18	0.32	12.66	45.25	77.84	88.53	99.22	99.61	100.00
OIB060 Mid Berm	0.29	1.81	0.49	0.29	6	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.14	2.68	25.12	67.28	92.55	98.43	99.57	99.69	99.71	100.00
MID BERM COMPOSITE	**0.26**	**1.96**	**0.79**	**0.23**	**6**	**7**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.05**	**0.10**	**0.18**	**0.44**	**2.39**	**10.69**	**31.39**	**64.24**	**85.12**	**94.81**	**97.48**	**99.66**	**99.74**	**99.99**
OIB000 Berm Crest	0.35	1.50	0.55	0.14	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.09	0.12	0.19	1.11	16.93	51.94	82.61	96.14	99.41	99.82	99.85	99.86	99.97
OIB010 Berm Crest	0.34	1.57	0.47	0.23	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.24	1.07	9.88	41.92	84.63	98.34	99.59	99.76	99.77	99.77	99.96
OIB025 Berm Crest	0.30	1.72	0.46	0.37	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.11	0.37	4.35	30.36	74.86	96.23	99.17	99.61	99.63	99.63	99.92
OIB040 Berm Crest	0.17	2.59	0.45	0.11	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	5.99	45.90	85.80	92.79	99.78	99.89	100.00
OIB060 Berm Crest	0.25	2.01	0.37	0.52	7	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.38	5.47	49.75	92.80	98.98	99.44	99.48	99.48	99.89
BERM CREST COMPOSITE	**0.24**	**2.03**	**0.72**	**0.22**	**6**	**7**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.03**	**0.05**	**0.11**	**0.52**	**6.31**	**25.94**	**59.57**	**85.88**	**96.59**	**98.28**	**99.70**	**99.73**	**99.95**
OIB000 MHW	0.24	2.04	0.50	1.30	5	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.18	0.72	3.15	10.55	42.38	83.93	97.79	98.67	98.70	98.70	99.73
OIB010 MHW	0.28	1.85	0.45	0.45	6	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.05	0.31	2.61	19.18	64.71	93.31	99.24	99.53	99.55	99.55	99.97
OIB025 MHW	0.25	2.02	0.45	1.19	5	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	1.07	11.04	46.50	86.83	97.74	98.76	98.81	98.81	99.88
OIB040 MHW	0.21	2.27	0.62	0.37	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.36	4.71	39.64	64.39	89.14	94.20	99.25	99.63	100.00
OIB060 MHW	0.31	1.70	0.74	1.18	5	6	0.00	0.00	0.00	0.00	0.09	0.09	0.28	0.69	0.99	1.56	2.47	4.45	12.43	32.82	63.91	88.51	97.91	98.77	98.81	98.82	99.89
MHW COMPOSITE	**0.23**	**2.15**	**0.56**	**0.7**	**5**	**7**	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	**0.02**	**0.06**	**0.14**	**0.20**	**0.32**	**0.54**	**1.11**	**4.32**	**15.66**	**51.43**	**83.39**	**96.36**	**97.99**	**99.02**	**99.10**	**99.89**
OIB000 MTL	0.24	2.04	0.62	1.00	4	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.10	0.37	4.41	20.99	45.17	73.28	96.01	98.89	98.99	99.00	99.99
OIB010 MTL	0.28	1.83	0.56	0.90	4	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.14	0.63	6.77	27.02	60.25	88.27	98.49	99.09	99.10	99.10	100.00
OIB025 MTL	0.28	1.84	0.67	0.99	5	7	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.12	0.14	0.29	1.21	12.11	30.87	54.41	82.97	97.93	98.98	99.01	99.01	100.00
OIB040 MTL	0.23	2.11	0.79	0.57	-	-	0.00	0.00	0.00	0.00	0.00	0.17	0.17	0.17	0.17	0.18	0.23	0.50	9.04	17.58	48.55	67.97	87.39	93.13	98.86	99.43	100.00
OIB060 MTL	0.24	2.06	0.63	1.01	5	7	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.16	0.23	0.45	0.94	1.92	5.28	14.97	38.96	76.04	97.03	98.92	98.98	98.99	100.00
MTL COMPOSITE	**0.26**	**1.95**	**0.67**	**0.78**	**5**	**7**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.05**	**0.07**	**0.09**	**0.11**	**0.17**	**0.34**	**0.93**	**7.52**	**22.29**	**49.47**	**77.71**	**95.37**	**97.80**	**98.99**	**99.11**	**100.00**
OIB000 MLW	0.40	1.31	0.86	0.94	6	7	0.00	0.00	0.00	0.34	0.34	0.34	0.43	0.68	0.99	1.85	4.30	12.64	37.59	58.25	76.88	91.40	98.37	99.04	99.06	99.06	100.00
OIB010 MLW	0.45	1.15	0.71	1.12	5	7	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.10	0.16	0.51	2.12	12.62	50.82	70.76	84.28	94.76	98.64	98.87	98.88	98.88	99.94
OIB025 MLW	0.69	0.54	1.39	0.97	5	7	0.00	0.00	2.55	4.85	5.58	6.13	7.11	8.66	10.71	15.36	23.88	38.52	60.28	76.59	88.36	95.98	98.85	99.02	99.03	99.03	99.89
OIB040 MLW	0.21	2.28	0.88	0.57	-	-	0.00	0.00	0.00	0.00	0.88	1.08	1.08	1.12	1.15	1.18	1.26	1.52	5.10	8.68	35.42	59.09	82.76	90.81	98.85	99.43	100.00
OIB060 MLW	0.50	0.99	1.15	0.93	5	7	0.00	0.00	0.00	0.66	1.38	1.78	2.97	4.18	5.86	9.20	14.99	26.65	46.28	63.33	80.87	93.32	98.65	99.05	99.07	99.07	99.92
MLW COMPOSITE	**0.37**	**1.45**	**1.13**	**0.8**	**5**	**7**	**0.00**	**0.00**	**0.51**	**1.17**	**1.64**	**1.88**	**2.33**	**2.95**	**3.77**	**5.62**	**9.31**	**18.39**	**40.01**	**55.52**	**73.16**	**86.91**	**95.45**	**97.36**	**98.98**	**99.09**	**99.95**

(-) indicates value not tested.

ELEVATION CUMULATIVE PERCENTS AND COMPUTED DISTRIBUTION
OCEAN ISLE BEACH NATIVE BEACH SAMPLES (2 of 2)

SAMPLE I. D. (NAVD, FT)	MEAN (mm)	PHI MEAN	PHI SORTING	% SILT	WET MUNSELL VALUE	DRY MUNSELL VALUE	CUMULATIVE PERCENT RETAINED (SIEVES EXPRESSED IN PHI)																				
							GRAVEL						GRANULAR			SAND											FINES
							-4.25	-4.00	-3.50	-3.00	-2.50	-2.25	-2.00	-1.5	-1.0	-0.5	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.75	4.0	PAN
OIB000 Trough	0.26	1.92	1.07	0.93	6	7	0.00	0.00	0.00	0.00	0.77	0.93	1.31	2.06	2.74	3.92	5.87	8.38	14.36	25.02	41.41	64.9	92.52	98.83	99.04	99.07	100.00
OIB010 Trough	0.19	2.37	0.58	1.03	4	7	0.00	0.00	0.00	0.00	0.01	0.01	0.2	0.25	0.27	0.44	0.67	1.13	2.51	6.1	16.14	53.02	92.98	98.78	98.94	98.97	100.00
OIB025 Trough	0.23	2.15	0.91	1.57	4	7	0.00	0.00	0.00	0.47	0.85	1.26	1.48	1.92	2.28	2.73	3.4	4.18	6.26	10.66	23.15	64.48	94.84	98.27	98.4	98.43	99.92
OIB040 Trough	0.31	1.69	1.45	0.49	-	-	0.00	0.00	5.43	5.43	5.43	5.43	5.43	5.47	5.51	5.61	5.75	5.96	11.98	17.99	60.94	77.66	94.38	96.70	99.02	99.51	99.99
OIB060 Trough	0.22	2.17	0.56	1.05	4	7	0.00	0.00	0.00	0.00	0.12	0.17	0.17	0.21	0.26	0.34	0.53	0.9	2.58	9.03	29.4	73.19	96.96	98.89	98.94	98.95	100
TROUGH COMPOSITE	**0.25**	**2.02**	**1.03**	**0.88**	**5**	**7**	**0.00**	**0.00**	**1.09**	**1.18**	**1.44**	**1.56**	**1.72**	**1.98**	**2.21**	**2.61**	**3.24**	**4.11**	**7.54**	**13.76**	**34.21**	**66.65**	**94.34**	**98.29**	**98.87**	**98.99**	**99.98**
OIB000 Bar Crest	0.22	2.17	0.66	1.08	5	6	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.18	0.33	0.55	0.86	1.87	5.20	13.04	31.29	65.98	95.34	98.72	98.90	98.92	99.98
OIB010 Bar Crest	0.22	2.18	0.54	1.17	5	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.22	0.51	2.34	9.72	32.33	69.67	96.06	98.76	98.83	98.83	99.85
OIB025 Bar Crest	0.38	1.39	0.91	1.13	5	6	0.00	0.00	0.00	0.00	0.00	0.08	0.35	1.43	2.45	3.73	5.97	11.06	28.45	53.16	73.41	89.69	98.10	98.86	98.87	98.87	99.92
OIB040 Bar Crest	0.22	2.16	0.84	0.51	-	-	0.00	0.00	0.00	0.00	0.00	0.45	0.45	0.60	0.75	0.95	1.30	2.07	7.74	13.40	43.69	65.41	87.12	93.05	98.97	99.49	100.00
OIB060 Bar Crest	0.35	1.5	0.82	1.28	5	6	0.00	0.00	0.00	0.00	0.62	0.62	0.66	0.98	1.35	1.82	3.03	6.5	22.04	48.53	74.04	89.32	97.59	98.69	98.71	98.72	99.84
BAR CREST COMPOSITE	**0.27**	**1.88**	**0.84**	**1.03**	**5**	**6**	**0.00**	**0.00**	**0.00**	**0.00**	**0.12**	**0.23**	**0.31**	**0.64**	**0.98**	**1.43**	**2.28**	**4.40**	**13.15**	**27.57**	**50.95**	**76.01**	**94.84**	**97.62**	**98.86**	**98.97**	**99.92**
OIB000 -8.75 NAVD	0.18	2.46	0.69	1.51	5	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.14	0.35	0.75	1.71	4.41	9.39	18.32	39.11	82.80	97.25	98.24	98.49	100.00
OIB010 -8.75 NAVD	0.21	2.28	0.77	1.52	5	6	0.00	0.00	0.00	0.00	0.04	0.08	0.14	0.25	0.41	0.72	1.31	2.81	7.00	13.80	24.81	52.00	87.82	97.51	98.29	98.48	100.00
OIB025 -8.75 NAVD	0.18	2.48	0.96	1.74	4	6	0.00	0.00	0.43	0.43	0.57	0.71	0.77	1.12	1.48	2.11	2.95	4.34	7.05	10.50	15.42	28.75	76.75	96.32	97.87	98.26	99.99
OIB040 -9.0 NAVD	0.17	2.59	0.71	0.40	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.06	0.13	0.30	2.54	4.78	19.52	45.14	70.76	84.98	99.20	99.60	99.99
OIB060 -8.75 NAVD	0.16	2.66	0.64	1.69	4	6	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.31	0.44	0.76	1.10	1.70	2.97	4.71	7.96	21.62	76.57	96.51	98.00	98.31	100.00
-8.75 NAVD COMPOSITE	**0.2**	**2.34**	**0.86**	**1.13**	**5**	**6**	**0.00**	**0.00**	**0.09**	**0.09**	**0.12**	**0.16**	**0.20**	**0.35**	**0.50**	**0.80**	**1.25**	**2.17**	**4.79**	**8.64**	**17.21**	**37.32**	**78.94**	**94.51**	**98.32**	**98.63**	**100.00**
OIB000 -12.5 NAVD	0.14	2.79	0.46	2.20	5	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.12	0.24	0.44	0.99	1.91	3.46	13.85	71.60	95.26	97.38	97.80	100.00
OIB010 -12.5 NAVD	0.13	2.96	0.45	2.66	4	6	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.09	0.12	0.17	0.27	0.56	1.19	2.67	7.69	49.42	91.24	96.20	97.34	100.00
OIB025 -12.5 NAVD	0.13	2.94	0.48	2.18	4	6	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12	0.19	0.25	0.30	0.40	0.74	1.40	2.67	7.88	51.47	91.06	96.68	97.82	100.00
OIB040 -13.0 NAVD	0.13	2.95	0.69	0.73	-	-	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.14	0.20	0.29	0.41	0.63	1.58	2.53	6.36	24.90	43.44	70.99	98.54	99.27	100.00
OIB060 -12.5 NAVD	0.15	2.76	0.88	1.88	4	6	0.00	0.00	1.14	1.14	1.14	1.14	1.25	1.39	1.60	1.78	1.93	2.14	2.43	2.85	3.68	9.90	66.15	95.00	97.59	98.12	100.00
-12.5 NAVD COMPOSITE	**0.14**	**2.86**	**0.6**	**1.75**	**4**	**6**	**0.00**	**0.00**	**0.23**	**0.23**	**0.23**	**0.24**	**0.27**	**0.35**	**0.42**	**0.51**	**0.61**	**0.78**	**1.26**	**1.98**	**3.77**	**12.84**	**56.42**	**88.71**	**97.28**	**98.07**	**100.00**
OIB000 -16.25 NAVD	0.14	2.86	0.43	3.09	4	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.05	0.09	0.21	0.46	0.91	2.54	12.70	60.66	93.64	96.66	96.91	100.00
OIB010 -16.25 NAVD	0.15	2.77	0.74	4.03	4	6	0.00	0.00	0.00	0.00	0.04	0.20	0.36	0.57	0.73	0.96	1.17	1.57	2.55	4.53	9.26	18.96	54.79	90.87	95.85	95.97	100.00
OIB025 -16.25 NAVD	0.14	2.81	0.74	4.93	4	6	0.00	0.00	0.00	0.11	0.11	0.13	0.19	0.38	0.56	0.79	1.00	1.44	3.22	5.58	8.78	16.52	50.77	88.33	94.24	95.07	99.79
OIB040 -17.0 NAVD	0.11	3.15	0.53	1.85	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.05	0.08	0.14	0.35	0.55	1.60	15.11	28.62	62.46	96.30	98.15	100.00
OIB060 -16.25 NAVD	0.5	1	0.9	1.71	4	6	0.00	0.00	0.00	0.00	0.16	0.27	0.45	1.23	2.95	5.32	8.59	19.09	50.77	76.93	89.56	92.26	95.2	97.76	98.18	98.29	99.95
-16.25 NAVD COMPOSITE	**0.13**	**2.93**	**0.65**	**2.97**	**4**	**6**	**0.00**	**0.00**	**0.00**	**0.02**	**0.06**	**0.12**	**0.20**	**0.44**	**0.86**	**1.43**	**2.19**	**4.49**	**11.47**	**17.70**	**22.35**	**31.11**	**58.01**	**86.61**	**96.25**	**96.88**	**99.95**
OIB000 -20 NAVD	0.17	2.56	1.14	3.08	4	6	0.00	0.00	1.85	1.85	2.16	2.19	2.35	2.66	2.92	3.12	3.27	3.50	4.03	5.26	8.91	26.42	68.20	92.91	96.13	96.92	100.00
OIB010 -20.0 NAVD	0.14	2.83	0.77	7.33	4	6	0.00	0.00	0.25	0.33	0.43	0.43	0.49	0.73	0.90	1.07	1.23	1.52	2.11	3.05	5.23	14.62	52.45	84.99	90.83	92.67	100.00
OIB025 -20.0 NAVD	0.17	2.56	1.15	7.06	4	6	0.00	0.00	0.47	0.47	0.90	1.02	1.26	1.70	2.38	3.12	3.70	4.64	8.24	12.12	16.30	27.28	54.66	83.54	90.07	92.94	100.00
OIB040 -19.0 NAVD	0.11	3.20	0.59	3.07	-	-	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.08	0.10	0.19	0.27	0.39	0.92	1.44	3.60	12.48	21.36	57.61	93.86	96.93	100.00
OIB060 -20.0 NAVD	0.21	2.28	0.93	2.53	4	6	0.00	0.00	0.00	0.00	0.03	0.13	0.21	0.40	0.91	1.49	1.99	3.11	7.52	17.69	34.29	50.03	74.63	93.08	96.45	97.47	99.99
-20.0 NAVD COMPOSITE	**0.14**	**2.83**	**0.92**	**4.3**	**4**	**6**	**0.00**	**0.00**	**0.51**	**0.53**	**0.70**	**0.76**	**0.87**	**1.11**	**1.44**	**1.80**	**2.09**	**2.63**	**4.56**	**7.91**	**13.67**	**26.17**	**54.26**	**82.43**	**93.47**	**95.39**	**100.00**

(-) indicates value not tested.

PERCENTAGE OF MATERIAL BY SEDIMENT GRAIN SIZE CATEGORY
OCEAN ISLE BEACH 2013 NATIVE BEACH SAMPLES (1 of 2)

SAMPLE I. D. (NAVD, FT)	FINE % (<0.0625mm)	SAND % (0.0625mm-2.00mm)	GRANULAR % (2mm-4.76mm)	GRAVEL % (4.76mm-76mm)
OIB000 Dune	0.10	99.90	0.00	0.00
OIB000 Dune Toe	0.14	99.86	0.00	0.00
OIB000 Mid Berm	0.08	99.86	0.06	0.00
OIB000 Berm Crest	0.14	99.77	0.09	0.00
OIB000 MHW	1.30	98.70	0.00	0.00
OIB000 MTL	1.00	98.97	0.03	0.00
OIB000 MLW	0.94	98.07	0.65	0.34
OIB000 Trough	0.93	96.33	1.81	0.93
OIB000 Bar Crest	1.08	98.59	0.33	0.00
OIB000 -8.75 NAVD	1.51	98.35	0.14	0.00
OIB000 -12.5 NAVD	2.20	97.76	0.04	0.00
OIB000 -16.25 NAVD	3.09	96.88	0.03	0.00
OIB000 -20 NAVD	3.08	94.00	0.73	2.19
OIB000 COMPOSITE	**1.23**	**98.23**	**0.30**	**0.27**
OIB010 Dune	0.28	99.72	0.00	0.00
OIB010 Dune Toe	0.35	99.65	0.00	0.00
OIB010 Mid Berm	0.23	99.76	0.01	0.00
OIB010 Berm Crest	0.23	99.73	0.04	0.00
OIB010 MHW	0.45	99.54	0.01	0.00
OIB010 MTL	0.90	99.10	0.00	0.00
OIB010 MLW	1.12	98.72	0.09	0.07
OIB010 Trough	1.03	98.70	0.26	0.01
OIB010 Bar Crest	1.17	98.80	0.03	0.00
OIB010 -8.75 NAVD	1.52	98.07	0.33	0.08
OIB010 -12.5 NAVD	2.66	97.25	0.09	0.00
OIB010 -16.25 NAVD	4.03	95.24	0.53	0.20
OIB010 -20.0 NAVD	7.33	91.77	0.47	0.43
OIB010 COMPOSITE	**1.64**	**98.16**	**0.14**	**0.06**
OIB025 Dune	2.17	97.83	0.00	0.00
OIB025 Dune Toe	0.18	99.82	0.00	0.00
OIB025 Mid Berm	0.31	99.29	0.40	0.00
OIB025 Berm Crest	0.37	99.61	0.02	0.00
OIB025 MHW	1.19	98.81	0.00	0.00
OIB025 MTL	0.99	98.89	0.12	0.00
OIB025 MLW	0.97	88.32	4.58	6.13
OIB025 Trough	1.57	96.15	1.02	1.26
OIB025 Bar Crest	1.13	96.42	2.37	0.08
OIB025 -8.75 NAVD	1.74	96.78	0.77	0.71
OIB025 -12.5 NAVD	2.18	97.63	0.19	0.00
OIB025 -16.25 NAVD	4.93	94.51	0.43	0.13
OIB025 -20.0 NAVD	7.06	90.56	1.36	1.02
OIB025 COMPOSITE	**1.93**	**96.51**	**0.87**	**0.72**

PERCENTAGE OF MATERIAL BY SEDIMENT GRAIN SIZE CATEGORY
OCEAN ISLE BEACH 2013 NATIVE BEACH SAMPLES (2 of 2)

SAMPLE I. D. (NAVD, FT)	FINE % (<0.0625mm)	SAND % (0.0625mm-2.00mm)	GRANULAR % (2mm-4.76mm)	GRAVEL % (4.76mm-76mm)
OIB040 Dune Toe*	0.95	98.86	0.15	0.04
OIB040 Mid Berm*	0.39	99.60	0.01	0.00
OIB040 Berm Crest*	0.11	99.89	0.00	0.00
OIB040 MHW*	0.37	99.63	0.00	0.00
OIB040 MTL*	0.57	99.26	0.00	0.17
OIB040 MLW*	0.57	98.28	0.07	1.08
OIB040 Trough*	0.49	94.00	0.08	5.43
OIB040 Bar Crest*	0.51	98.74	0.30	0.45
OIB040 -9.0 NAVD*	0.40	99.59	0.01	0.00
OIB040 -13.0 NAVD*	0.73	99.07	0.12	0.08
OIB040 -17.0 NAVD*	1.85	98.12	0.03	0.00
OIB040 -19.0 NAVD*	3.07	96.83	0.05	0.05
OIB040 COMPOSITE	**0.94**	**98.49**	**0.07**	**0.61**
OIB060 Dune	0.23	99.77	0.00	0.00
OIB060 Dune Toe	0.26	99.70	0.04	0.00
OIB060 Mid Berm	0.29	99.71	0.00	0.00
OIB060 Berm Crest	0.52	99.48	0.00	0.00
OIB060 MHW	1.18	97.83	0.90	0.09
OIB060 MTL	1.01	98.76	0.14	0.09
OIB060 MLW	0.93	93.21	4.08	1.78
OIB060 Trough	1.05	98.69	0.09	0.17
OIB060 Bar Crest	1.28	97.37	0.73	0.62
OIB060 -8.75 NAVD	1.69	97.87	0.43	0.01
OIB060 -12.5 NAVD	1.88	96.52	0.46	1.14
OIB060 -16.25 NAVD	1.71	95.34	2.68	0.27
OIB060 -20.0 NAVD	2.53	96.56	0.78	0.13
OIB060 COMPOSITE	**1.12**	**97.75**	**0.79**	**0.33**
TOTAL BEACH COMPOSITE	**1.34**	**97.83**	**0.43**	**0.40**

APPENDIX 5
BEACH COMPOSITE GRANULARMETRIC REPORTS

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB000 COMPOSITE

Analysis Date: 02-05-14

Analyzed By: TM

CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP		Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	1.17	0.03	#200 - 1.34 #230 - 1.20		5	

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	0.14	0.14	0.14	0.14
5/16"	-3.00	8.00	0.03	0.03	0.17	0.17
3.5	-2.50	5.66	0.08	0.08	0.25	0.25
4	-2.25	4.76	0.02	0.02	0.27	0.27
5	-2.00	4.00	0.05	0.05	0.32	0.32
7	-1.50	2.83	0.12	0.12	0.44	0.44
10	-1.00	2.00	0.13	0.13	0.57	0.57
14	-0.50	1.41	0.23	0.23	0.80	0.80
18	0.00	1.00	0.51	0.51	1.31	1.31
25	0.50	0.71	1.81	1.81	3.12	3.12
35	1.00	0.50	7.10	7.10	10.22	10.22
45	1.50	0.35	12.14	12.14	22.36	22.36
60	2.00	0.25	19.53	19.53	41.89	41.89
80	2.50	0.18	23.02	23.02	64.91	64.91
120	3.00	0.13	24.30	24.30	89.21	89.21
170	3.50	0.09	8.68	8.68	97.89	97.89
200	3.75	0.07	0.77	0.77	98.66	98.66
230	4.00	0.06	0.14	0.14	98.80	98.80

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.33	2.89	2.71	2.18	1.57	1.24	0.63

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.06	0.24	0.85	-1.26	7.64

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 6/26/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB010 COMPOSITE

Analysis Date: 02-05-14

Analyzed By: TM

CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP		Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	1.60	0.04	#200 - 1.90 #230 - 1.64		5	

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	0.02	0.02	0.02	0.02
5/16"	-3.00	8.00	0.01	0.01	0.03	0.03
3.5	-2.50	5.66	0.01	0.01	0.04	0.04
4	-2.25	4.76	0.02	0.02	0.06	0.06
5	-2.00	4.00	0.04	0.04	0.10	0.10
7	-1.50	2.83	0.05	0.05	0.15	0.15
10	-1.00	2.00	0.05	0.05	0.20	0.20
14	-0.50	1.41	0.11	0.11	0.31	0.31
18	0.00	1.00	0.27	0.27	0.58	0.58
25	0.50	0.71	1.18	1.18	1.76	1.76
35	1.00	0.50	5.60	5.60	7.36	7.36
45	1.50	0.35	13.36	13.36	20.72	20.72
60	2.00	0.25	23.99	23.99	44.71	44.71
80	2.50	0.18	21.35	21.35	66.06	66.06
120	3.00	0.13	20.37	20.37	86.43	86.43
170	3.50	0.09	10.35	10.35	96.78	96.78
200	3.75	0.07	1.32	1.32	98.10	98.10
230	4.00	0.06	0.26	0.26	98.36	98.36

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.41	2.94	2.72	2.12	1.59	1.32	0.79

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.1	0.23	0.78	-0.53	4.48

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB025 COMPOSITE

Analysis Date: 02-05-14

Analyzed By: TM

CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW		Munsell Values not available.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	1.85	0.06	#200 - 2.31 #230 - 1.91		7	

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	0.27	0.27	0.27	0.27
5/16"	-3.00	8.00	0.22	0.22	0.49	0.49
3.5	-2.50	5.66	0.13	0.13	0.62	0.62
4	-2.25	4.76	0.10	0.10	0.72	0.72
5	-2.00	4.00	0.15	0.15	0.87	0.87
7	-1.50	2.83	0.33	0.33	1.20	1.20
10	-1.00	2.00	0.38	0.38	1.58	1.58
14	-0.50	1.41	0.64	0.64	2.22	2.22
18	0.00	1.00	1.07	1.07	3.29	3.29
25	0.50	0.71	2.04	2.04	5.33	5.33
35	1.00	0.50	6.18	6.18	11.51	11.51
45	1.50	0.35	13.76	13.76	25.27	25.27
60	2.00	0.25	22.19	22.19	47.46	47.46
80	2.50	0.18	20.06	20.06	67.52	67.52
120	3.00	0.13	18.30	18.30	85.82	85.82
170	3.50	0.09	10.33	10.33	96.15	96.15
200	3.75	0.07	1.54	1.54	97.69	97.69
230	4.00	0.06	0.40	0.40	98.09	98.09

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.44	2.95	2.70	2.06	1.49	1.16	0.42

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.97	0.26	1.01	-1.54	8.39

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB040 COMPOSITE

Analysis Date: 03-18-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-0.5 NAVD 88

USCS:	Munsell:	Comments:
SW		

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.84	0.00	#200 - 1.67 #230 - 0.84			

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	0.45	0.45	0.45	0.45
5/16"	-3.00	8.00	0.00	0.00	0.45	0.45
3.5	-2.50	5.66	0.08	0.08	0.53	0.53
4	-2.25	4.76	0.08	0.08	0.61	0.61
5	-2.00	4.00	0.00	0.00	0.61	0.61
7	-1.50	2.83	0.03	0.03	0.64	0.64
10	-1.00	2.00	0.04	0.04	0.68	0.68
14	-0.50	1.41	0.05	0.05	0.73	0.73
18	0.00	1.00	0.08	0.08	0.81	0.81
25	0.50	0.71	0.19	0.19	1.00	1.00
35	1.00	0.50	2.56	2.56	3.56	3.56
45	1.50	0.35	2.56	2.56	6.12	6.12
60	2.00	0.25	17.72	17.72	23.84	23.84
80	2.50	0.18	22.42	22.42	46.26	46.26
120	3.00	0.13	22.41	22.41	68.67	68.67
170	3.50	0.09	14.83	14.83	83.50	83.50
200	3.75	0.07	14.83	14.83	98.33	98.33
230	4.00	0.06	0.83	0.83	99.16	99.16

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.69	3.51	3.21	2.58	2.03	1.78	1.28

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.53	0.17	0.89	-2.09	14.83

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: OIB060 COMPOSITE

Analysis Date: 03-18-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW		Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	1.08	0.04	#200 - 1.28 #230 - 1.12			

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	0.09	0.09	0.09	0.09
5/16"	-3.00	8.00	0.05	0.05	0.14	0.14
3.5	-2.50	5.66	0.13	0.13	0.27	0.27
4	-2.25	4.76	0.06	0.06	0.33	0.33
5	-2.00	4.00	0.15	0.15	0.48	0.48
7	-1.50	2.83	0.25	0.25	0.73	0.73
10	-1.00	2.00	0.40	0.40	1.13	1.13
14	-0.50	1.41	0.63	0.63	1.76	1.76
18	0.00	1.00	1.04	1.04	2.80	2.80
25	0.50	0.71	2.70	2.70	5.50	5.50
35	1.00	0.50	7.87	7.87	13.37	13.37
45	1.50	0.35	12.67	12.67	26.04	26.04
60	2.00	0.25	21.96	21.96	48.00	48.00
80	2.50	0.18	24.31	24.31	72.31	72.31
120	3.00	0.13	19.50	19.50	91.81	91.81
170	3.50	0.09	6.26	6.26	98.07	98.07
200	3.75	0.07	0.65	0.65	98.72	98.72
230	4.00	0.06	0.16	0.16	98.88	98.88

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.25	2.80	2.57	2.04	1.46	1.10	0.41

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.92	0.26	0.91	-1.29	6.9

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: TOTAL BEACH COMP

Analysis Date: 03-19-14

Analyzed By: TM

CB&I
Coastal Planning & Engineering, Inc.
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391 8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SW		Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	1.31	0.03	#200 - 1.70 #230 - 1.34		6	

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	0.19	0.19	0.19	0.19
5/16"	-3.00	8.00	0.06	0.06	0.25	0.25
3.5	-2.50	5.66	0.09	0.09	0.34	0.34
4	-2.25	4.76	0.06	0.06	0.40	0.40
5	-2.00	4.00	0.08	0.08	0.48	0.48
7	-1.50	2.83	0.16	0.16	0.64	0.64
10	-1.00	2.00	0.19	0.19	0.83	0.83
14	-0.50	1.41	0.34	0.34	1.17	1.17
18	0.00	1.00	0.59	0.59	1.76	1.76
25	0.50	0.71	1.58	1.58	3.34	3.34
35	1.00	0.50	5.87	5.87	9.21	9.21
45	1.50	0.35	10.89	10.89	20.10	20.10
60	2.00	0.25	21.08	21.08	41.18	41.18
80	2.50	0.18	22.23	22.23	63.41	63.41
120	3.00	0.13	20.98	20.98	84.39	84.39
170	3.50	0.09	10.09	10.09	94.48	94.48
200	3.75	0.07	3.82	3.82	98.30	98.30
230	4.00	0.06	0.36	0.36	98.66	98.66

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.53	2.99	2.78	2.20	1.62	1.31	0.64

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.11	0.23	0.92	-1.32	8.16

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 6/26/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: DUNE COMPOSITE

Analysis Date: 03-19-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP		Average wet Munsell Value is 6. Average dry Munsell Value is 8.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.65	0.04	#200 - 0.72 #230 - 0.69			

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.01	0.01	0.01	0.01
25	0.50	0.71	0.03	0.03	0.04	0.04
35	1.00	0.50	0.58	0.58	0.62	0.62
45	1.50	0.35	6.94	6.94	7.56	7.56
60	2.00	0.25	30.62	30.62	38.18	38.18
80	2.50	0.18	41.53	41.53	79.71	79.71
120	3.00	0.13	17.24	17.24	96.95	96.95
170	3.50	0.09	2.18	2.18	99.13	99.13
200	3.75	0.07	0.15	0.15	99.28	99.28
230	4.00	0.06	0.03	0.03	99.31	99.31

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.94	2.62	2.44	2.14	1.78	1.64	1.32

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.13	0.23	0.46	-0.02	3.15

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: TOE OF DUNE COMP

Analysis Date: 07-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP		Average wet Munsell Value is 7. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.31	0.02	#200 - 0.54 #230 - 0.33			

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	0.01	0.01	0.01	0.01
5	-2.00	4.00	0.01	0.01	0.02	0.02
7	-1.50	2.83	0.01	0.01	0.03	0.03
10	-1.00	2.00	0.01	0.01	0.04	0.04
14	-0.50	1.41	0.01	0.01	0.05	0.05
18	0.00	1.00	0.07	0.07	0.12	0.12
25	0.50	0.71	0.22	0.22	0.34	0.34
35	1.00	0.50	2.92	2.92	3.26	3.26
45	1.50	0.35	15.76	15.76	19.02	19.02
60	2.00	0.25	29.58	29.58	48.60	48.60
80	2.50	0.18	24.20	24.20	72.80	72.80
120	3.00	0.13	14.03	14.03	86.83	86.83
170	3.50	0.09	6.46	6.46	93.29	93.29
200	3.75	0.07	6.17	6.17	99.46	99.46
230	4.00	0.06	0.21	0.21	99.67	99.67

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.57	2.90	2.58	2.03	1.60	1.40	1.06

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.12	0.23	0.72	0.3	3.03

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: MID BERM COMP

Analysis Date: 07-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP		Composite

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.22	0.01	#200 - 0.33 #230 - 0.23			

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	0.05	0.05	0.05	0.05
10	-1.00	2.00	0.05	0.05	0.10	0.10
14	-0.50	1.41	0.09	0.09	0.19	0.19
18	0.00	1.00	0.28	0.28	0.47	0.47
25	0.50	0.71	2.07	2.07	2.54	2.54
35	1.00	0.50	8.78	8.78	11.32	11.32
45	1.50	0.35	16.49	16.49	27.81	27.81
60	2.00	0.25	24.71	24.71	52.52	52.52
80	2.50	0.18	22.81	22.81	75.33	75.33
120	3.00	0.13	15.62	15.62	90.95	90.95
170	3.50	0.09	4.51	4.51	95.46	95.46
200	3.75	0.07	4.21	4.21	99.67	99.67
230	4.00	0.06	0.10	0.10	99.77	99.77

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.45	2.78	2.49	1.95	1.41	1.14	0.64

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.96	0.26	0.79	-0.05	3.03

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/19/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: BERM CREST COMP

Analysis Date: 07-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	0.0 NAVD 88

USCS:	Munsell:	Comments:
SP		Composite

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.17	0.05	#200 - 0.29 #230 - 0.22			

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	0.01	0.01	0.01	0.01
7	-1.50	2.83	0.02	0.02	0.03	0.03
10	-1.00	2.00	0.02	0.02	0.05	0.05
14	-0.50	1.41	0.04	0.04	0.09	0.09
18	0.00	1.00	0.11	0.11	0.20	0.20
25	0.50	0.71	0.57	0.57	0.77	0.77
35	1.00	0.50	5.81	5.81	6.58	6.58
45	1.50	0.35	17.30	17.30	23.88	23.88
60	2.00	0.25	25.38	25.38	49.26	49.26
80	2.50	0.18	25.56	25.56	74.82	74.82
120	3.00	0.13	16.87	16.87	91.69	91.69
170	3.50	0.09	4.11	4.11	95.80	95.80
200	3.75	0.07	3.91	3.91	99.71	99.71
230	4.00	0.06	0.07	0.07	99.78	99.78

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.40	2.77	2.51	2.01	1.52	1.27	0.86

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.03	0.24	0.72	0.06	3.08

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: MHW COMPOSITE

Analysis Date: 02-05-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	1.8 NAVD 88

USCS:	Munsell:	Comments:
SP		Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.59	0.11	#200 - 0.81 #230 - 0.70			

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	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.01	0.01	0.01	0.01
18	0.00	1.00	0.04	0.04	0.05	0.05
25	0.50	0.71	0.17	0.17	0.22	0.22
35	1.00	0.50	1.62	1.62	1.84	1.84
45	1.50	0.35	7.26	7.26	9.10	9.10
60	2.00	0.25	31.32	31.32	40.42	40.42
80	2.50	0.18	34.79	34.79	75.21	75.21
120	3.00	0.13	18.83	18.83	94.04	94.04
170	3.50	0.09	2.79	2.79	96.83	96.83
200	3.75	0.07	2.36	2.36	99.19	99.19
230	4.00	0.06	0.11	0.11	99.30	99.30

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.17	2.73	2.50	2.14	1.75	1.61	1.22

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.15	0.23	0.56	0.14	3.6

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: MTL COMPOSITE

Analysis Date: 02-05-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-0.6 NAVD 88

USCS:	Munsell:	Comments:
SP		Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.78	0.00	#200 - 0.99 #230 - 0.78			

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	0.03	0.03	0.03	0.03
5	-2.00	4.00	0.02	0.02	0.05	0.05
7	-1.50	2.83	0.01	0.01	0.06	0.06
10	-1.00	2.00	0.01	0.01	0.07	0.07
14	-0.50	1.41	0.02	0.02	0.09	0.09
18	0.00	1.00	0.11	0.11	0.20	0.20
25	0.50	0.71	0.56	0.56	0.76	0.76
35	1.00	0.50	7.49	7.49	8.25	8.25
45	1.50	0.35	14.38	14.38	22.63	22.63
60	2.00	0.25	31.93	31.93	54.56	54.56
80	2.50	0.18	23.86	23.86	78.42	78.42
120	3.00	0.13	16.51	16.51	94.93	94.93
170	3.50	0.09	2.48	2.48	97.41	97.41
200	3.75	0.07	1.60	1.60	99.01	99.01
230	4.00	0.06	0.21	0.21	99.22	99.22

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.01	2.67	2.43	1.93	1.54	1.27	0.78

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.95	0.26	0.67	-0.1	3.76

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: MLW COMPOSITE

Analysis Date: 02-05-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-2.9 NAVD 88

USCS:	Munsell:	Comments:
SW		Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.75	0.05	#200 - 0.99 #230 - 0.80			

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	0.51	0.51	0.51	0.51
5/16"	-3.00	8.00	0.53	0.53	1.04	1.04
3.5	-2.50	5.66	0.32	0.32	1.36	1.36
4	-2.25	4.76	0.19	0.19	1.55	1.55
5	-2.00	4.00	0.21	0.21	1.76	1.76
7	-1.50	2.83	0.39	0.39	2.15	2.15
10	-1.00	2.00	0.50	0.50	2.65	2.65
14	-0.50	1.41	1.21	1.21	3.86	3.86
18	0.00	1.00	2.59	2.59	6.45	6.45
25	0.50	0.71	6.93	6.93	13.38	13.38
35	1.00	0.50	19.51	19.51	32.89	32.89
45	1.50	0.35	13.90	13.90	46.79	46.79
60	2.00	0.25	21.02	21.02	67.81	67.81
80	2.50	0.18	15.24	15.24	83.05	83.05
120	3.00	0.13	11.46	11.46	94.51	94.51
170	3.50	0.09	2.36	2.36	96.87	96.87
200	3.75	0.07	2.14	2.14	99.01	99.01
230	4.00	0.06	0.19	0.19	99.20	99.20

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.10	2.54	2.24	1.58	0.80	0.57	-0.28

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.45	0.37	1.13	-1.15	6.48

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/19/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: TROUGH COMP

Analysis Date: 02-05-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-5.0 NAVD 88

USCS:	Munsell:	Comments:
SW		Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.86	0.02	#200 - 1.08 #230 - 0.88			

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	1.09	1.09	1.09	1.09
5/16"	-3.00	8.00	0.09	0.09	1.18	1.18
3.5	-2.50	5.66	0.23	0.23	1.41	1.41
4	-2.25	4.76	0.16	0.16	1.57	1.57
5	-2.00	4.00	0.16	0.16	1.73	1.73
7	-1.50	2.83	0.28	0.28	2.01	2.01
10	-1.00	2.00	0.25	0.25	2.26	2.26
14	-0.50	1.41	0.46	0.46	2.72	2.72
18	0.00	1.00	0.73	0.73	3.45	3.45
25	0.50	0.71	0.97	0.97	4.42	4.42
35	1.00	0.50	4.78	4.78	9.20	9.20
45	1.50	0.35	6.63	6.63	15.83	15.83
60	2.00	0.25	23.46	23.46	39.29	39.29
80	2.50	0.18	27.62	27.62	66.91	66.91
120	3.00	0.13	26.87	26.87	93.78	93.78
170	3.50	0.09	4.08	4.08	97.86	97.86
200	3.75	0.07	1.06	1.06	98.92	98.92
230	4.00	0.06	0.20	0.20	99.12	99.12

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.15	2.82	2.65	2.19	1.70	1.50	0.56

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.02	0.25	1.03	-2.83	14.97

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: BAR CRST COMP

Analysis Date: 02-05-14

Analyzed By: TM

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-7.0 NAVD 88

USCS:	Munsell:	Comments:
SP		Average wet Munsell Value is 5. Average dry Munsell Value is 6.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	0.95	0.08	#200 - 1.14 #230 - 1.03			

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	0.12	0.12	0.12	0.12
4	-2.25	4.76	0.11	0.11	0.23	0.23
5	-2.00	4.00	0.08	0.08	0.31	0.31
7	-1.50	2.83	0.33	0.33	0.64	0.64
10	-1.00	2.00	0.34	0.34	0.98	0.98
14	-0.50	1.41	0.45	0.45	1.43	1.43
18	0.00	1.00	0.85	0.85	2.28	2.28
25	0.50	0.71	2.12	2.12	4.40	4.40
35	1.00	0.50	8.75	8.75	13.15	13.15
45	1.50	0.35	14.42	14.42	27.57	27.57
60	2.00	0.25	23.38	23.38	50.95	50.95
80	2.50	0.18	25.06	25.06	76.01	76.01
120	3.00	0.13	18.83	18.83	94.84	94.84
170	3.50	0.09	2.78	2.78	97.62	97.62
200	3.75	0.07	1.24	1.24	98.86	98.86
230	4.00	0.06	0.11	0.11	98.97	98.97

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.03	2.71	2.48	1.98	1.41	1.10	0.53

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.88	0.27	0.84	-1.09	6.09

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: -8.75 COMPOSITE

Analysis Date: 07-12-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-8.8 NAVD 88

USCS:	Munsell:	Comments:
SW		Average wet Munsell Value is 5. Average dry Munsell Value is 6.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	1.13	0.00	#200 - 1.47 #230 - 1.13			

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	0.09	0.09	0.09	0.09
5/16"	-3.00	8.00	0.00	0.00	0.09	0.09
3.5	-2.50	5.66	0.17	0.17	0.26	0.26
4	-2.25	4.76	0.14	0.14	0.40	0.40
5	-2.00	4.00	0.03	0.03	0.43	0.43
7	-1.50	2.83	0.17	0.17	0.60	0.60
10	-1.00	2.00	0.19	0.19	0.79	0.79
14	-0.50	1.41	0.28	0.28	1.07	1.07
18	0.00	1.00	0.45	0.45	1.52	1.52
25	0.50	0.71	0.96	0.96	2.48	2.48
35	1.00	0.50	4.47	4.47	6.95	6.95
45	1.50	0.35	5.59	5.59	12.54	12.54
60	2.00	0.25	14.59	14.59	27.13	27.13
80	2.50	0.18	20.97	20.97	48.10	48.10
120	3.00	0.13	34.21	34.21	82.31	82.31
170	3.50	0.09	12.15	12.15	94.46	94.46
200	3.75	0.07	4.07	4.07	98.53	98.53
230	4.00	0.06	0.34	0.34	98.87	98.87

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.53	3.07	2.89	2.53	1.93	1.62	0.78

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.34	0.20	0.86	-1.77	9.62

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: -12.5 COMPOSITE

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-12.5 NAVD 88

USCS:	Munsell:	Comments:
SP		Average wet Munsell Value is 4. Average dry Munsell Value is 6.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	1.75	0.00	#200 - 2.64 #230 - 1.75			

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	0.02	0.02	0.02	0.02
5	-2.00	4.00	0.00	0.00	0.02	0.02
7	-1.50	2.83	0.05	0.05	0.07	0.07
10	-1.00	2.00	0.04	0.04	0.11	0.11
14	-0.50	1.41	0.07	0.07	0.18	0.18
18	0.00	1.00	0.10	0.10	0.28	0.28
25	0.50	0.71	0.17	0.17	0.45	0.45
35	1.00	0.50	0.95	0.95	1.40	1.40
45	1.50	0.35	1.15	1.15	2.55	2.55
60	2.00	0.25	4.05	4.05	6.60	6.60
80	2.50	0.18	12.42	12.42	19.02	19.02
120	3.00	0.13	36.90	36.90	55.92	55.92
170	3.50	0.09	29.96	29.96	85.88	85.88
200	3.75	0.07	11.48	11.48	97.36	97.36
230	4.00	0.06	0.89	0.89	98.25	98.25

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.70	3.47	3.32	2.92	2.58	2.38	1.80

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.86	0.14	0.6	-1.64	9.58

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: -16.25 COMPOSITE

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-16.3 NAVD 88

USCS:	Munsell:	Comments:
SP		Average wet Munsell Value is 4. Average dry Munsell Value is 6.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	2.92	0.05	#200 - 3.76 #230 - 2.97			

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	0.02	0.02	0.02	0.02
3.5	-2.50	5.66	0.01	0.01	0.03	0.03
4	-2.25	4.76	0.04	0.04	0.07	0.07
5	-2.00	4.00	0.04	0.04	0.11	0.11
7	-1.50	2.83	0.09	0.09	0.20	0.20
10	-1.00	2.00	0.08	0.08	0.28	0.28
14	-0.50	1.41	0.12	0.12	0.40	0.40
18	0.00	1.00	0.11	0.11	0.51	0.51
25	0.50	0.71	0.24	0.24	0.75	0.75
35	1.00	0.50	0.83	0.83	1.58	1.58
45	1.50	0.35	1.19	1.19	2.77	2.77
60	2.00	0.25	2.88	2.88	5.65	5.65
80	2.50	0.18	10.96	10.96	16.61	16.61
120	3.00	0.13	29.04	29.04	45.65	45.65
170	3.50	0.09	34.56	34.56	80.21	80.21
200	3.75	0.07	16.03	16.03	96.24	96.24
230	4.00	0.06	0.79	0.79	97.03	97.03

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.73	3.56	3.42	3.06	2.64	2.47	1.89

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.93	0.13	0.65	-2.41	15.02

GRANULARMETRIC REPORT OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/19/14

Granularmetric Report

Depths and elevations based on measured values

Project Name: Ocean Isle Beach Terminal Groin

Sample Name: -20.0 COMPOSITE

Analysis Date: 07-14-13

Analyzed By: ATP

Coastal Planning & Engineering
A CB&I Company
2481 NW Boca Raton Blvd.
Boca Raton, FL 33431
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
		North Carolina State Plane	-20.0 NAVD 88

USCS:	Munsell:	Comments:
SW-SM		Average wet Munsell Value is 4. Average dry Munsell Value is 6.

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.00	100.00	4.30	0.00	#200 - 6.21 #230 - 4.30			

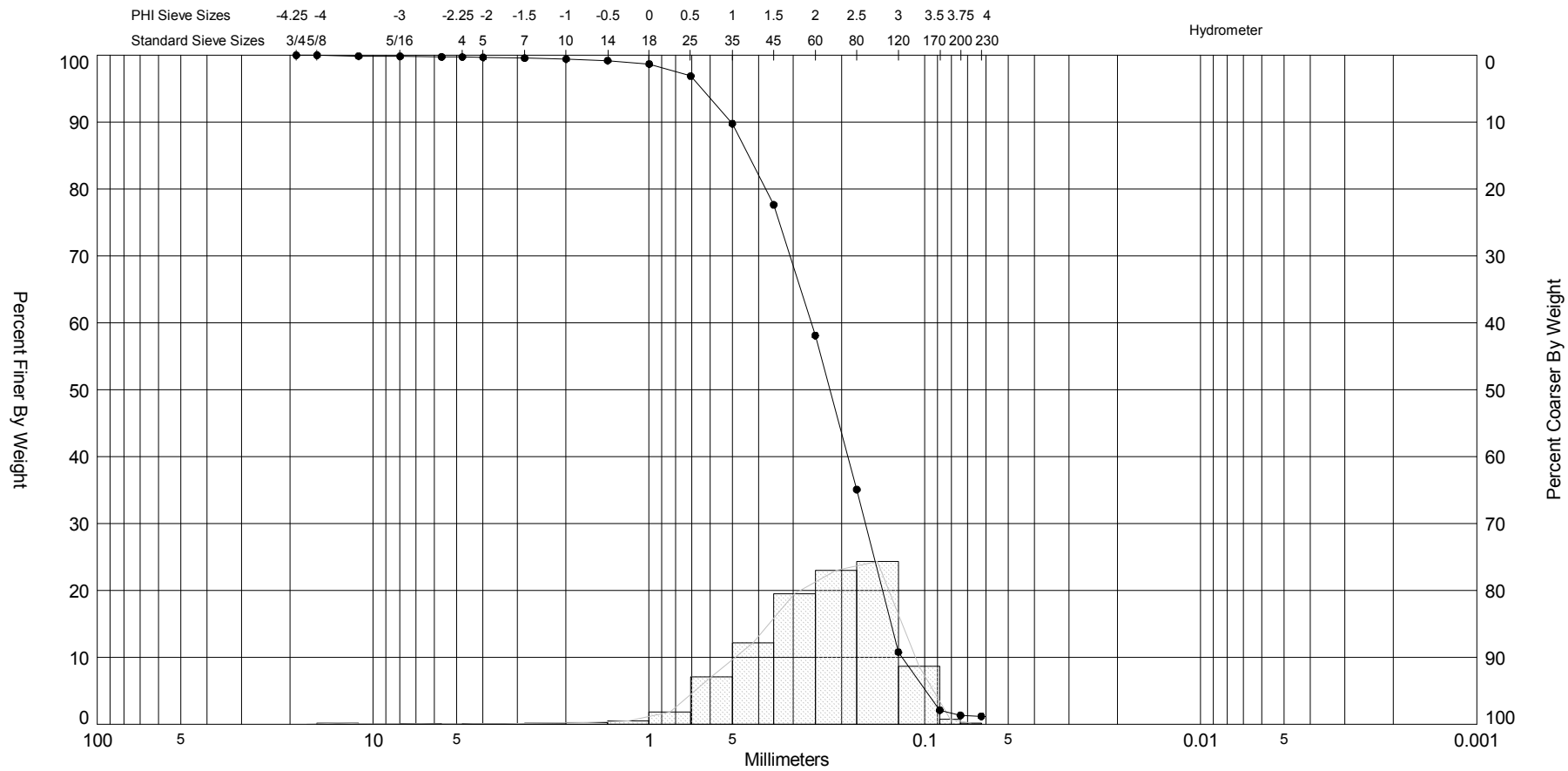
Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.51	0.51	0.51	0.51
5/16"	-3.00	8.00	0.02	0.02	0.53	0.53
3.5	-2.50	5.66	0.17	0.17	0.70	0.70
4	-2.25	4.76	0.04	0.04	0.74	0.74
5	-2.00	4.00	0.09	0.09	0.83	0.83
7	-1.50	2.83	0.22	0.22	1.05	1.05
10	-1.00	2.00	0.24	0.24	1.29	1.29
14	-0.50	1.41	0.27	0.27	1.56	1.56
18	0.00	1.00	0.21	0.21	1.77	1.77
25	0.50	0.71	0.36	0.36	2.13	2.13
35	1.00	0.50	1.16	1.16	3.29	3.29
45	1.50	0.35	1.42	1.42	4.71	4.71
60	2.00	0.25	2.86	2.86	7.57	7.57
80	2.50	0.18	13.32	13.32	20.89	20.89
120	3.00	0.13	27.14	27.14	48.03	48.03
170	3.50	0.09	29.94	29.94	77.97	77.97
200	3.75	0.07	15.82	15.82	93.79	93.79
230	4.00	0.06	1.91	1.91	95.70	95.70

Shell Hash calculated from visual estimate of shell <4.75mm and >2.8mm.

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.91	3.60	3.45	3.03	2.58	2.32	1.55

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.83	0.14	0.92	-3.54	21.73

APPENDIX 6
BEACH COMPOSITE GRAIN SIZE DISTRIBUTION CURVES/HISTOGRAMS



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB000 COMPOSITE	—●—	0.0	SP	#200 - 1.34 #230 - 1.20			2.18	2.06	-1.26	7.64	0.85

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-05-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

Coastal Planning & Engineering
A CB&I Company
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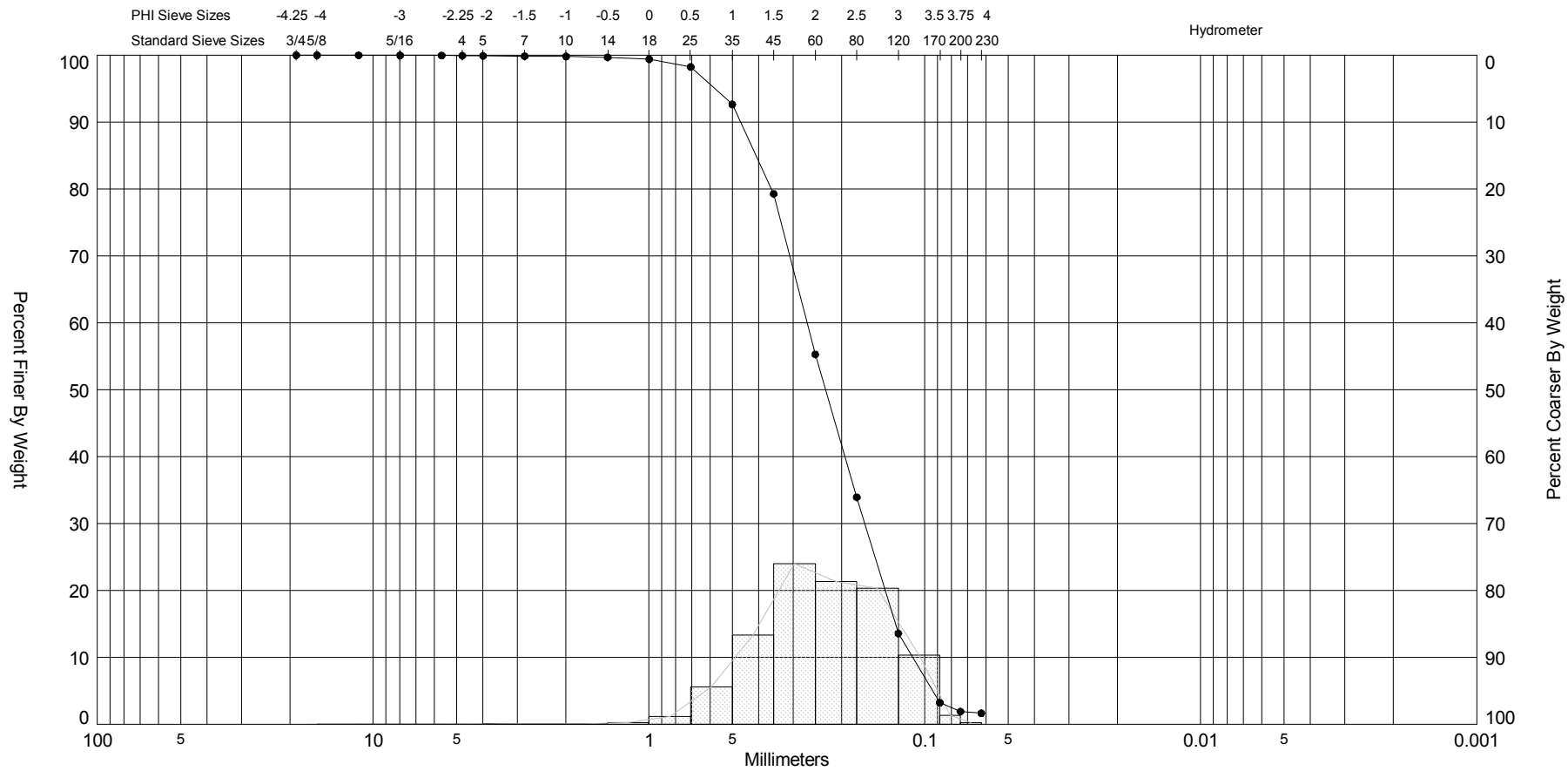
Boca Raton, FL 33431
ph (561) 391-8102



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB010 COMPOSITE	—●—	0.0	SP	#200 - 1.90 #230 - 1.64			2.12	2.1	-0.53	4.48	0.78

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-05-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

Coastal Planning & Engineering
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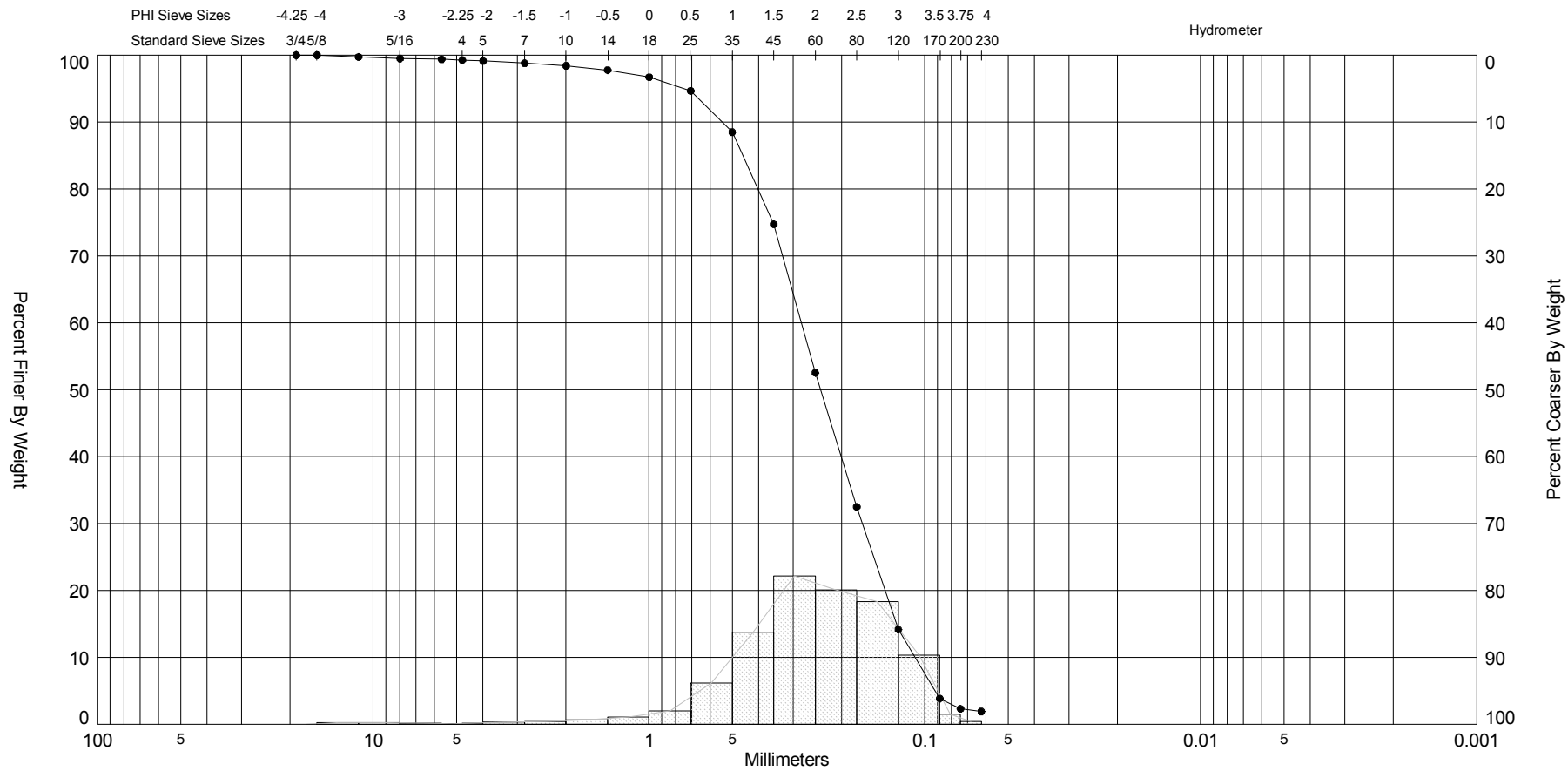

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB025 COMPOSITE	—●—	0.0	SW	#200 - 2.31 #230 - 1.91			2.06	1.97	-1.54	8.39	1.01

Comments: Munsell Values not available.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-05-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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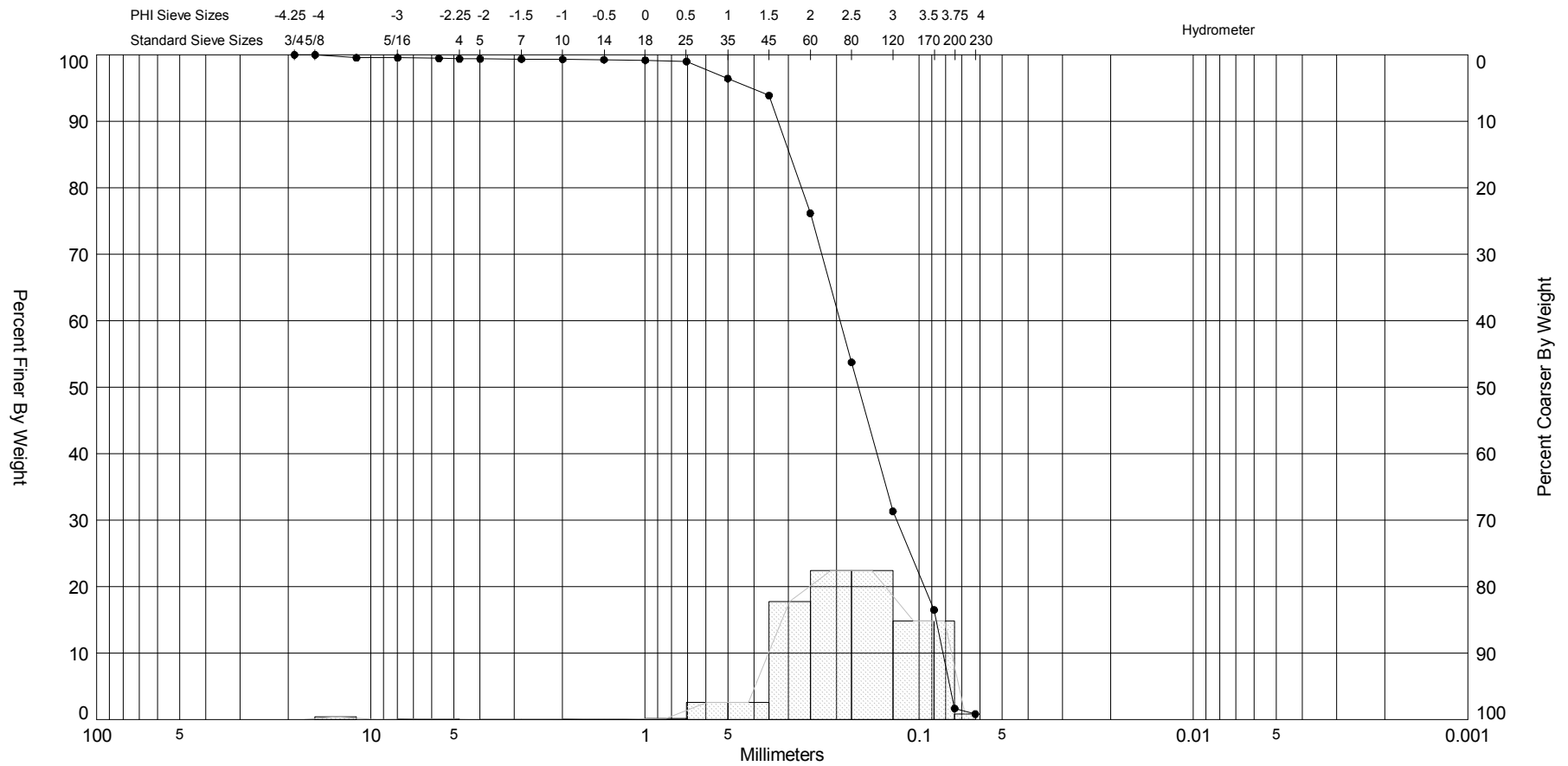

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB040 COMPOSITE	—●—	-0.5	SW	#200 - 1.67 #230 - 0.84			2.58	2.53	-2.09	14.83	0.89

Comments:

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	03-18-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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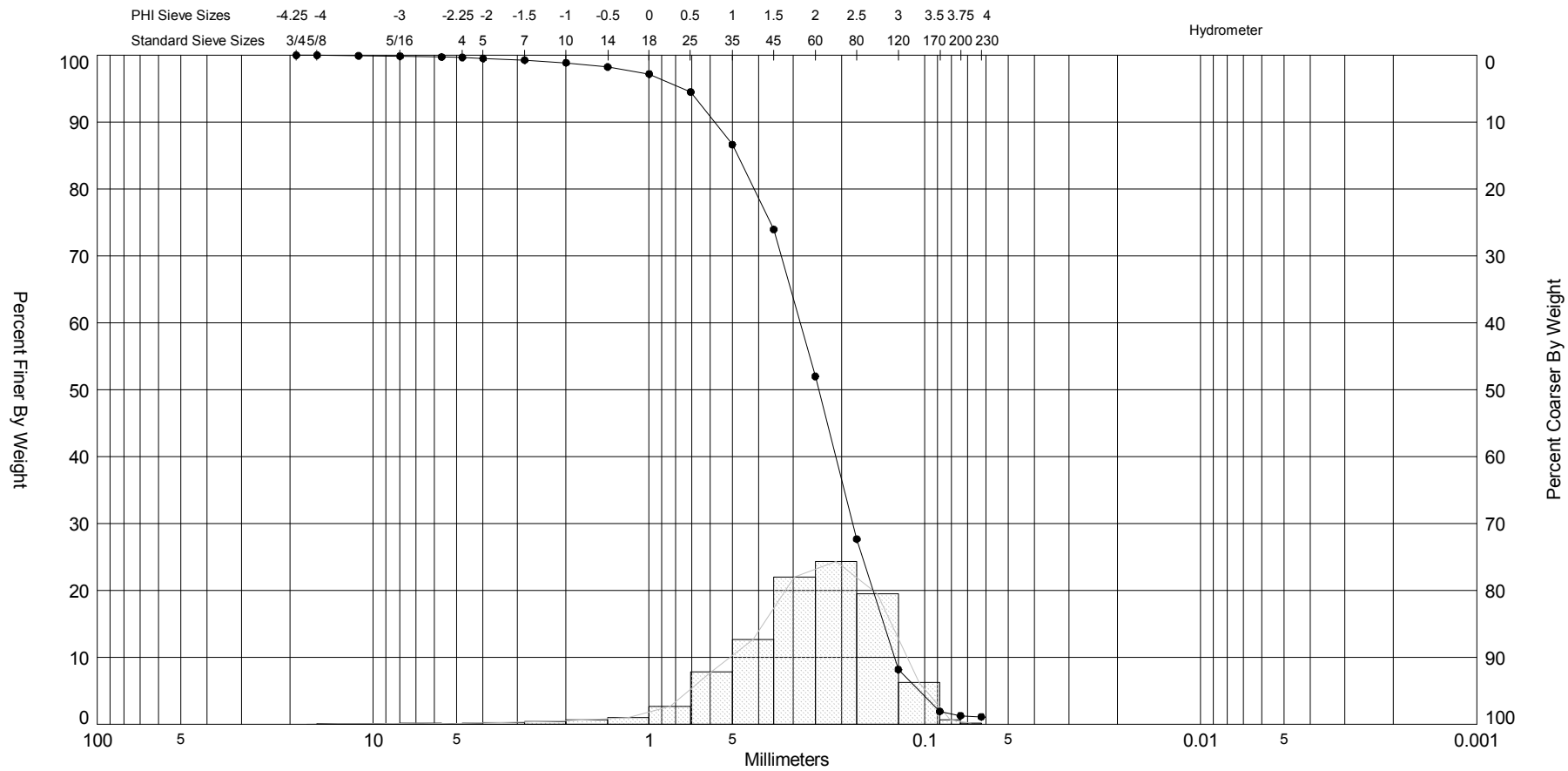
SIEVE ANALYSIS OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/19/14



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
OIB060 COMPOSITE	—●—	0.0	SW	#200 - 1.28 #230 - 1.12			2.04	1.92	-1.29	6.9	0.91

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	03-18-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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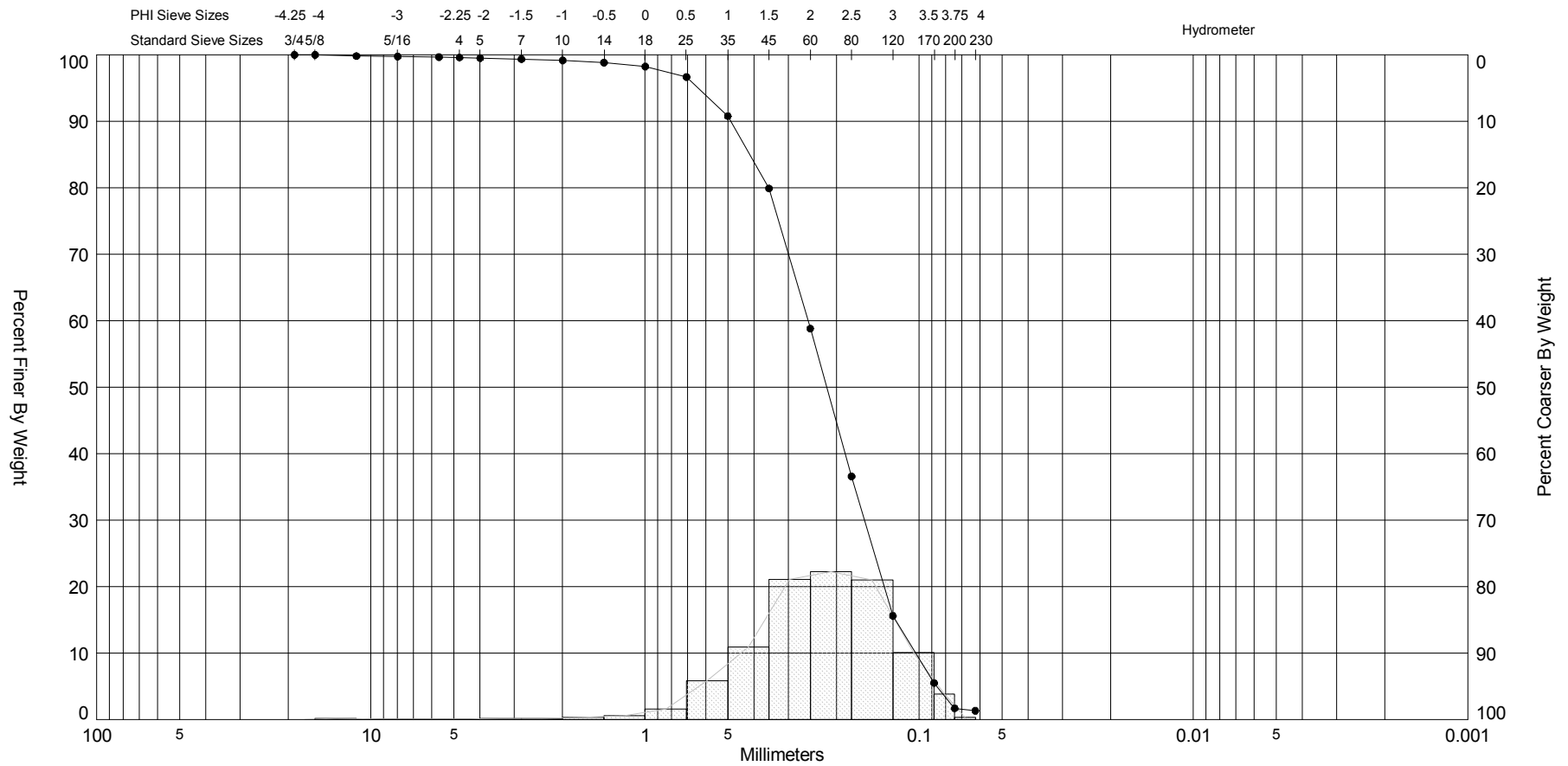

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
TOTAL BEACH COMP	—●—	0.0	SW	#200 - 1.70 #230 - 1.34			2.2	2.11	-1.32	8.16	0.92

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	03-19-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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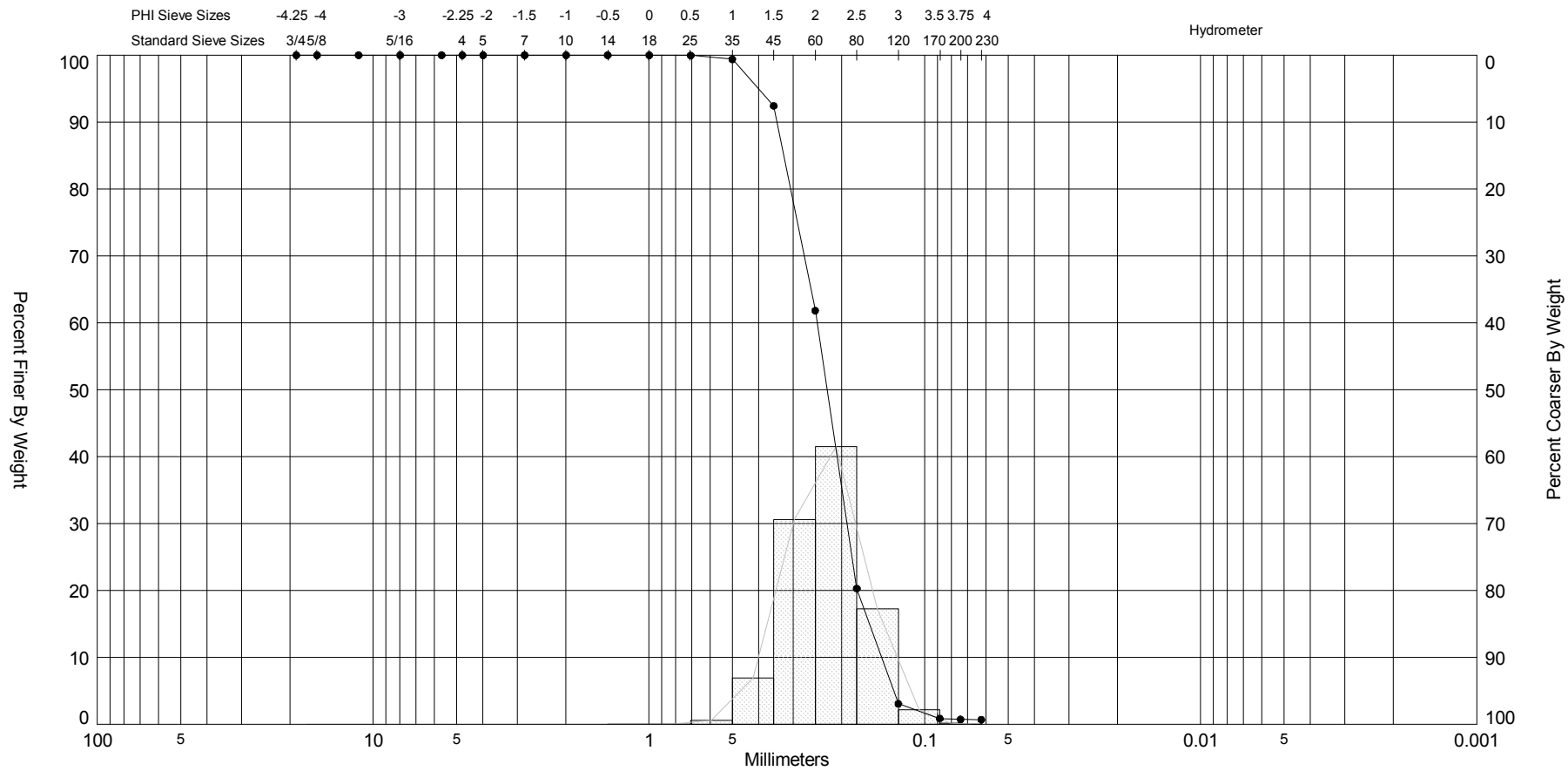

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
DUNE COMPOSITE	—●—	0.0	SP	#200 - 0.72 #230 - 0.69			2.14	2.13	-0.02	3.15	0.46

Comments: Average wet Munsell Value is 6. Average dry Munsell Value is 8.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	03-19-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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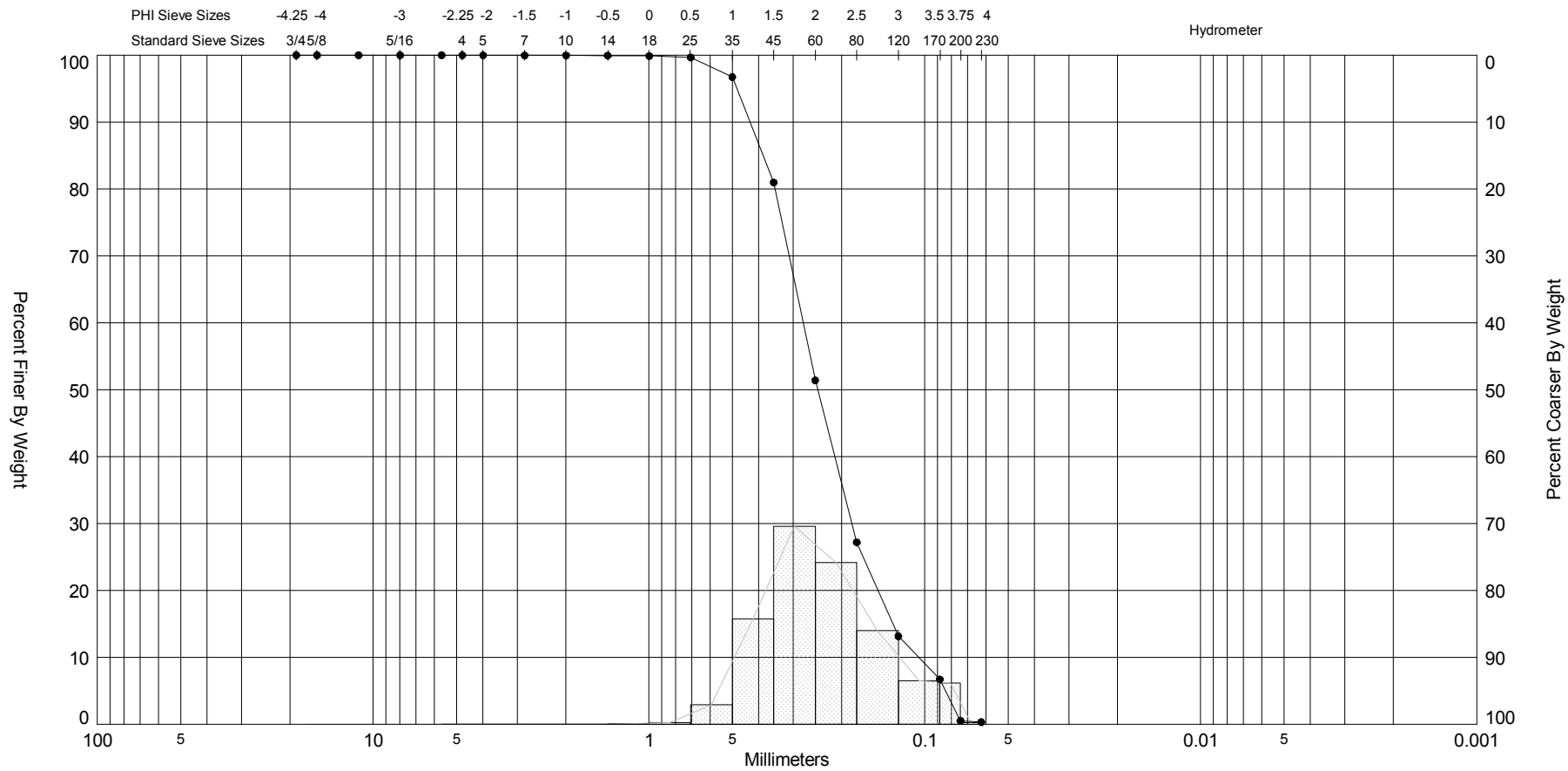

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
TOE OF DUNE COMP	—●—	0.0	SP	#200 - 0.54 #230 - 0.33			2.03	2.12	0.3	3.03	0.72

Comments: Average wet Munsell Value is 7. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-12-13
Analyzed By:	ATP
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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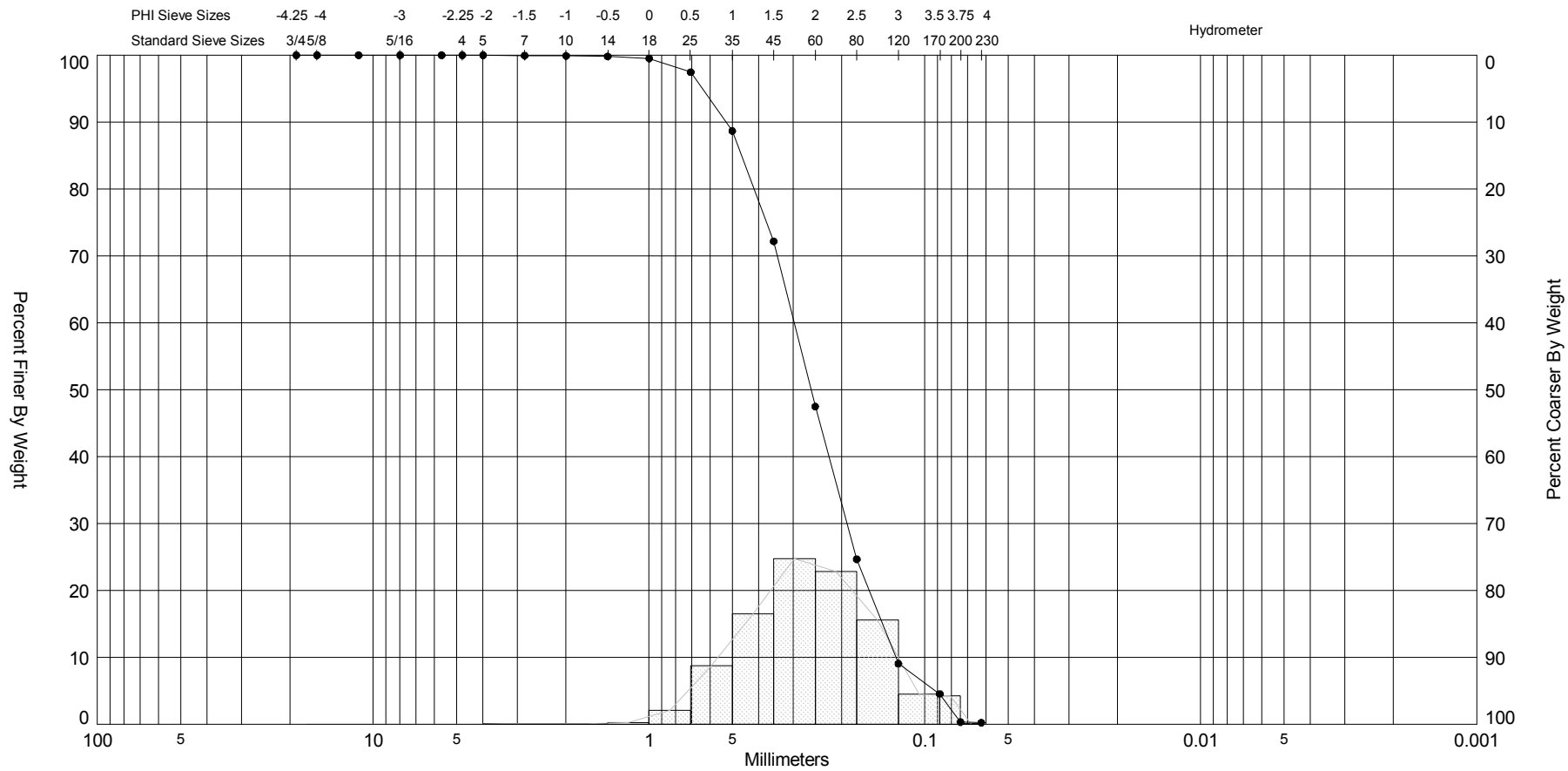

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
MID BERM COMP	—●—	0.0	SP	#200 - 0.33 #230 - 0.23			1.95	1.96	-0.05	3.03	0.79

Comments: Composite

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-12-13
Analyzed By:	ATP
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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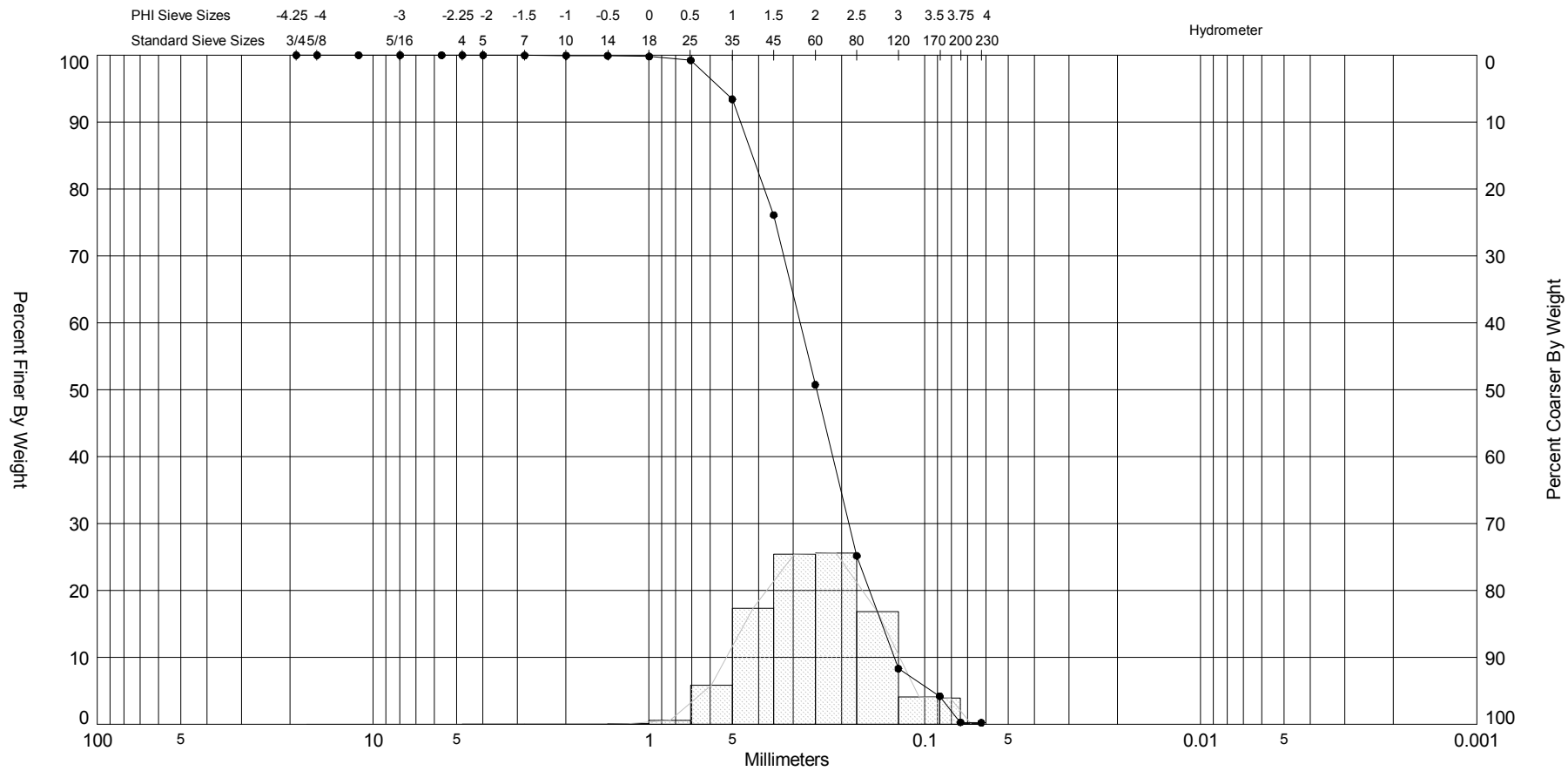
SIEVE ANALYSIS OIB_NATIVESS_APRIL2013_NAVD.GPJ JPBRAZIL.GDT 3/19/14



Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
BERM CREST COMP	—●—	0.0	SP	#200 - 0.29 #230 - 0.22			2.01	2.03	0.06	3.08	0.72

Comments: Composite

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-12-13
Analyzed By:	ATP
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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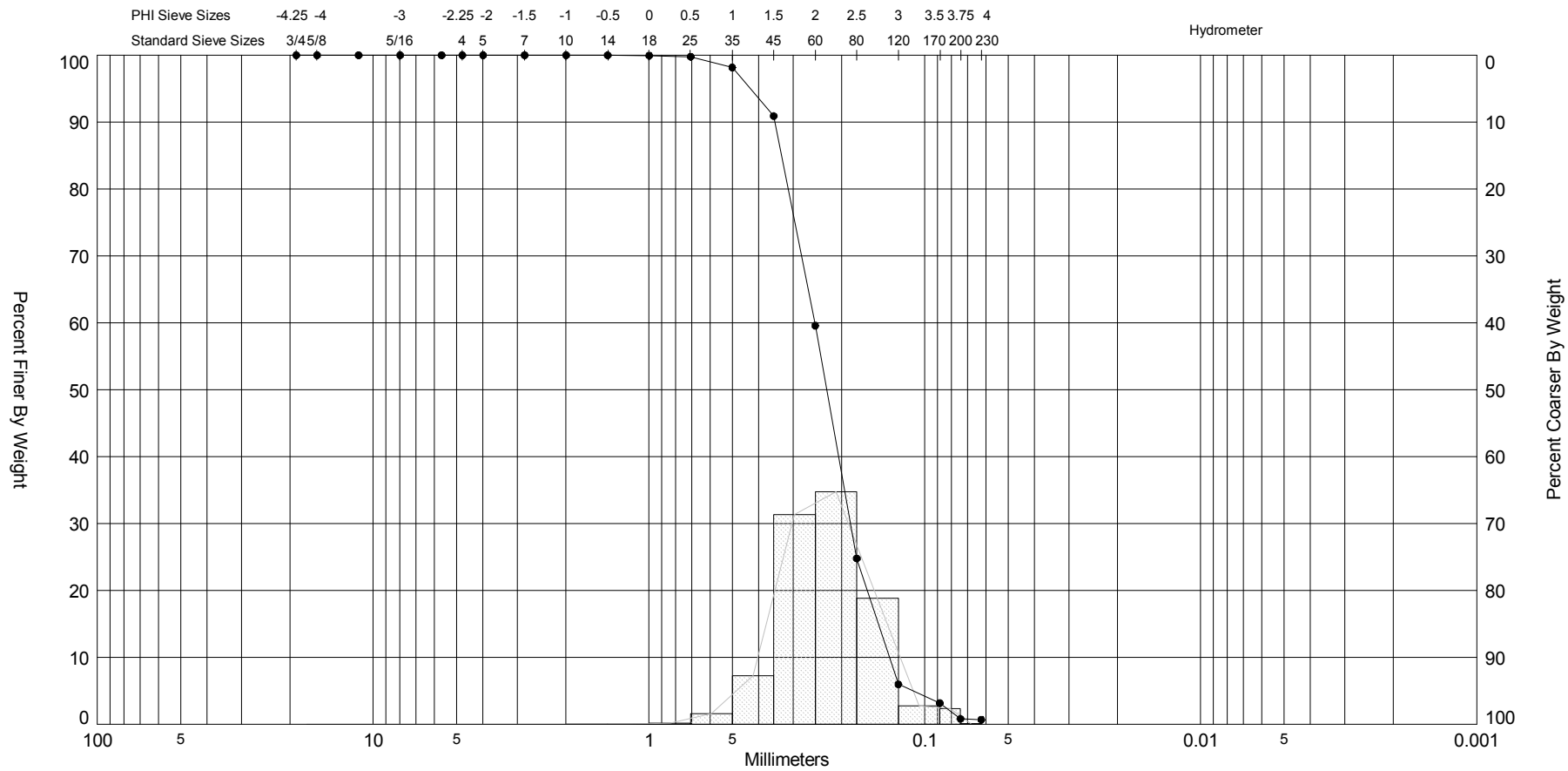

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
MHW COMPOSITE	—●—	1.8	SP	#200 - 0.81 #230 - 0.70			2.14	2.15	0.14	3.6	0.56

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-05-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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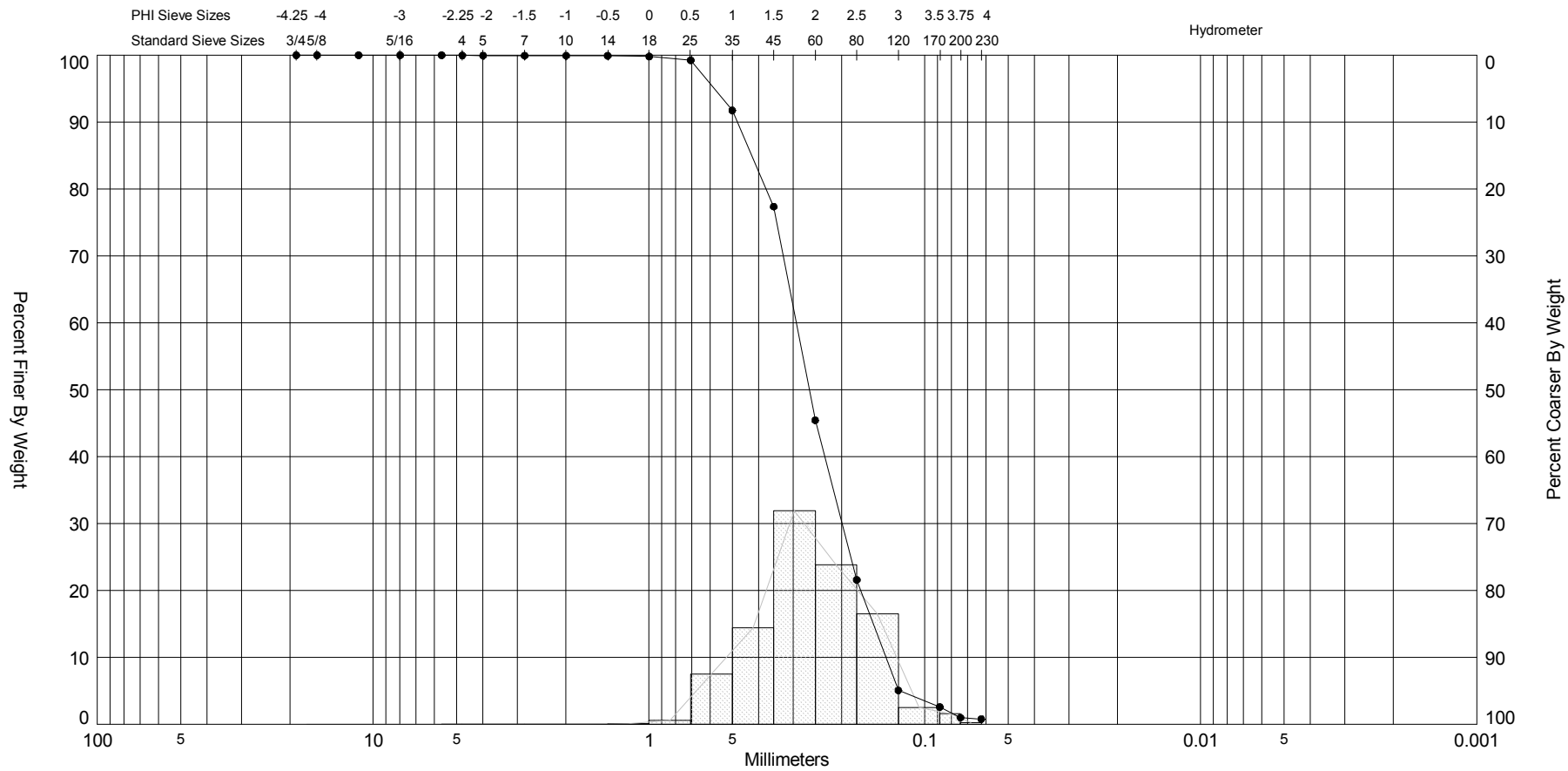

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
MTL COMPOSITE	—●—	-0.6	SP	#200 - 0.99 #230 - 0.78			1.93	1.95	-0.1	3.76	0.67

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-05-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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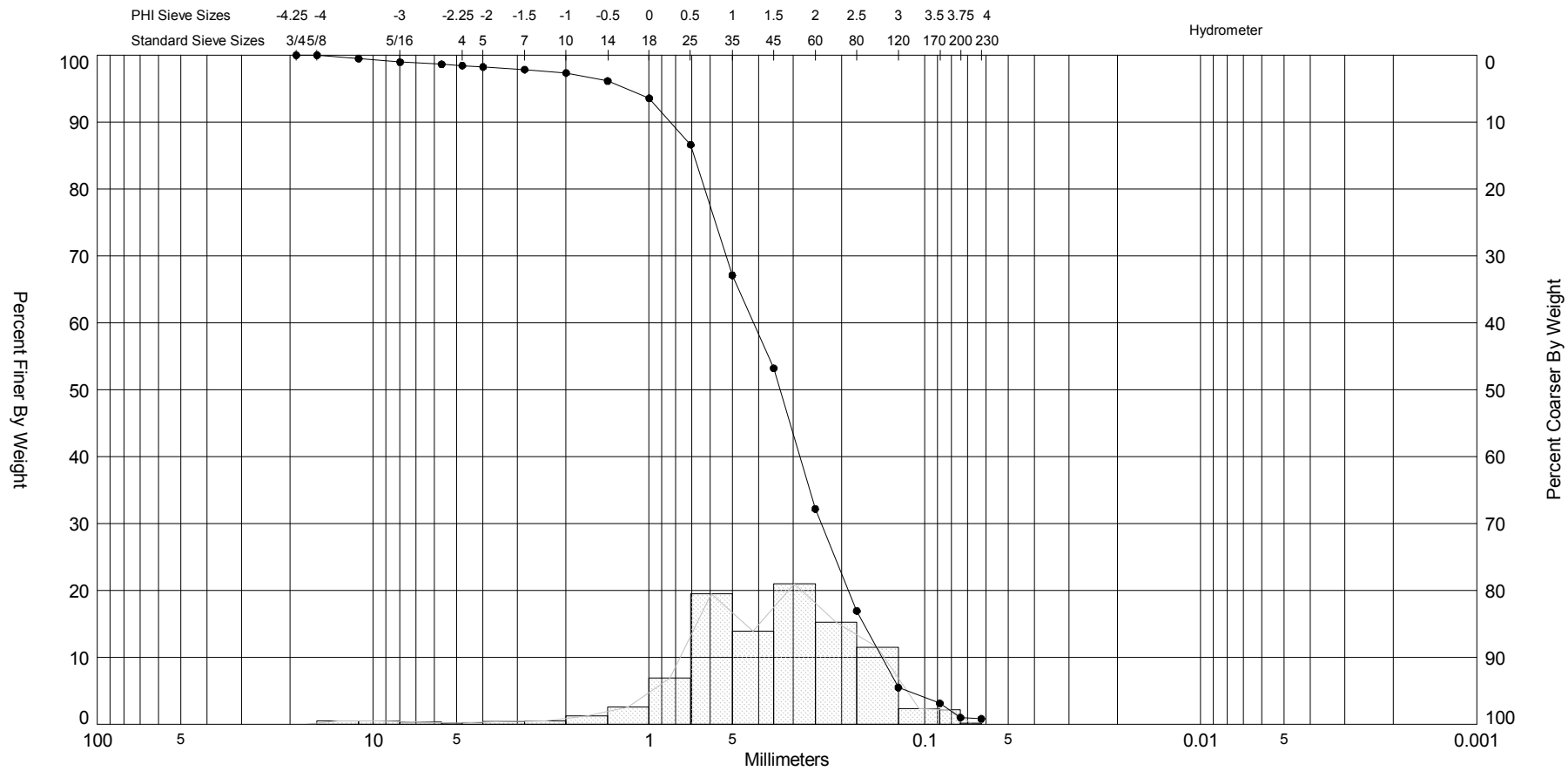

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
MLW COMPOSITE	—●—	-2.9	SW	#200 - 0.99 #230 - 0.80			1.58	1.45	-1.15	6.48	1.13

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-05-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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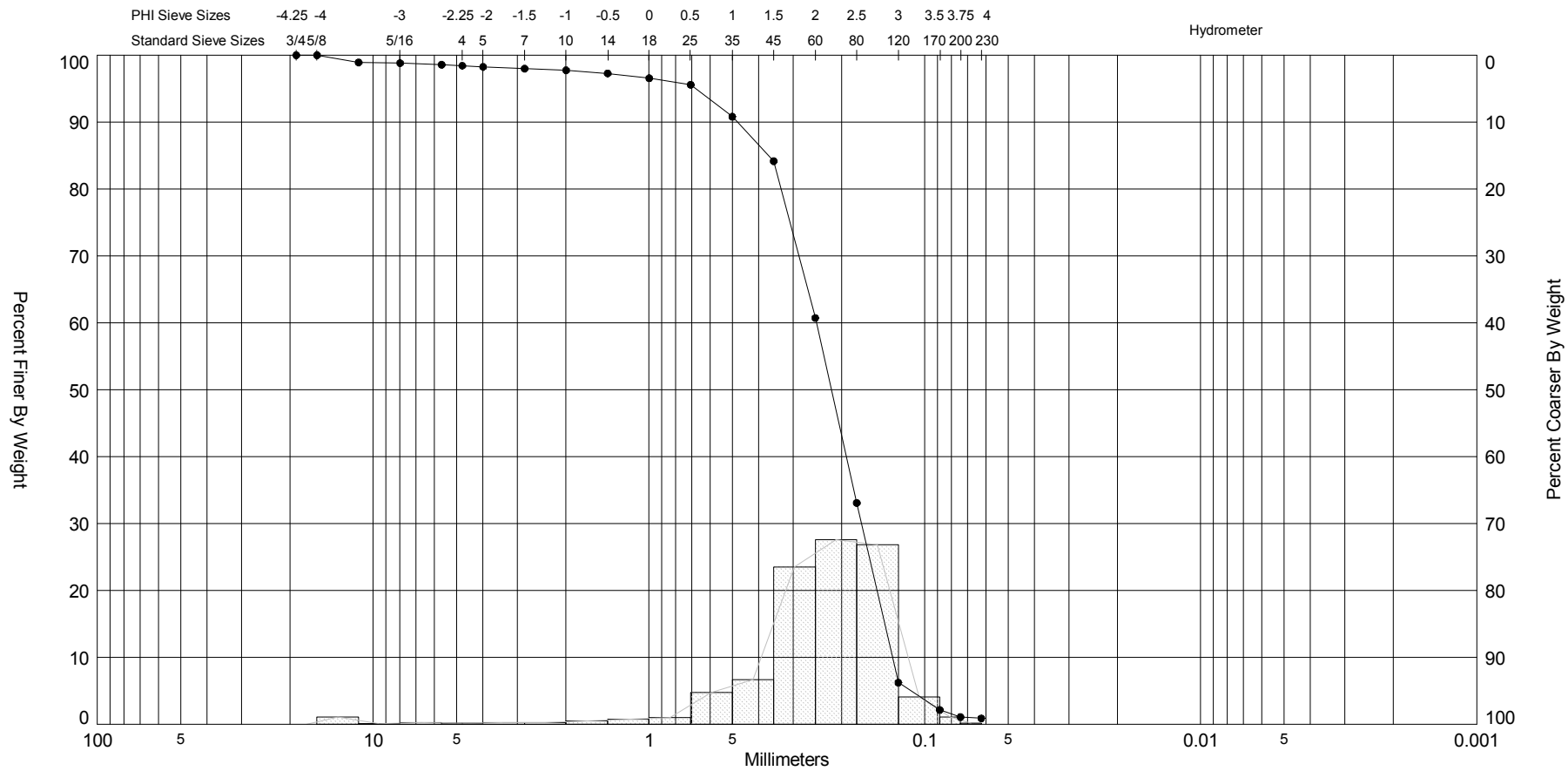

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
TROUGH COMP	—●—	-5.0	SW	#200 - 1.08 #230 - 0.88			2.19	2.02	-2.83	14.97	1.03

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 7.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-05-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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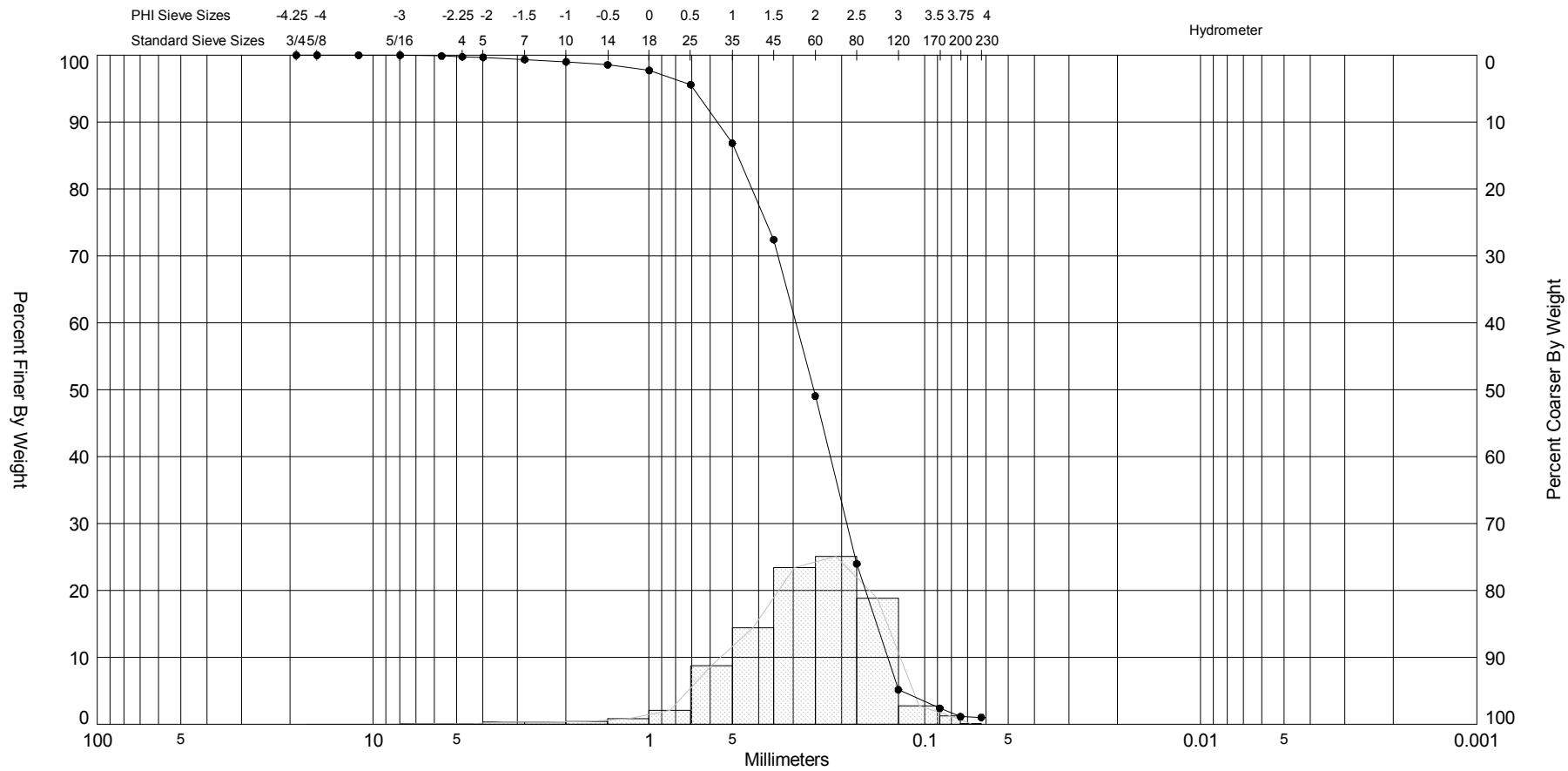

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
BAR CRST COMP	—●—	-7.0	SP	#200 - 1.14 #230 - 1.03			1.98	1.88	-1.09	6.09	0.84

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 6.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	02-05-14
Analyzed By:	TM
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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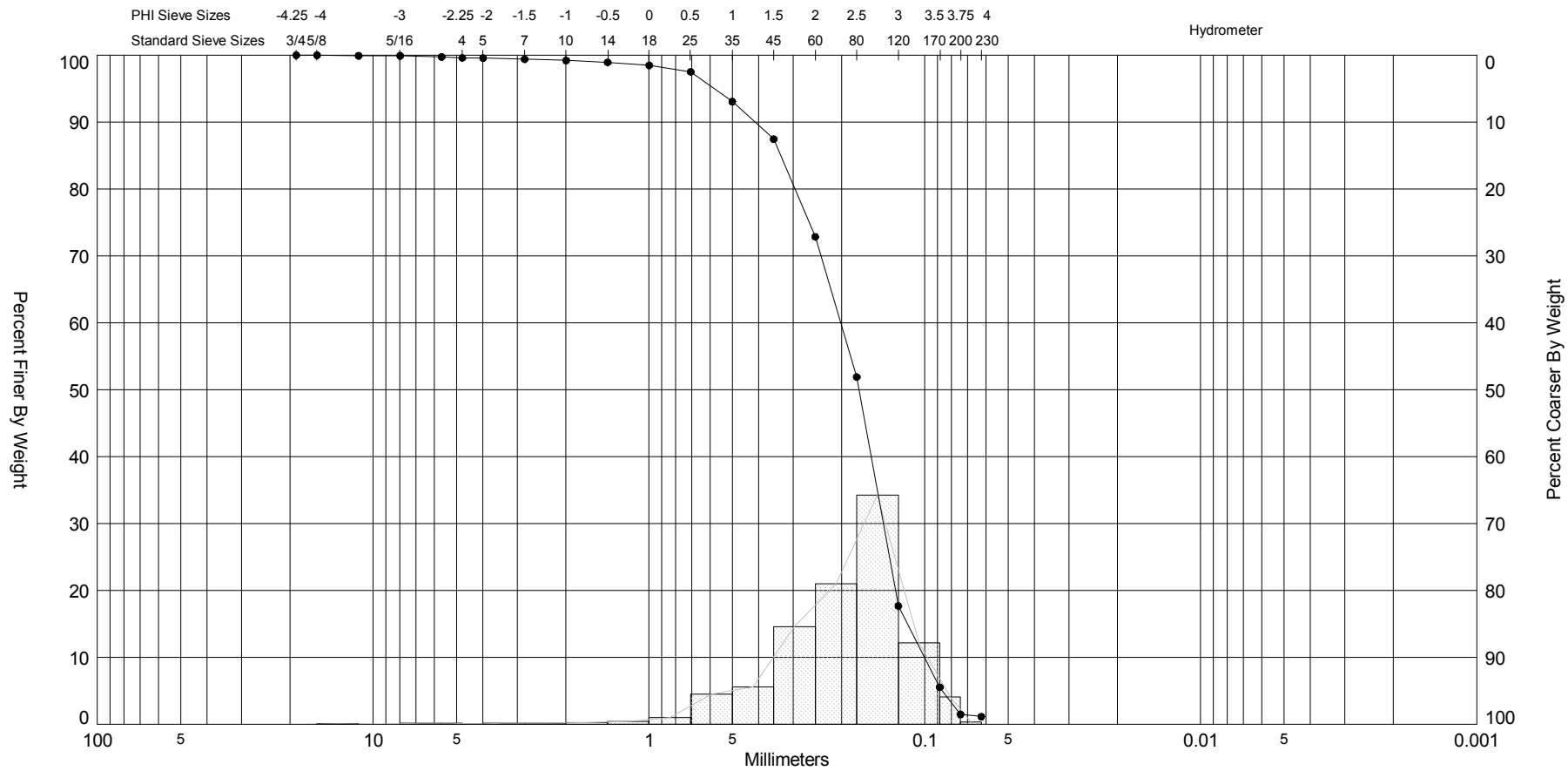

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
-8.75 COMPOSITE	—●—	-8.8	SW	#200 - 1.47 #230 - 1.13			2.53	2.34	-1.77	9.62	0.86

Comments: Average wet Munsell Value is 5. Average dry Munsell Value is 6.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-12-13
Analyzed By:	ATP
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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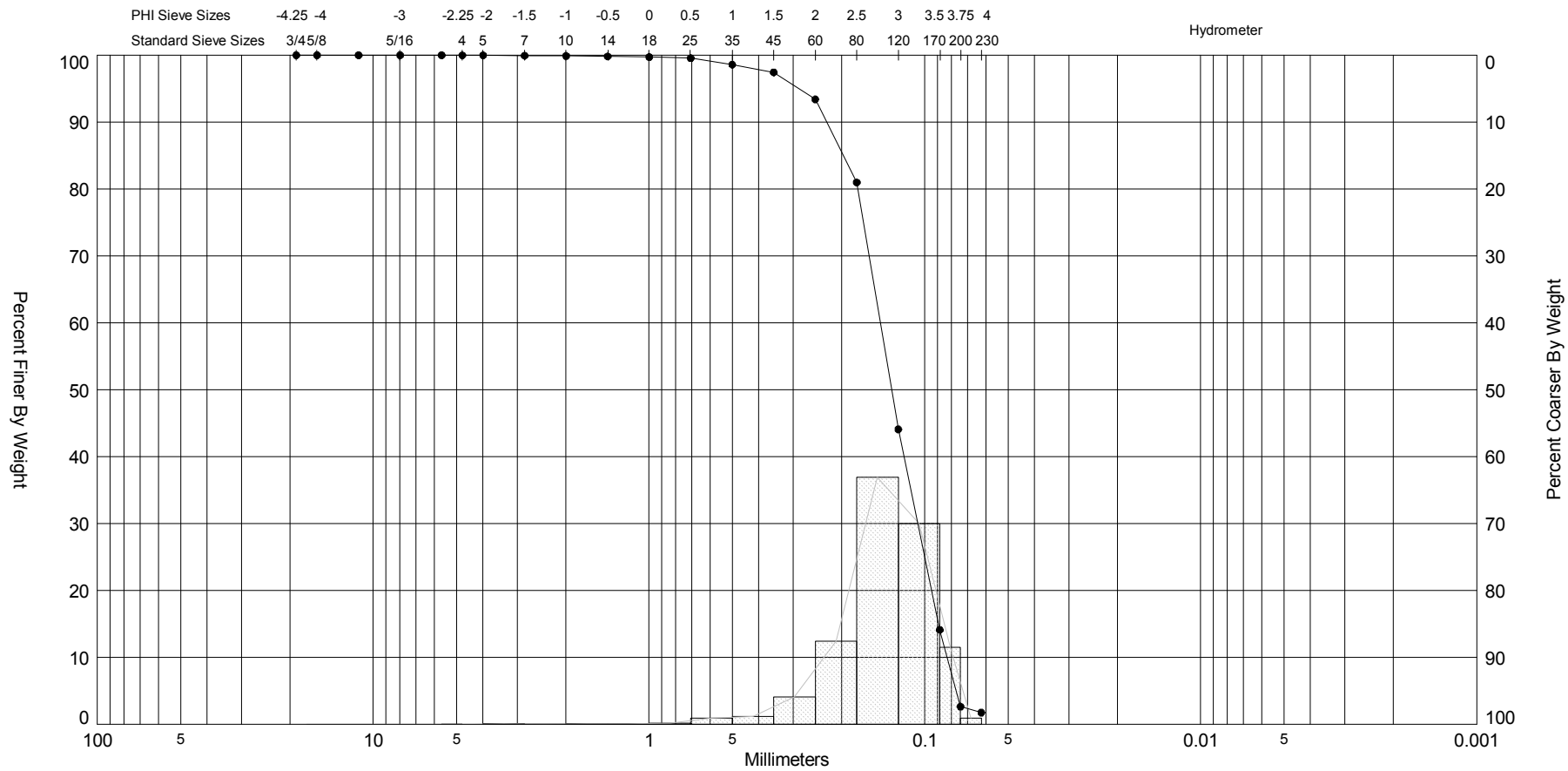

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
-12.5 COMPOSITE	—●—	-12.5	SP	#200 - 2.64 #230 - 1.75			2.92	2.86	-1.64	9.58	0.6

Comments: Average wet Munsell Value is 4. Average dry Munsell Value is 6.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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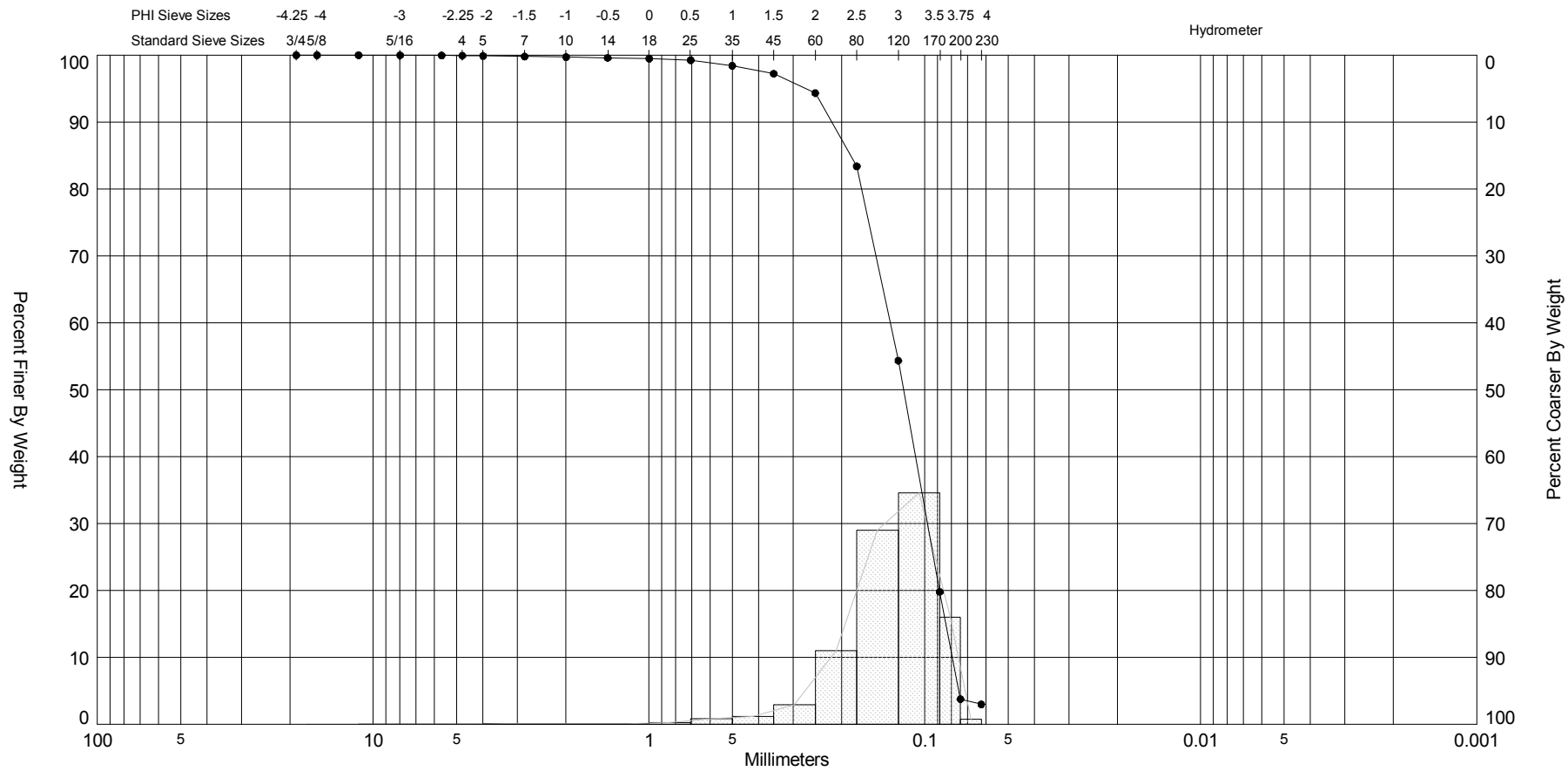

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
-16.25 COMPOSITE	—●—	-16.3	SP	#200 - 3.76 #230 - 2.97			3.06	2.93	-2.41	15.02	0.65

Comments: Average wet Munsell Value is 4. Average dry Munsell Value is 6.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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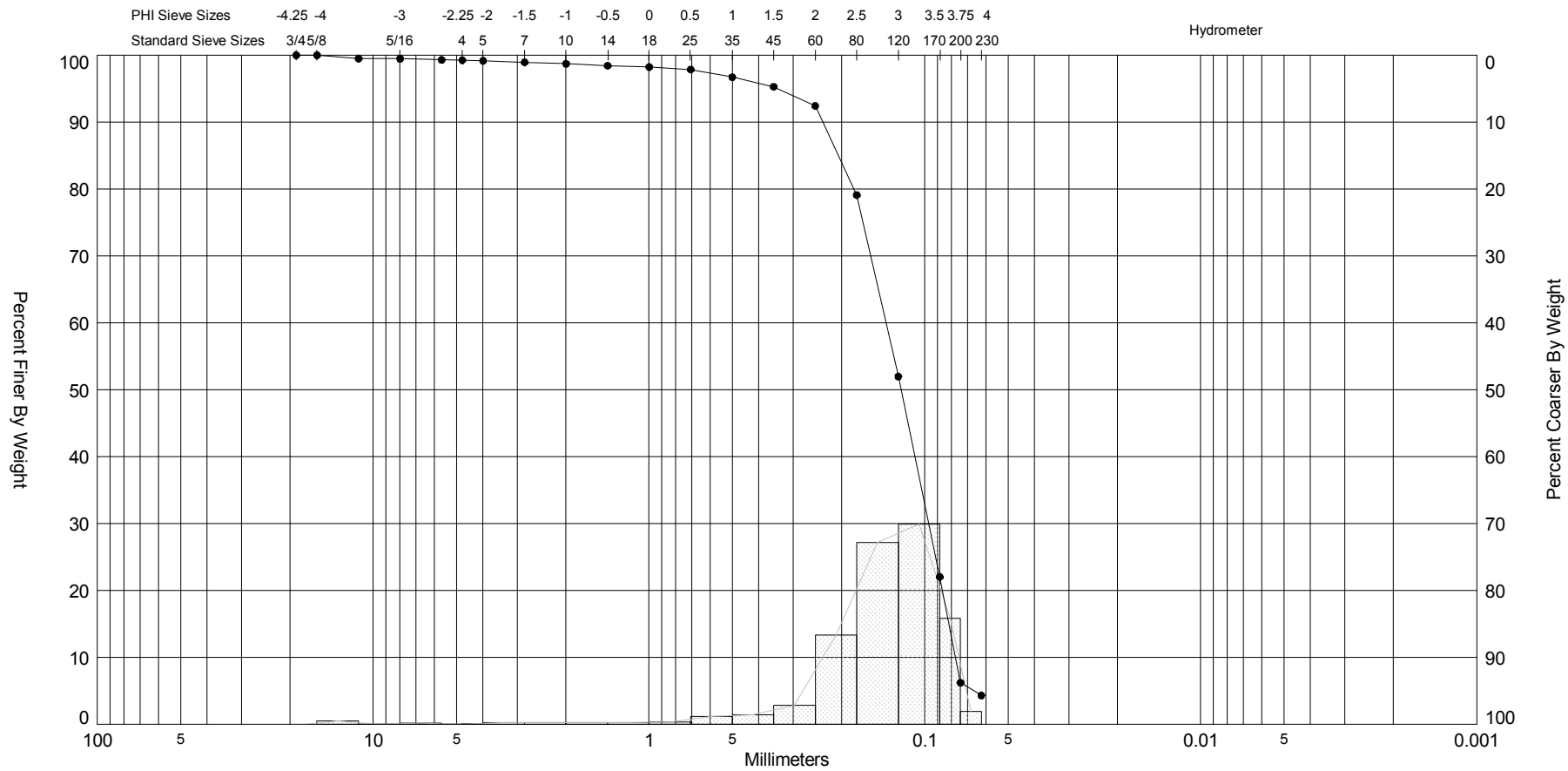

Sample	Symbol	Elev. (ft)	USCS	% Fines	% Organics	% Carbonates	Median	Mean	Skew	Kurt	Sort
-20.0 COMPOSITE	—●—	-20.0	SW-SM	#200 - 6.21 #230 - 4.30			3.03	2.83	-3.54	21.73	0.92

Comments: Average wet Munsell Value is 4. Average dry Munsell Value is 6.

Depths and elevations based on measured values

Sample Information	
Project Name:	Ocean Isle Beach Terminal Groin
Analysis Date:	07-14-13
Analyzed By:	ATP
Easting (X, ft):	
Northing (Y, ft):	
Horizontal System:	NAD 1983
Vertical System:	NAVD 88

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APPENDIX 7
1994 USACE VIBRACORE LOGS

Hole No. OI-9-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-9-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 3.1'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Gray, coarse poorly graded sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 0740 TOTAL TIME: 6 MIN.
			With shell fragments			
	2		CL-Gray, sandy lean clay, trace of shell fragments and with rock fragments (Sandstone)		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	3.1		BOTTOM OF HOLE @ 3.1' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-10-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 11" E078 27' 23"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-10-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN
9. TOTAL DEPTH OF HOLE 7.5'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Light gray, coarse poorly graded sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 1222 TOTAL TIME: 8 MIN.
	2		CL-Gray, sandy lean clay, trace of shell fragments		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	4				3	
	6				4	
	7.5		BOTTOM OF HOLE @ 7.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-11-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 50' 41" E 98° 27' 12"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-11-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN
9. TOTAL DEPTH OF HOLE 5.3'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Tan, coarse poorly graded sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 1139 TOTAL TIME: 9 MIN.
	2		SM-Gray, fine silty sand, trace of shell fragments and with rock fragments (Sandstone)		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	4		CH-Dark gray sandy fat clay		3	
	5.3		BOTTOM OF HOLE @ 5.3' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			
	6					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-12-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 40" E 78° 27' 00"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-12-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN
9. TOTAL DEPTH OF HOLE 2.5'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM-Gray, fine to medium silty sand with shell fragments		1	NOTE: VIBRA-CORE START TIME 1255 TOTAL TIME: 8 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		CH-Dark gray, fat clay, trace of shell with siltstone fragments		2	
	2.5		BOTTOM OF HOLE @ 2.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-13-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 06" E 78° 26' 36"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-13-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 4.4'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Light gray, coarse, poorly graded sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 1102 TOTAL TIME: 8 MIN.
	2		CL-Gray, sandy lean clay, trace of rock fragments		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	4					
	4.4		BOTTOM OF HOLE @ 4.4' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-14-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 50' 41" E 78° 26' 24"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-14-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN
9. TOTAL DEPTH OF HOLE 11.7'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Tan, coarse, poorly graded sand with shell fragments		1	NOTE: VIBRA-CORE START TIME 1032
			CH-Dark gray, fat clay		2	TOTAL TIME: 8 MIN.
	2		Soft and saturated			NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
					3	
	4					
	6		CL-Gray, sandy lean clay, trace of rock fragments (Sandstone)		4	
	8					
	10				5	
	11.7 12		BOTTOM OF HOLE @ 11.7' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-15-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 50' 16" E 78° 26' 13"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-15-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94; COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 2.8'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Light tan, coarse poorly graded sand, Trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 0803 TOTAL TIME: 7 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		CL-Gray, sandy lean clay, trace of shell and rock fragments (sandstone)		2	
	2.8		BOTTOM OF HOLE @ 2.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-16-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 50" E 78° 26' 24"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-16-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN
9. TOTAL DEPTH OF HOLE 3.5'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Tan, coarse, poorly graded trace of rock and shell fragments		1	NOTE: VIBRA-CORE START TIME 1334 TOTAL TIME: 8 MIN.
	2		CL-Gray, sandy lean clay, trace of shell and rock fragments (Sandstone)		2, 3	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	3.5		BOTTOM OF HOLE @ 3.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			
	4					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-17-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 15" E 78° 26' 00"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-17-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN N/A	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
8. DEPTH DRILLED INTO ROCK 0.0'	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 8.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Tan, coarse poorly graded sand, trace of rock and shell fragments. (Limestone)		1	NOTE: VIBRA-CORE START TIME 0920 TOTAL TIME: 6 MIN.
	2		CL-Gray, sandy lean clay, trace of rock and shell fragments (Sandstone)		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	4				3	
	6					
	8				4	
			BOTTOM OF HOLE @ 8.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-18-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 50' 51" E 78° 25' 49"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-18-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN
9. TOTAL DEPTH OF HOLE 7.7'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Tan, coarse, poorly graded sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 0957 TOTAL TIME: 6 MIN.
			SM-Gray, fine silty sand with shell and rock fragments (Limestone)		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		CL-Gray, sandy lean clay trace of rock fragments (Sandstone)			
	4				3	
	6					
	7.7				4	
	8		BOTTOM OF HOLE @ 7.7' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-20-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3 " VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 10" E 78° 25' 24 "	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-20-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94 : COMPLETED 8/25/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN
9. TOTAL DEPTH OF HOLE 3.6'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM Gray, fine to medium poorly graded silty sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 0949 TOTAL TIME: 7 MIN.
	2		CL- Gray, sandy lean clay trace of shell fragments		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	3.6		BOTTOM OF HOLE @ 3.6' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			
	4					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-21-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 25" E 98 25' 25"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-21-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN N/A	16. DATE HOLE: STARTED 8/25/94; COMPLETED 8/25/94
8. DEPTH DRILLED INTO ROCK 0.0'	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 5.1'	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Gray, fine to medium poorly graded silty sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME: 1420 TOTAL TIME: 8 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		CL-Gray, sandy lean clay, trace of shell and rock fragments (Sandstone)		2	
	4				3	
	5.1		BOTTOM OF HOLE @ 5.1' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-22-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 01" E 78° 25' 13"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-22-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94; COMPLETED 8/24/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 3.8'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Light gray, fine to medium poorly graded silty sand trace of shell fragments		1	NOTE: VIBRA-CORE START TIME: 1448 TOTAL TIME: 8 MIN.
			CH-Dark gray, sandy fat clay trace of shell fragments		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		CL-Gray, sandy lean clay trace of rock fragments (Sandstone)		3	
	3.8		BOTTOM OF HOLE @ 3.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-24-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 35" E 78° 24' 49"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-24-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94; COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 8.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Tan, coarse, poorly graded sand		1	NOTE: VIBRA-CORE START TIME: 0914 TOTAL TIME: 7 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		CL-Greenish gray, sandy lean clay, trace of shell and rock fragments (Sandstone)		2	
	4				3	
	6					
	8				4	
			BOTTOM OF HOLE @ 8.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-25-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 10" E 78° 24' 37"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-25-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94; COMPLETED 8/24/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 4.7'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Gray, fine to medium poorly graded silty sand with shell fragments		1	NOTE: VIBRA-CORE START TIME: 1513 TOTAL TIME: 7 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		SM-Gray, fine silty sand, with shell fragments and trace of rock fragments (Sandstone)		2	
	4					
	4.7		BOTTOM OF HOLE @ 4.7' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-26-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 50' 45" E 78° 24' 26"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-26-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94; COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 2.5'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Gray, fine to medium poorly graded silty sand		1	NOTE: VIBRA-CORE START TIME: 1807 TOTAL TIME: 6 MIN.
	2		CL-Gray, sandy lean clay with rock fragments (Sandstone)		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2.5		BOTTOM OF HOLE @ 2.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM		3	

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT | HOLE NO.

Hole No. OI-27-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 45" E 78° 24' 13"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-27-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94 : COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 5.8'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Light gray, medium to coarse poorly graded sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME: 1103 TOTAL TIME: 6 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		SP-SM, Light gray, fine to medium poorly graded silty sand with shell fragments		2	
	4				3	
					4	
	5.8		BOTTOM OF HOLE @ 5.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

Hole No. OI-28-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 20" E 78° 24' 02"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-28-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94; COMPLETED 8/24/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 10.8'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Light gray, coarse poorly graded sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME: 1556 TOTAL TIME: 8 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		CL-Gray, sandy lean clay, trace of shell and rock fragments (Sandstone)		2	
	4				3	
	6					
	8				4	
	10				5	
	10.8		BOTTOM OF HOLE @ 10.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-30-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 49" E 78° 23' 50"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-30-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94; COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 8.5'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-Gray, coarse poorly graded sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME: 1124 TOTAL TIME: 4 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		SP-SM, Gray, fine to medium poorly graded silty sand, trace of shell fragments			
	4				2	
	6					
			With shell fragments		3	
	8					
	8.5		BOTTOM OF HOLE @ 8.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-31-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 30" E 78° 23' 26"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-31-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 9.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP-Tan, coarse poorly sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME: 1627 TOTAL TIME: 8 MIN.
	2		SM, Dark gray, fine silty sand, trace of shell fragments		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	4		CL, Light gray, sandy lean clay, trace of rock fragments (Sandstone)		3	
	6					
	8					
	9				4	
			BOTTOM OF HOLE @ 9.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT | HOLE NO.

Hole No. OI-32-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 05" E 78° 23' 15"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-32-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94; COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 13.8'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Tan, fine to medium poorly graded silty sand trace of shell fragments		1	NOTE: VIBRA-CORE START TIME: 1731 TOTAL TIME: 7 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
			CL-Tanish gray, sandy lean clay, saturated, trace of rock fragments (Sandstone)		2	
	2					
	4				3	
	6					
	8				4	
	10					
	12				5	
	13.8		BOTTOM OF HOLE @ 13.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. 01-33-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 34" E 78° 23' 26"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) 01-33-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94; COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 7.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JARS	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Gray, fine to medium poorly graded silty sand, with shell fragments		1	NOTE: VIBRA-CORE START TIME: 1238 TOTAL TIME: 5 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		SM-Grayish tan, fine silty sand, trace of rock fragments, with shell fragments		2	
	4		CL-Gray and tan sandy lean clay with rock fragments (Sandstone)		3	
	6					
	7.0		BOTTOM OF HOLE @ 7.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-34-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 07" E 78° 23' 04"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-34-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 8.5'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM-Gray, fine silty sand, trace of clay and shell fragments		1	NOTE: VIBRA-CORE START TIME 18:39 TOTAL TIME: 7 MIN.
	2		Tan, trace of rock fragments (Sandstone)		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	4				3	
	6		Sandstone-Tan, sandy, fine to medium grained, moderately weathered, soft to moderately hard, fragmental		4	
	8				5	
	8.5		BOTTOM OF HOLE @ 8.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-35-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 39" E 78° 22' 51"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-35-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94 : COMPLETED 8/24/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 5.3'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Gray, fine to medium poorly graded silty sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 17:05 TOTAL TIME: 7 MIN.
	1		CH-Dark gray, fat clay		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		SM-Gray, fine silty sand with rock fragments (Sandtone)			
	3				3	
	4					
	5				4	
	5.3		BOTTOM OF HOLE @ 5.3' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-37-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 23" E 78° 22' 45"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-37-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94; COMPLETED 8/24/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN
9. TOTAL DEPTH OF HOLE 6.0'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM-Gray, fine silty sand trace of shell fragments and with rock fragments (Sandstone)		1	NOTE: VIBRA-CORE START TIME 18:00 TOTAL TIME: 7 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	1					
	2					
	3				2	
	4					
	5					
	6				3	
			BOTTOM OF HOLE @ 6.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-38-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 49" E 78° 22' 25"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-38-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/24/94; COMPLETED 8/24/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 4.8'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Dark gray, fine to medium poorly graded silty sand			NOTE: VIBRA-CORE START TIME 17:35 TOTAL TIME: 7 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	1				1	
	2				2	
	3					
	4				3	
	4.8		BOTTOM OF HOLE @ 4.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-39-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 40" E 78° 22' 07"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-39-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94; COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN 7.5'	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.3'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 7.8'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		CL-Gray, sandy lean clay, trace of shell and rock fragments (Sandstone)			NOTE: VIBRA-CORE START TIME 16:52
					1	TOTAL TIME: 7 MIN. 30 SEC.
	2					NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	4				2	
	6					NOTE: SCALE CHANGED AT 6.0' TO 1"=1'
	7		Sandstone-Tan, sandy fine/medium grained, moderately weathered, fragmental, soft to moderately hard		3	
	7.8		BOTTOM OF HOLE @ 7.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-40-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 58" E 78° 22' 24"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-40-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94; COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 11.0'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Tan, fine to medium poorly graded silty sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 13:10 TOTAL TIME: 5 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		GP-Tan, coarse poorly graded gravel, trace of shell fragments		2	
	4		CL-Gray and tan, sandy lean clay		3	
	6				4	
	8					
	10				5	
	11		BOTTOM OF HOLE @ 11.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-41-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 38" E 78° 21' 51"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-41-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 6 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94 : COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 17.8'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		Sandtone-Tan & gray, sandy, fine grained, moderately weathered fragmental, soft		1	NOTE: VIBRA-CORE START TIME 15:41 TOTAL TIME: 8 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2		SM-Gray, fine silty sand, trace of shell and rock fragments (Sandstone)		2	
	4					
	6				3	
	8					
	10				4	
	12				5	
	14					
	16				6	
	17.8		BOTTOM OF HOLE @ 17.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-42-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 36" E 78° 21' 38"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-42-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94 : COMPLETED 8/25/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN 1.6'	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 1.3'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN
9. TOTAL DEPTH OF HOLE 2.9'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SM-Gray, fine silty sand, trace of shell fragments		1	NOTE: VIBRA-CORE START TIME 16:09 TOTAL TIME: 7 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	1					
	2		Sandstone-Gray, sandy, fine to medium grained, moderately weathered, fragmental, very hard to hard		2	
	2.9		BOTTOM OF HOLE @ 2.9' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-44-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 58" E 78° 21' 25"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-44-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94 : COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 17.1'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		CL-Gray and tan, sandy lean clay, trace of rock fragments (Sandstone)		1	NOTE: VIBRA-CORE START TIME 13:46 TOTAL TIME: 9 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2				2	
	4					
	6				3	
	8					
	10				4	
	12					
	14					
	16				5	
	17.1		BOTTOM OF HOLE @ 17.1' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-45-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 47" E 78° 20' 52"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-45-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 6 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94 : COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 19.5'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		CL-Gray and tan, sandy lean clay, trace of rock fragments (Sandstone)		1	NOTE: VIBRA-CORE START TIME 14:17 TOTAL TIME: 10 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2					
	4				2	
	6					
					3	
	8					
					4	
	10					
	12					
					5	
	14					
	16					
	18					NOTE: SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM
	19.5				6	
			BOTTOM OF HOLE @ 19.5'			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT | HOLE NO.

Hole No. OI-46-94

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISRTICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 48" E 78° 20' 40"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-46-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 8/25/94 : COMPLETED 8/25/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 7.8'	19. SIGNATURE OF INSPECTOR LARRY BENJAMIN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. JAR	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0		SP-SM, Tan and gray, fine to medium poorly graded silty sand with shell fragments		1	NOTE: VIBRA-CORE START TIME 14:59 TOTAL TIME: 3 MIN. NOTE: VIBRA-CORE TUBE CLASSIFIED BY LARRY BENJAMIN ON 8/27/94
	2					
			SM-Gray, fine silty sand with shell fragments		2	
	4					
			Trace of shell fragments			
	6				3	
	7.8		BOTTOM OF HOLE @ 7.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-200

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 59" E 78 24' 25"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-200	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 11/5/94 COMPLETED 11/5/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0	19. SIGNATURE OF INSPECTOR BEN LACKEY
9. TOTAL DEPTH OF HOLE 13.5	

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1, 2, 3, 4, 5, 6, 7, 8		SP Gray slightly silty fine to medium sand.		1	
			CONTINUED ON SHEET 2 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI-200

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: N 33 51' 59" E 78 24' 25"

Hole No. OI-200

PROJECT: OCEAN ISLE

INSTALLATION: WILMINGTON DISTRICT

SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	8.0		SPSM Gray slightly silty fine to medium sand.			
	9					
	10					
			SP Gray fine to medium sand.		2	
	11					
			SPSM Gray slightly silty fine to medium sand with shells.			
	12					
	13					
			MH Gray sandy silt.		3	
	13.5		BOTTOM OF HOLE @ 13.5 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836-A PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT: OCEAN ISLE

HOLE NO. OI-200

Hole No. OI-201

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 59" E 78 24' 13"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-201	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED UNDISTURBED
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 11/5/94 COMPLETED 11/5/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0	19. SIGNATURE OF INSPECTOR BEN LACKEY
9. TOTAL DEPTH OF HOLE 3.5	

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP Gray fine to medium sand		1	
	1		SM Gray silty fine to medium sand			
	2		MH Gray silt with gravel		2	
	3		BOTTOM OF HOLE @ 3.5 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI-201

Hole No. OI-202

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 59" E 78 24'02"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-202	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/5/94: COMPLETED 11/5/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 9.0	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	2		SP Gray fine sand with some shells.		1	
	4		Fine to medium sand.		2	
	6		SM Gray silty fine to medium sand with some shells.			
	8		MH Gray silt with gravel.			
	9		BOTTOM OF HOLE @ 9.0 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI-202

Hole No. OI-203

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 59" E 78 23' 50"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-203	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 11/5/94 COMPLETED 11/5/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0	19. SIGNATURE OF INSPECTOR BEN LACKEY
9. TOTAL DEPTH OF HOLE 6.0	

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP Gray fine sand with shells.			
	1		SPSM Gray fine to medium sand with a trace of shells.		1	
	2		MH Gray sandy silt with gravel.			
	3		Silt with gravel.			
	4					
	5					
	6		BOTTOM OF HOLE @ 6.0 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			Mislabeled OI-201-94

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT Ocean Isle HOLE NO. OI-203

Hole No. OI- 204

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 59" E 78 24' 38"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI- 204	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/5/94: COMPLETED 11/5/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0	19. SIGNATURE OF INSPECTOR BEN LACKEY
9. TOTAL DEPTH OF HOLE 4.0	

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SPSM Gray slightly silty fine sand with shells.		1	
	2		SM Gray silty fine sand.		2	
	3		MH Gray sandy silt with gravel.		3	
	4		BOTTOM OF HOLE @ 4.0 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI- 204

Hole No. OI-205

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 49" E 78 23' 26"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-205	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN N/A	16. DATE HOLE STARTED 11/5/94 COMPLETED 11/5/94
8. DEPTH DRILLED INTO ROCK 0.0	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 16.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP Gray fine to medium sand with shells.		1	
	2		SM Gray silty sand with trace of shells.		2	
	3					
	4		MH Gray sandy silt with trace of gravel.			
	5					
	6					
	7					
	8					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI-205

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE N 33 51' 49" E 78 23' 26"	Hole No. 01-205
PROJECT OCEAN ISLE	INSTALLATION WILMINGTON DISTRICT	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH 8.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			MH Gray sandy silt with trace of gravel.			
	9				3	
	10					
	11					
	12					
	13					
	14					
	15		Silt with a trace of gravel.		4	
	16		BOTTOM OF HOLE @ 16.0 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836-A PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT OCEAN ISLE

HOLE NO. 01-205

Hole No. OI-206

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 55" E 78 23' 26"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-206	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/5/94: COMPLETED 11/5/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 5.5	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP Gray fine to medium sand.		1	
	2		SM Gray silty fine to medium sand.		2	
	3		MH Gray sandy silt with some shells.			
	4					
	5					
	5.5		BOTTOM OF HOLE @ 5.5 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle | HOLE NO. OI-206

Hole No. OI-207

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-207	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN N/A	16. DATE HOLE: STARTED 11/5/94: COMPLETED 11/5/94
8. DEPTH DRILLED INTO ROCK 0.0	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP Gray fine to medium sand		1	
	2		MH Gray sandy silt with some shell.			
	3					
	4				2	
	5					
	6		BOTTOM OF HOLE @ 6.0 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI-207

Hole No. OI-208

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 39" E 78 23' 38"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-208	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN N/A	16. DATE HOLE: STARTED 11/5/94: COMPLETED 11/5/94
8. DEPTH DRILLED INTO ROCK 0.0	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 5.5	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0 b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP Gray fine sand with some shell.			
	1				1	
			Fine to medium sand with no shells.			
	2		SM Gray silty fine to medium sand with shells.		2	
	3		MH Gray sandy silt.			
	4				3	
	5					
	5.5		BOTTOM OF HOLE @ 5.5 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT Ocean Isle HOLE NO. OI-208

Hole No. OI-209

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 40" E 78 23' 50"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-209	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/5/94 COMPLETED 11/5/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0	19. SIGNATURE OF INSPECTOR BEN LACKEY
9. TOTAL DEPTH OF HOLE 3.0	

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP Gray fine sand with trace of shells.		1	
	2		MH Gray sandy silt.		2	
	3		BOTTOM OF HOLE @ 3.0 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT Ocean Isle HOLE NO. OI-209

Hole No. OI-210

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 40" E 78 23' 50"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-210	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN N/A	16. DATE HOLE: STARTED 11/5/94: COMPLETED 11/5/94
8. DEPTH DRILLED INTO ROCK 0.0	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 3.5	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP Gray fine to medium sand with shells.			
	2		SM Gray silty fine sand.		1	
	3		MH Gray sandy silt.		2	
	3.5		BOTTOM OF HOLE @ 3.5 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI-210

Hole No. OI-211

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 49" E 78 24" 02"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-211	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED UNDISTURBED
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 11/5/94 COMPLETED 11/5/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 8.5	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP Gray fine to medium sand with shells.		1	
	2		MH Gray very sandy silt with some gravel.			
	3				2	
	4		Sandy silt with some gravel.			
	5					
	6					
	7					
	8					
	8.5		BOTTOM OF HOLE @ 8.5 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI-211

Hole No. OI-212

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 53" E 78 24' 13"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-212	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN N/A	16. DATE HOLE STARTED 11/5/94 COMPLETED 11/5/94
8. DEPTH DRILLED INTO ROCK 0.0	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 5.5	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP Gray fine sand.			
	1		SPSM Gray silty fine to medium sand		1	
	2					
	3		SM Gray silty fine sand with some gravel.			
	4		MH Gray sandy silt with some gravel.			
	5					
	5.5		BOTTOM OF HOLE @ 5.5 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI-212

Hole No. OI-213

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 37" E 78 24' 14"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-213	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
	14. TOTAL NUMBER CORE BOXES N/A
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	16. DATE HOLE: STARTED 11/5/94: COMPLETED 11/5/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0	19. SIGNATURE OF INSPECTOR BEN LACKEY
9. TOTAL DEPTH OF HOLE 11.5	

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1, 2		SP Gray fine sand with some shell.		1	
	3, 4, 5		SPSM Gray slightly silty fine to medium sand.		2	
	6, 7		SP Gray fine to medium sand with shell.		3	
	8		CONTINUED ON SHEET 2 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT Ocean Isle HOLE NO. OI-213

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE: N 33 51' 37" E 78 24' 14"

Hole No. OI-213

PROJECT: OCEAN ISLE

INSTALLATION: WILMINGTON DISTRICT

SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH 8.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	9		SP Gray fine to medium sand.		4	
	10		SPSM Gray slightly silty fine sand.		5	
	11					
	11.5		BOTTOM OF HOLE @ 11.5 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836-A PREVIOUS EDITIONS ARE OBSOLETE.
MAR 71

PROJECT: OCEAN ISLE

HOLE NO. OI-213

Hole No. OI-214

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 40" E 78 24' 25"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-214	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED UNDISTURBED
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 11/5/94 COMPLETED 11/5/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 7.5	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1, 2, 3		SPSM Gray slightly silty fine sand with some shell.		1	
	3, 4		SP Gray fine to medium sand with shell.			
	5, 6		SM gray silty fine sand with trace of shell.			
	6		SPSM Gray slightly silty fine to mediium sand.		2	
	7, 7.5		MH Gray sandy silt with gravel.			
	7.5		BOTTOM OF HOLE @ 7.5 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle HOLE NO. OI-214

Hole No. OI-215

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION Wilmington Distr.	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" Vibracore Tube (20')
2. LOCATION (Coordinates or Station) N 33 51' 50" E 78 24' 25"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-215	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER JERRY FULCHER & JAMES WILLIAMS	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/5/94: COMPLETED 11/5/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 7.0	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH 0.0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP Gray fine to medium sand with trace of shells.		1	
	2		SM Gray silty fine to medium sand with some sand and gravel.			
	3		MH Gray sandy silt with some gravel.		2	
	4		Silt with some gravel.			
	5					
	6					
	7		BOTTOM OF HOLE @ 7.0 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Ocean Isle | HOLE NO. OI-215

Hole No. OI-216

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 00.05" E 78° 24' 37.60"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-216	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR BEN LACKEY
9. TOTAL DEPTH OF HOLE 3.0'	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SM-Gray, silty fine sand, traces traces of shell, with gravel		1	NOTE: VIBRA-CORE START TIME 15:32
	2		MH-Gray, sandy silt		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	3		BOTTOM OF HOLE AT 3.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-217

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 50.16" E 98 24' 37.67"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-217	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 6.5'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP-SM/Slightly silty fine sand, traces of shell			NOTE: VIBRA-CORE START TIME 15:54
	2		MH-silt with gravel (Limestone)			NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	3					
	4					
	5				1	
	6					
	6.5		BOTTOM OF HOLE AT 6.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-218

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 40.27" E 78° 24' 37.74"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-218	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 8.0'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP-Gray, fine sand			
	2		SP-SM/Gray, slightly silty fine to medium sand with some sand		1	NOTE: VIBRA-CORE START TIME 16:11
	4		MH-Gray, sandy silt with gravel			NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
			Silt with gravel			
	6					
	8		BOTTOM OF HOLE AT 8.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT | HOLE NO.

Hole No. OI-219

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 30.37" E 78° 24' 37.82"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-219	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 3.5'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP-Gray, fine sand		1	NOTE: VIBRA-CORE START TIME 16:37
	2		Fine to medium sand			NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	3		SM-Gray, silty fine sand with gravel		2	
	3.5		BOTTOM OF HOLE AT 3.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT | HOLE NO.

Hole No. OI-220

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 00.05" E 98 24' 37.60"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-220	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 0 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 7.0'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	2		SP-Gray, fine sand with some shell			NOTE: VIBRA-CORE START TIME 16:55
	4		SP-SM Gray, slightly silty fine to medium sand with shell			NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	6		MH-Gray, silt with gravel			
	7		BOTTOM OF HOLE AT 7.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-221

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRA-CORE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 04.43" E 78° 28' 14.32"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA- CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-221	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94; COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 17.5'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	2, 4, 6, 8, 10		SP-SM, Gray, slightly silty fine sand		1	NOTE: VIBRA-CORE START TIME 07:50 NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	12		SM, Gray, silty fine sand		2	
			CONTINUED ON SHEET 2 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE	Hole No. OI-221
PROJECT OCEAN ISLE	INSTALLATION WILMINGTON DISTRICT	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			MH-Gray, sandy silt with some shell			
	14		silt with some shell			
	16					
	17.5		BOTTOM OF HOLE AT 17.5			

ENG FORM 1836-A PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT | HOLE NO.

Hole No. OI-222

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRA-CORE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 17.40" E 78° 28' 17.09"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA- CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-222	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 5 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 14.0'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	2		SP-SM, Gray, slightly silty fine sand		1	NOTE: VIBRA-CORE START TIME 08:07 NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	4		SM-Gray, silty fine sand		2	
	6		SP-SM, Gray, slightly silty fine sand		3	
	8		Fine to medium sand		4	
	10					
	12		CONTINUED ON SHEET 2 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT | HOLE NO.

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE	Hole No. OI-222
PROJECT OCEAN ISLE	INSTALLATION WILMINGTON DISTRICT	SHEET 2 OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SM-Gray, silty fine sand		5	
	14		BOTTOM OF HOLE AT 14.0			

ENG FORM 1836-A PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-223

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRA-CORE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 19.78" E 078 28' 19.32"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA- CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-223	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 17.5'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	2		SP, Gray, fine sand, trace of shells		1	NOTE: VIBRA-CORE START TIME 08:20 NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	4		SP-SM, Gray, slightly silty fine sand		2	
	6		SP, Gray, fine to medium sand, trace of shells			
	8		SP-SM, Gray, slightly silty fine sand trace of shells			
	10					
	12				3	
			CONTINUED ON SHEET 2 SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. OI-223

PROJECT	INSTALLATION	SHEET 2 OF 2 SHEETS
OCEAN ISLE	WILMINGTON DISTRICT	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP-SM, Gray, slightly fine sand trace of shells			
	14		SM-Silty fine sand		4	
	16					
			MH-Sandy silt			
	17.5		BOTTOM OF HOLE AT 17.5			

ENG FORM 1836-A PREVIOUS EDITIONS ARE OBSOLETE. MAR 71 | PROJECT | HOLE NO.

Hole No. OI-224

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 09.88" E 98° 24' 25.68"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-224	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94; COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 3.5'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1 2 3		MH-Gray, silty sand with some shells and gravel		1	NOTE: VIBRA-CORE START TIME 10:00 NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	3.5		BOTTOM OF HOLE AT 3.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-225

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 09.82" E 98° 24' 13.82"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-225	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 5.0'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP-Gray, fine to medium sand ,traces of shell,		1	NOTE: VIBRA-CORE START TIME 10:25
	2		SM-silty fine sand		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	3		MH-Gray, silt		3	
	4					
	5		BOTTOM OF HOLE AT 5.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT | HOLE NO.

Hole No. OI-226

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 09.76" E 78° 24' 01.96"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-226	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 2.0'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SM-Gray, silty fine sand		1	NOTE: VIBRA-CORE START TIME 10:57
	2		MH-Gray, sandy silt with gravel		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
			BOTTOM OF HOLE AT 2.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-227

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRACORE TUBE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 09.58" E 78° 23' 26.39"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-227	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94; COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 4.5'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1 2 3 4 4.5		SP-SM/Gray, slightly silty fine to medium sand with some shell fragments		1	NOTE: VIBRA-CORE START TIME 11:40 NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
			BOTTOM OF HOLE AT 4.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-228

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRA-CORE (20')
2. LOCATION (Coordinates or Station) N 33° 52' 09.52" E 98 23' 14.53"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA- CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-228	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 3 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 6.0'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP-SM, Gray, slightly silty fine sand		1	NOTE: VIBRA-CORE START TIME 12:01
	2		SM, Gray, silty fine sand with some shell		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	4		MH, Gray, sandy silt with gravel		3	
	6		BOTTOM OF HOLE AT 6.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-229

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 2 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRA-CORE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 59.63" E 78° 23' 14.61"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA- CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-229	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94; COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 3.5'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP-SM, Gray, slightly silty fine sand with some shells		1	NOTE: VIBRA-CORE START TIME 12:44
	2		SM, Gray, silty fine sand with gravel		2	NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	3					
	3.5		BOTTOM OF HOLE AT 3.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-230

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRA-CORE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 49.74" E 078 23' 14.68"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA- CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-230	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1 : UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 11/06/94 : COMPLETED 11/06/94
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 4.5'	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		SP- Gray, fine sand, with some shells			NOTE: VIBRA-CORE START TIME
	2		SM, Gray, silty fine sand with some gravel		1	NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	3		MH- Gray, sandy silt with some gravel			
	4					
	4.5		BOTTOM OF HOLE AT 4.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Hole No. OI-231

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT OCEAN ISLE	10. SIZE AND TYPE OF BIT 3" VIBRA-CORE (20')
2. LOCATION (Coordinates or Station) N 33° 51' 59.51" E 78° 22' 50.89"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA- CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) OI-231	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER & JERRY TRIM	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN N/A	16. DATE HOLE: STARTED 11/06/94; COMPLETED 11/06/94
8. DEPTH DRILLED INTO ROCK N/A	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 6.5'	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR BEN LACKEY

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP-SM, Gray, slightly silty fine sand			
	1		MH- Gray, sandy silt with gravel			NOTE: VIBRA-CORE START TIME 13:59
	2					NOTE: VIBRA-CORE TUBE CLASSIFIED BY BEN LACKEY
	3				1	
	4		Silt, trace of gravel			
	5					
	6				2	
	6.5		BOTTOM OF HOLE AT 6.5' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

APPENDIX 8
1998 USACE VIBRACORE LOGS, GRANULARMETRIC REPORTS & GRAIN SIZE DISTRIBUTION CURVES

Hole No. SHI-1

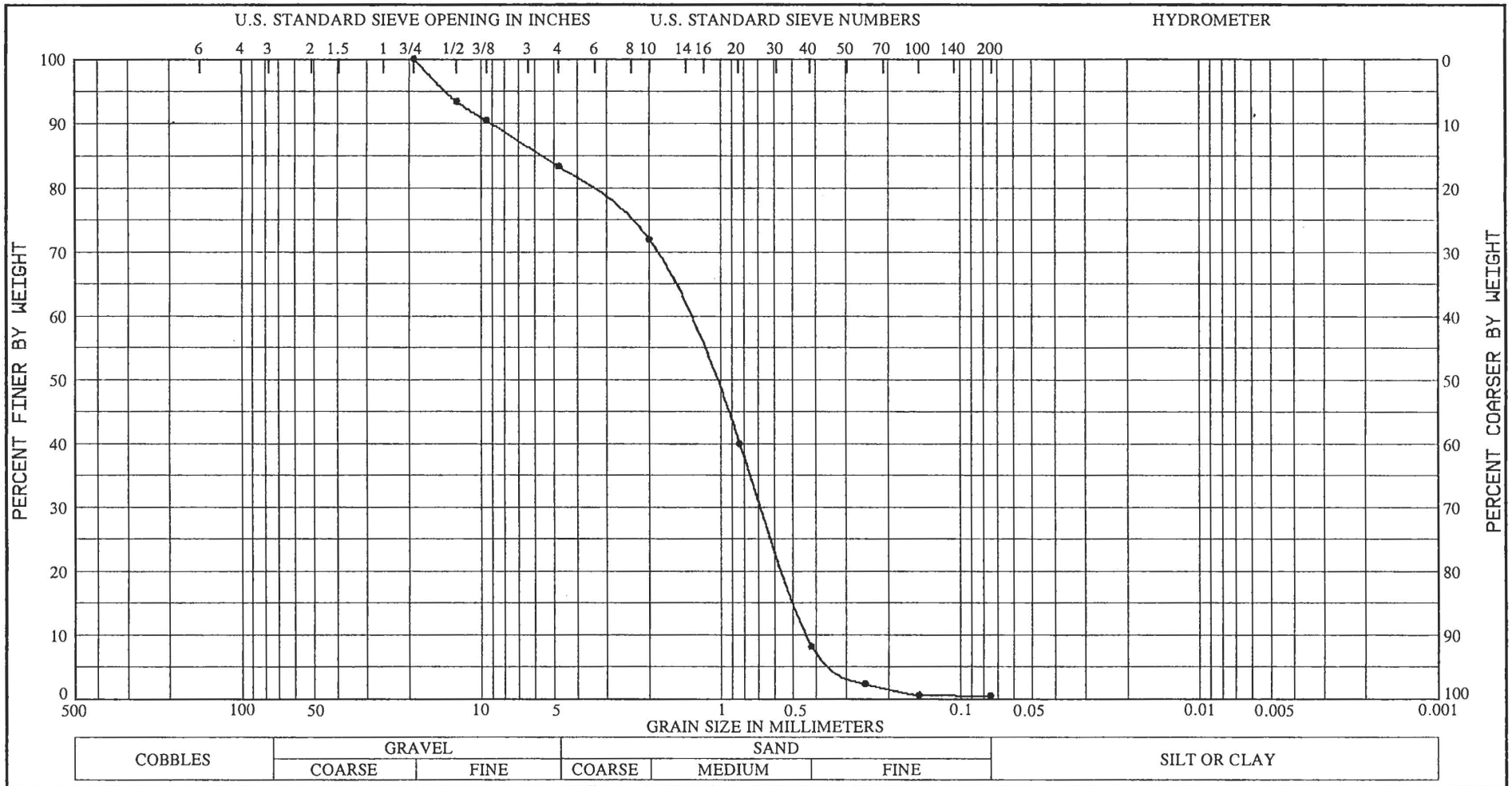
DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2187021 N 57751	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-1	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 4; UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE: STARTED 2/5/98; COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -5.0 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 12.6'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
-5.0	0					
			SP-Tan, coarse poorly graded sand with shell fragments		1	Time Begin Vibracoring @ 8:05 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH. NOTE: Top of Hole at River Bottom
	2					
	4					LAB CLASSIFICATION Jar Number / Classification 1 SP 2 SM 3 SM 4 SP
-11.0	6		SP-SM Grayish tan medium, to coarse poorly graded silty sand, trace of shell fragments		2	
	8					
-13.6			MH Dark gray elastic silt		3	
-14.0			SP-Tan, coarse poorly graded sand		4	
	10					NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibracore run depth was not recorded.
	12					
-17.6	12.6		BOTTOM OF HOLE AT 12.6' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

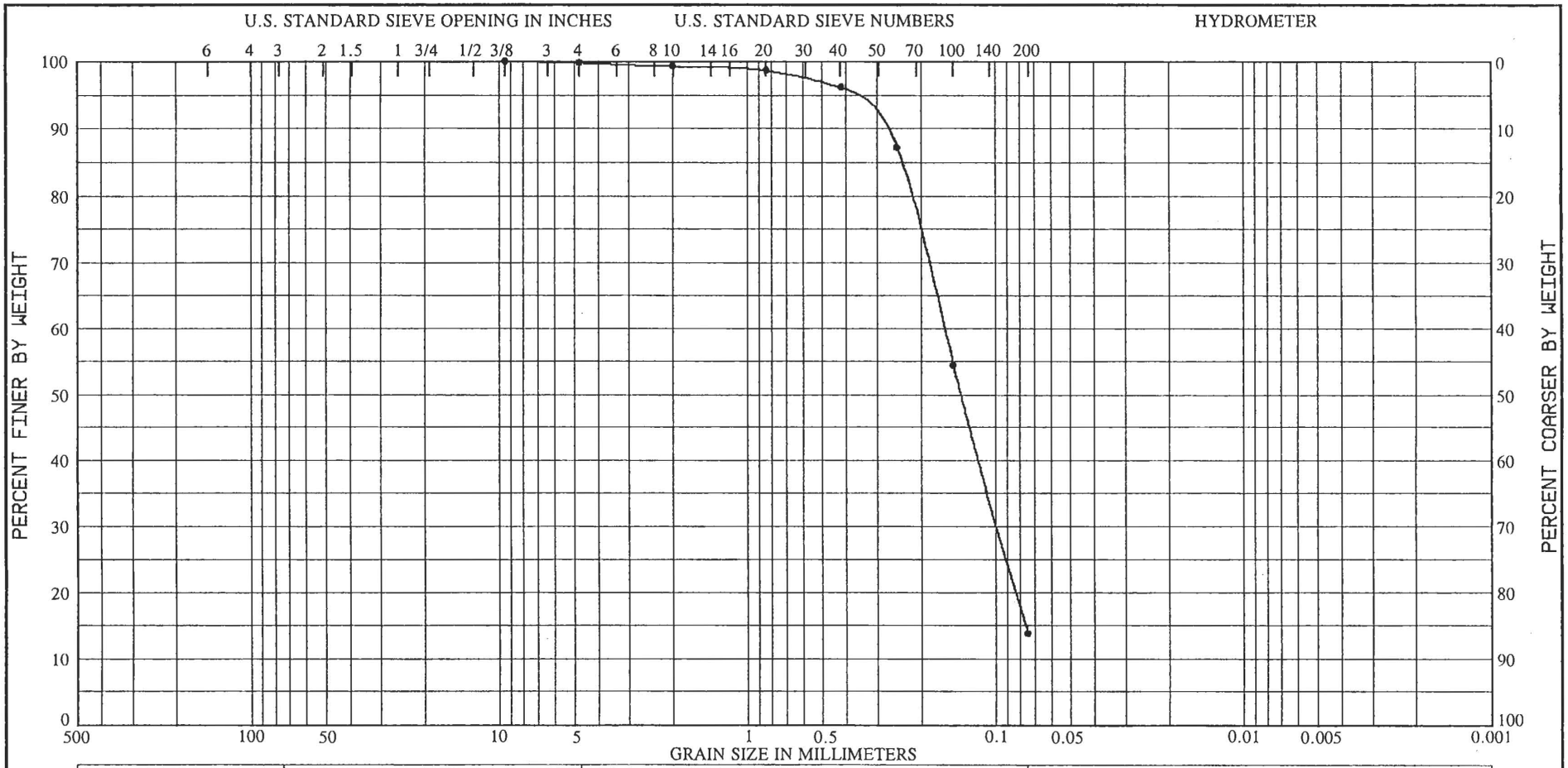
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.0 - 1.5	TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZE AND SAND SIZE SHELL FRAGMENTS.	11.3			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6005
Hole No. SHI-1
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

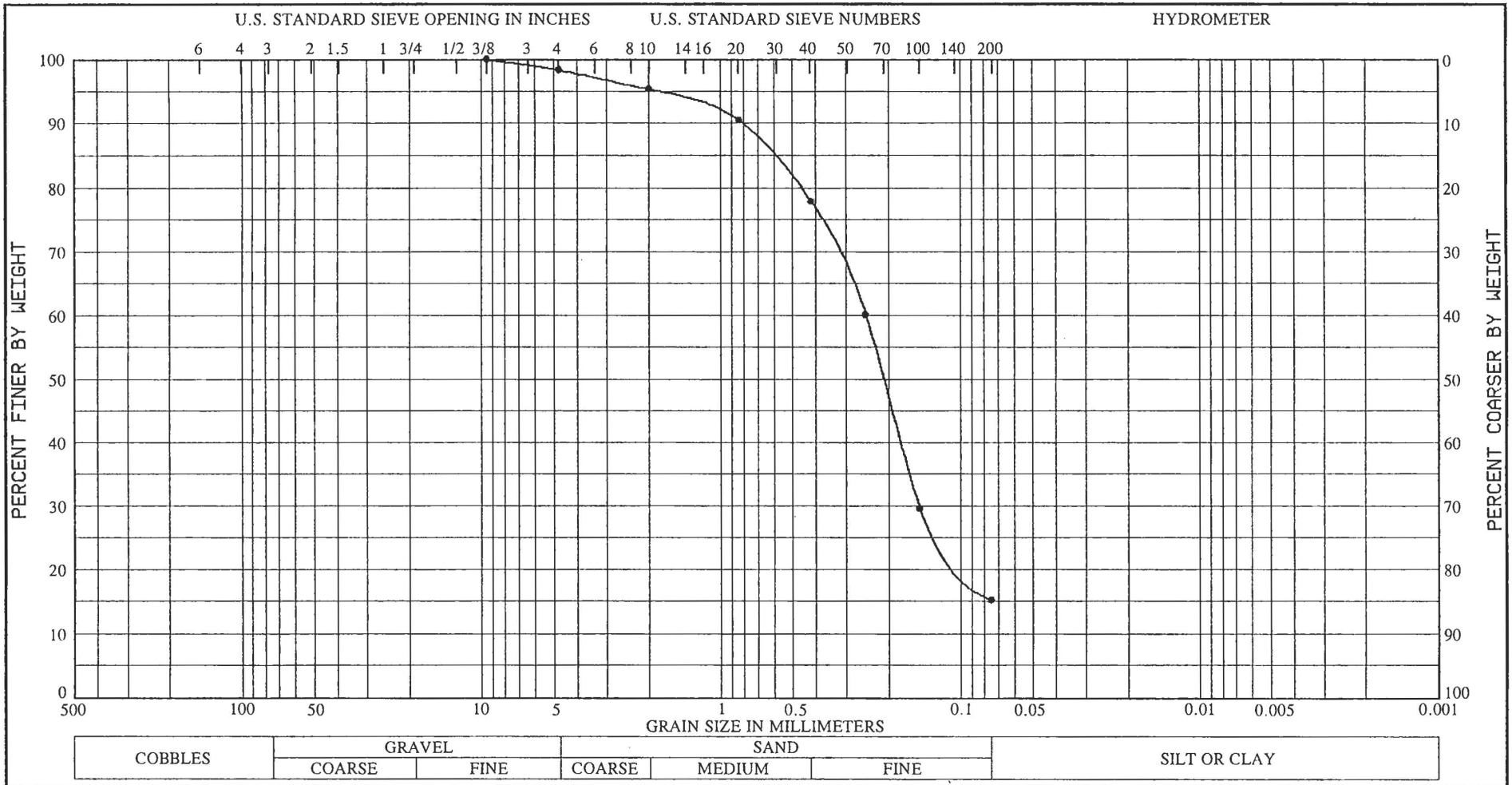
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	6.0 - 6.5	GRAY, SILTY SAND (SM), WITH A TRACE OF MICA.	25.8			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6006
Hole No. SHI-1
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



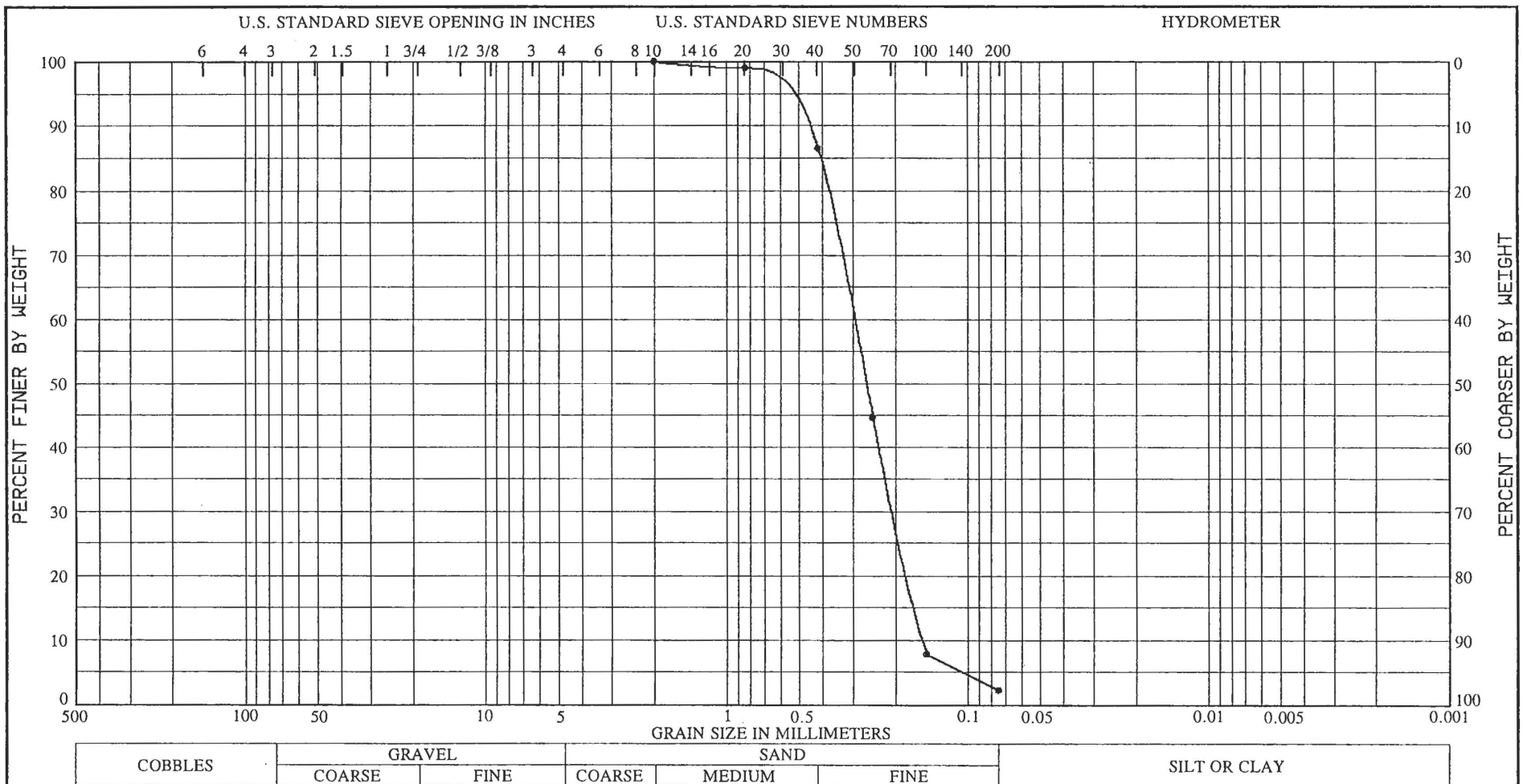
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	8.5 - 9.0	GRAY, SILTY SAND (SM), WITH A TRACE OF GRAVEL AND SHELL FRAGMENTS.	34.4			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6007
Hole No. SHI-1
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
4	9.0 - 9.5	GRAYISH TAN, POORLY GRADED SAND (SP).	16.8			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6008
Hole No. SHI-1
Date 05/26/98

GRADATION CURVES

Hole No. SHI-2

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2187299 N 57375	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-2	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 2 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -5.6 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 11.2'	19. SIGNATURE OF INSPECTOR KEITH BENTON

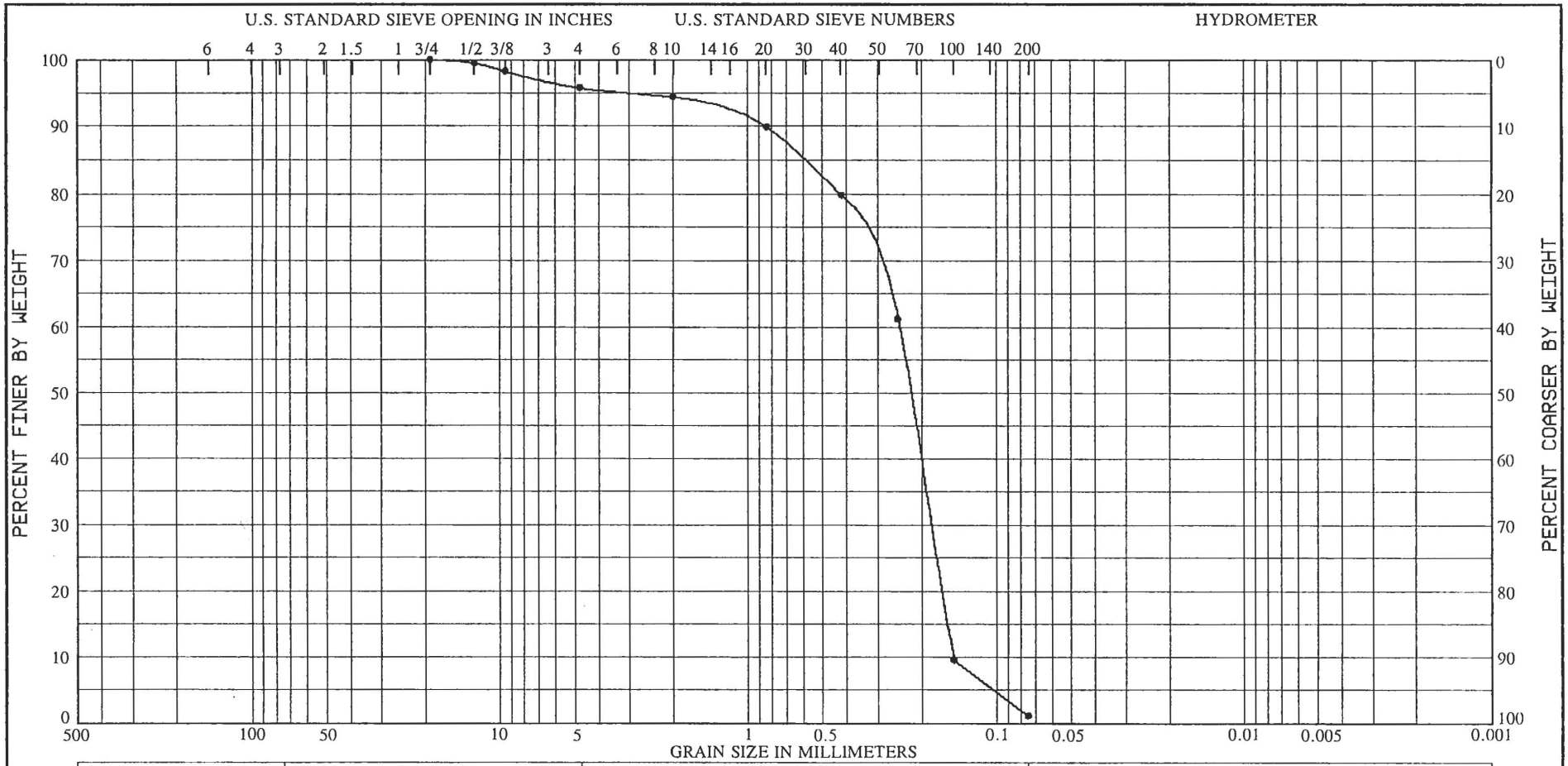
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-5.6	0		SP-Grayish tan, coarse poorly graded sand with shell fragments		1	Time Began Vibracoring @ 9:55 hours NOTE: CLASSIFIED ON 3/5/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH. NOTE: Top of Hole at River Bottom LAB CLASSIFICATION Jar Number / Classification 1 SP 2 SP
	2					
	4					
	6					
	8		Trace of shell fragments		2	NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibracore run depth was not recorded.
	10					
-16.8	11.2		BOTTOM OF HOLE AT 11.2' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT SHALLOTTE INLET | HOLE NO. SHI-2

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

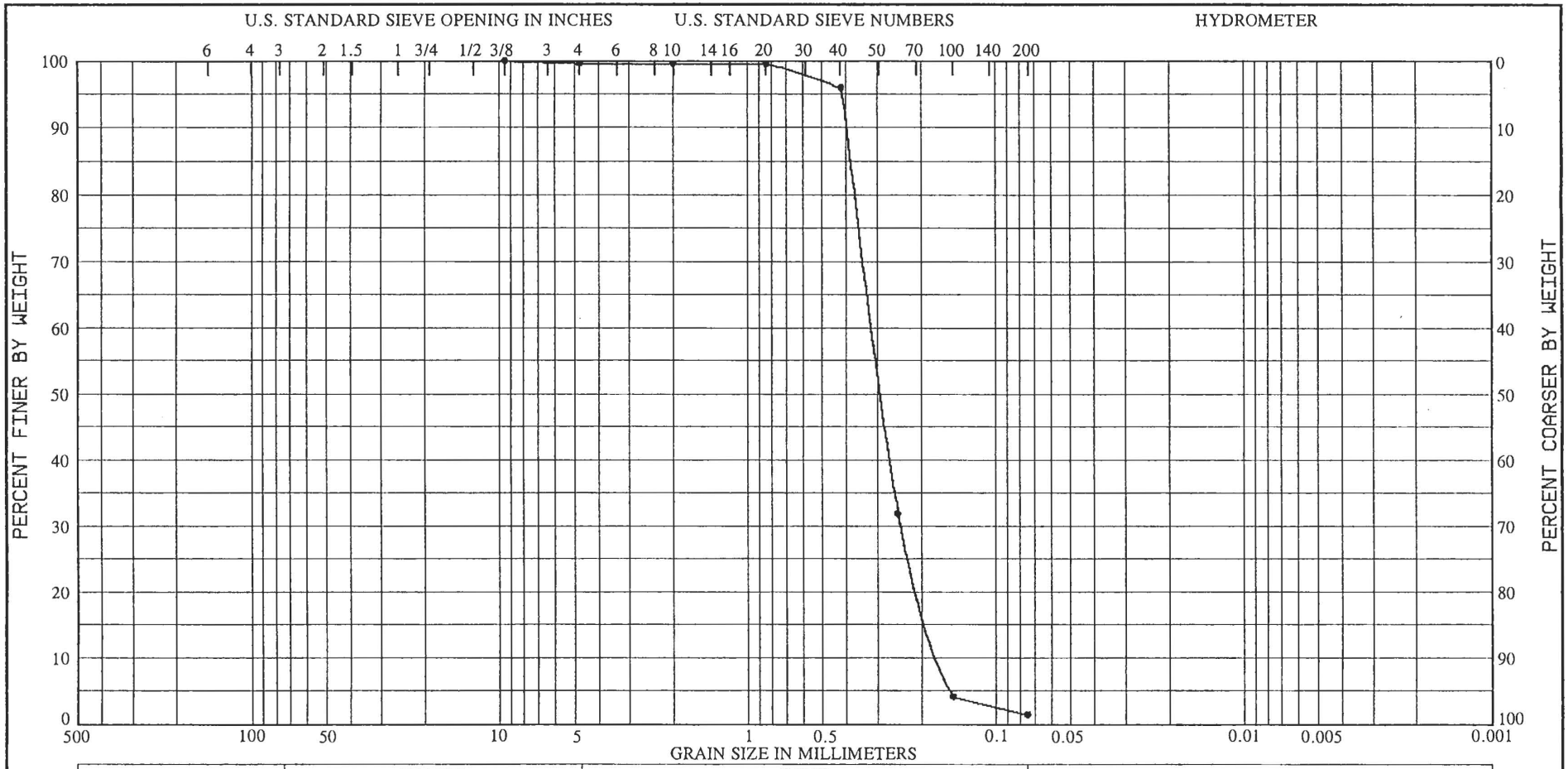
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.0 - 1.5	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZE AND SAND SIZE SHELL FRAGMENTS.	19.2			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6009
Hole No. SHI-2
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	8.0 - 8.5	GRAY, POORLY GRADED SAND (SP).	19.3			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6010
Hole No. SHI-2
Date 05/26/98

GRADATION CURVES

Hole No. SHI-3

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2186432 N 57188	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-3	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 2 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
	17. ELEVATION TOP OF HOLE -5.8 Ft.
7. THICKNESS OF OVERBURDEN N/A	18. TOTAL CORE RECOVERY FOR BORING N/A %
8. DEPTH DRILLED INTO ROCK 0.0'	19. SIGNATURE OF INSPECTOR KEITH BENTON
9. TOTAL DEPTH OF HOLE 4.1'	

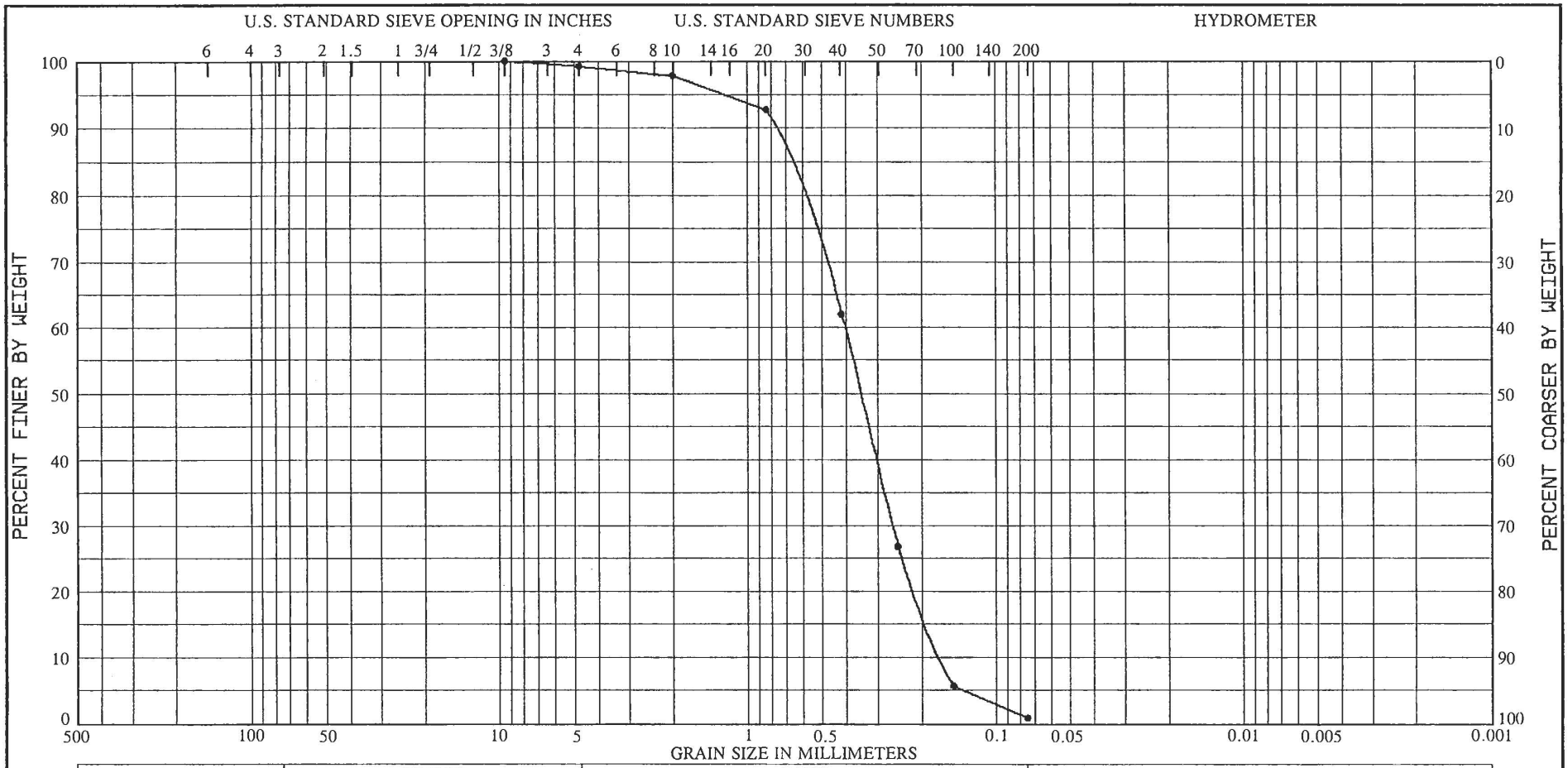
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
-5.8	0		SP-Tan, coarse poorly graded sand with shell fragments			Time Began Vibracoring @ 8:42 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH.
	1				1	NOTE: Top of Hole at River Bottom
	2					LAB CLASSIFICATION Jar Number / Classification 1 SP 2 SC
	3					
-9.2			SC-Brown fine to medium clayey sand with rock fragments		2	
-9.9	4 4.1		BOTTOM OF HOLE AT 4.1' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibracore run depth was not recorded.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT SHALLOTTE INLET | HOLE NO. SHI-3

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.0 - 1.5	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF SAND SIZE SHELL FRAGMENTS.	17.0			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6011
Hole No. SHI-3
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	3.4 - 3.9	TAN, CLAYEY SAND (SC), WITH A LITTLE GRAVEL.	18.1			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6012
Hole No. SHI-3
Date 05/26/98

GRADATION CURVES

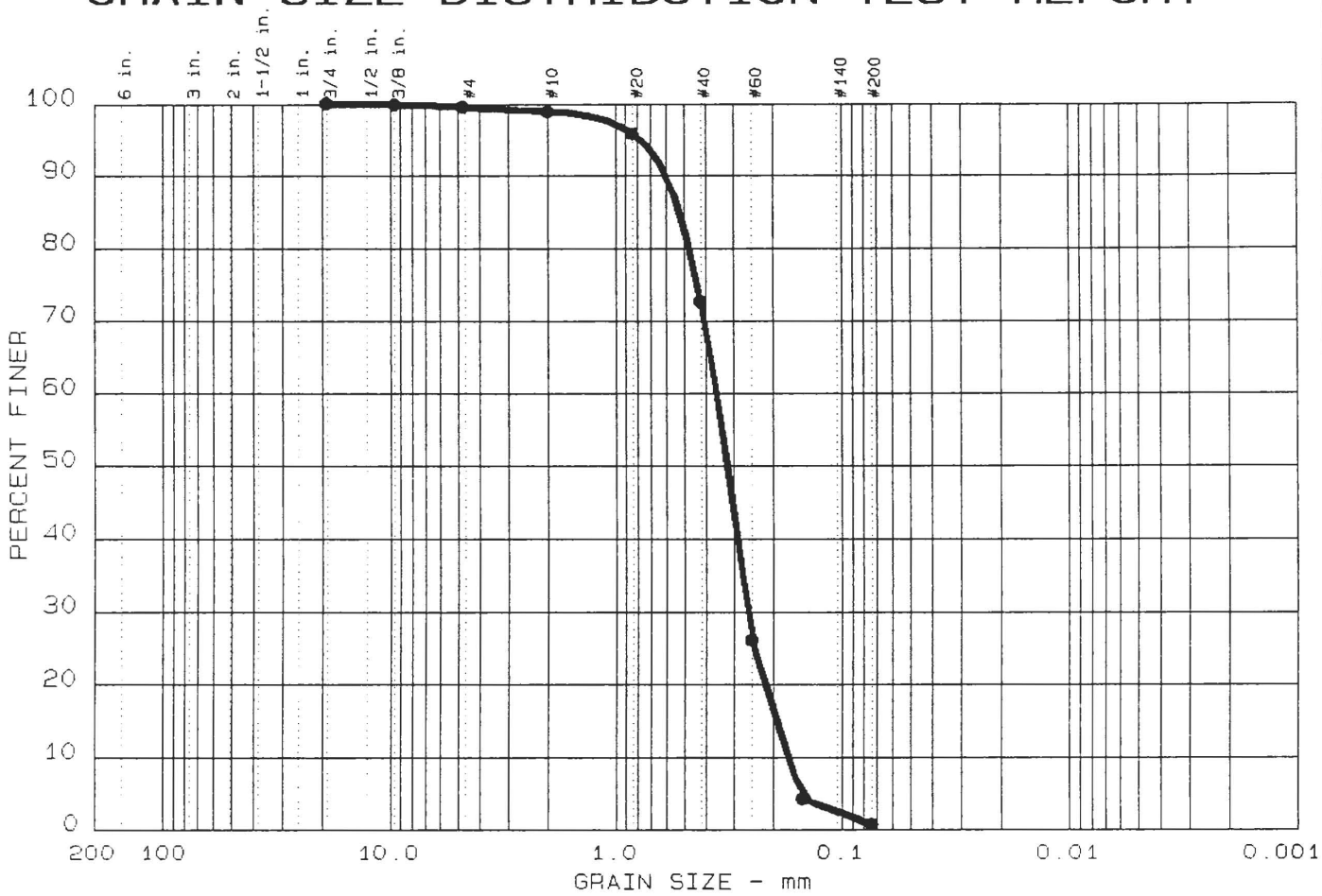
Hole No. SHI-4

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2187011 N 56726	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-4	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 3 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -2.4 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 11.7'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION	DEPTH	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-2.4	0		SP-Tan, coarse poorly graded sand trace of shell fragments		1	Time Began Vibracoring @ 9:25 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH. NOTE: Top of Hole at River Bottom
	2					
	4				2	LAB CLASSIFICATION Jar Number 1 — Classification SP
	6					
	8				3	NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibracore run depth was not recorded.
	10					
-14.1	11.7		BOTTOM OF HOLE AT 11.7' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.5	98.8	0.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.52	0.36	0.32	0.261	0.1919	0.1704	1.12	2.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-4 Jar Sample 1 @ 1.0-1.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: JL CA

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 14

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-4 Jar Sample 1 @ 1.0-1.5 Ft.
Sample Description: Tan Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: JL CA Reviewed by: HJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	303.47
Tare =	0.00
Dry sample weight =	303.47

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	0.39	99.9
# 4	1.48	99.5
# 10	3.40	98.9
# 20	12.67	95.8
# 40	82.80	72.7
# 60	224.19	26.1
# 100	290.46	4.3
# 200	301.34	0.7

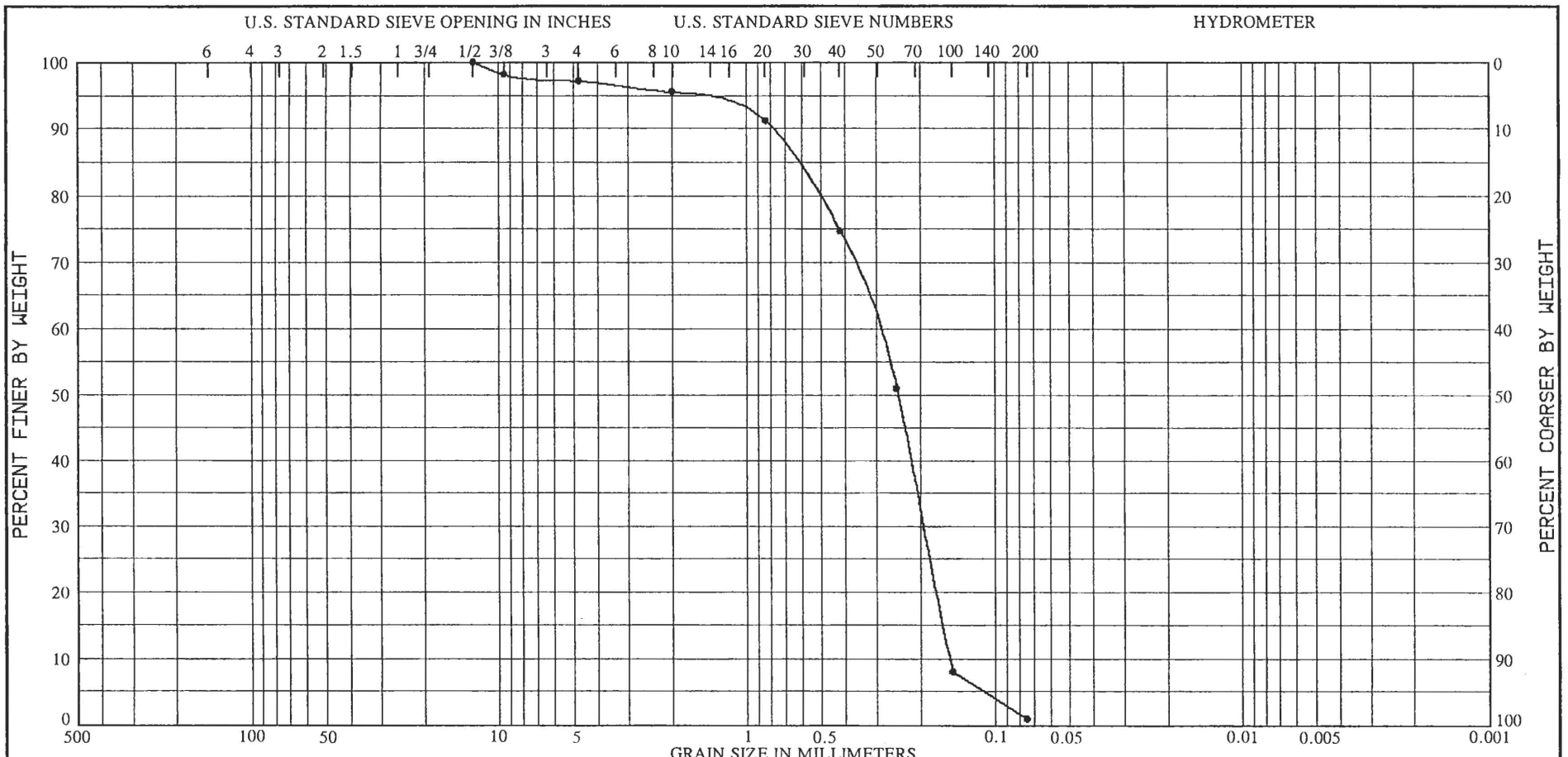
Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.5 % SAND = 98.8
% FINES = 0.7

D85= 0.52 D60= 0.355 D50= 0.320
D30= 0.2606 D15= 0.19187 D10= 0.17041
Cc = 1.1220 Cu = 2.0845

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	5.0 - 5.5	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZE AND SAND SIZE SHELL FRAGMENTS.	18.2			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6013
Hole No. SHI-4
Date 05/26/98

GRADATION CURVES

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 15

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-4 Jar Sample 3 @ 9.0-9.5 Ft.
Sample Description: Tan Poorly Graded Sand with Shell Fragments
USCS Class: SP Liquid limit:
AASHTO Class: Plasticity index:

Notes

Remarks: Tested by: CA JL Reviewed by: HJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	338.90
Tare =	0.00
Dry sample weight =	338.90

Tare for cumulative weight retained= 0

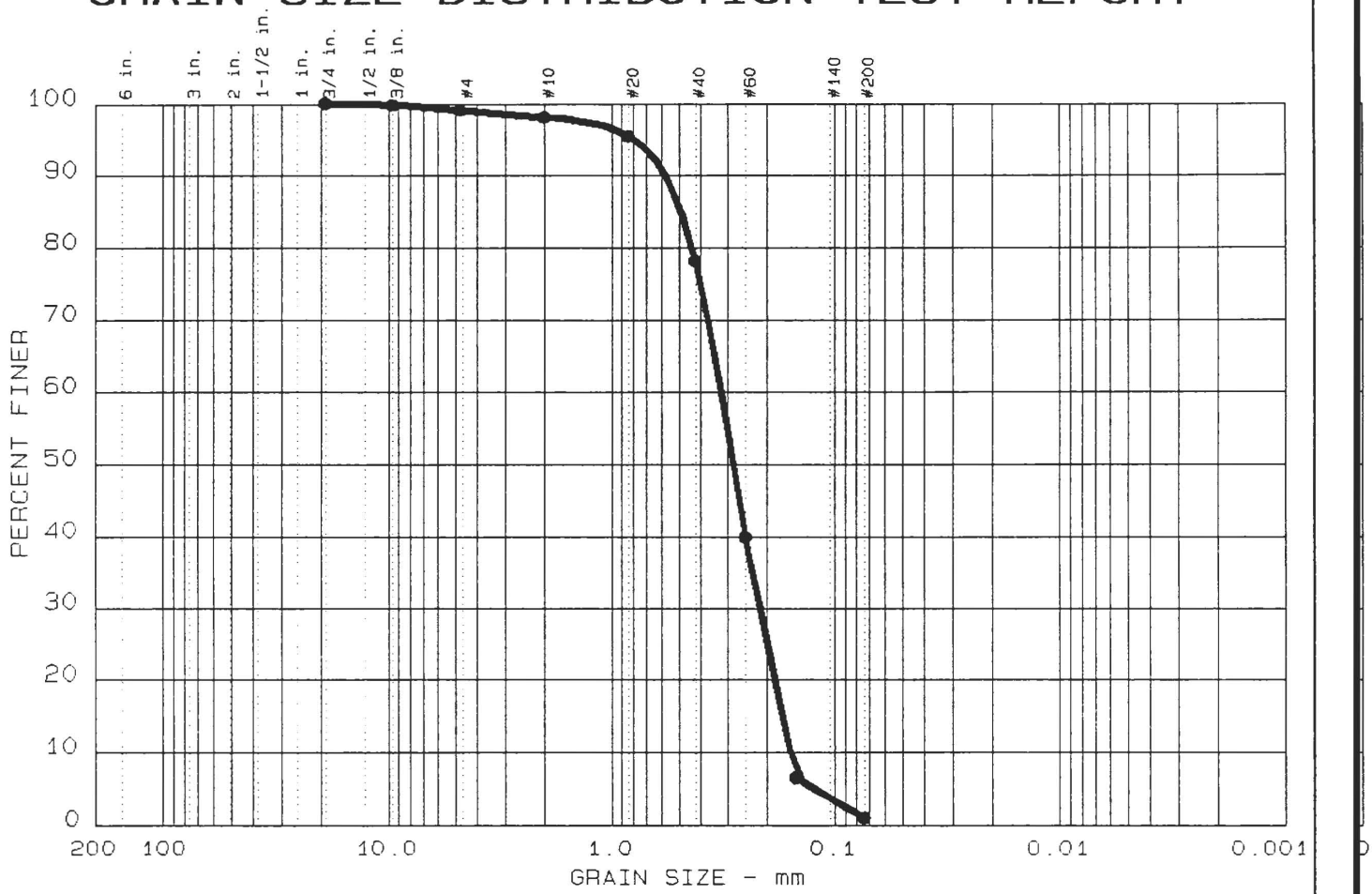
Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	0.73	99.8
# 4	3.01	99.1
# 10	6.41	98.1
# 20	15.38	95.5
# 40	73.85	78.2
# 60	203.92	39.8
# 100	316.75	6.5
# 200	335.47	1.0

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.9 % SAND = 98.1
% FINES = 1.0

D85= 0.48 D60= 0.320 D50= 0.282
D30= 0.2143 D15= 0.16982 D10= 0.15722
Cc = 0.9131 Cu = 2.0347

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	15	0.0	0.9	98.1	1.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.48	0.32	0.28	0.214	0.1698	0.1572	0.91	2.0

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet, Brunswick, NC
● Location: SHI-4 Jar Sample 3 @ 9.0-9.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

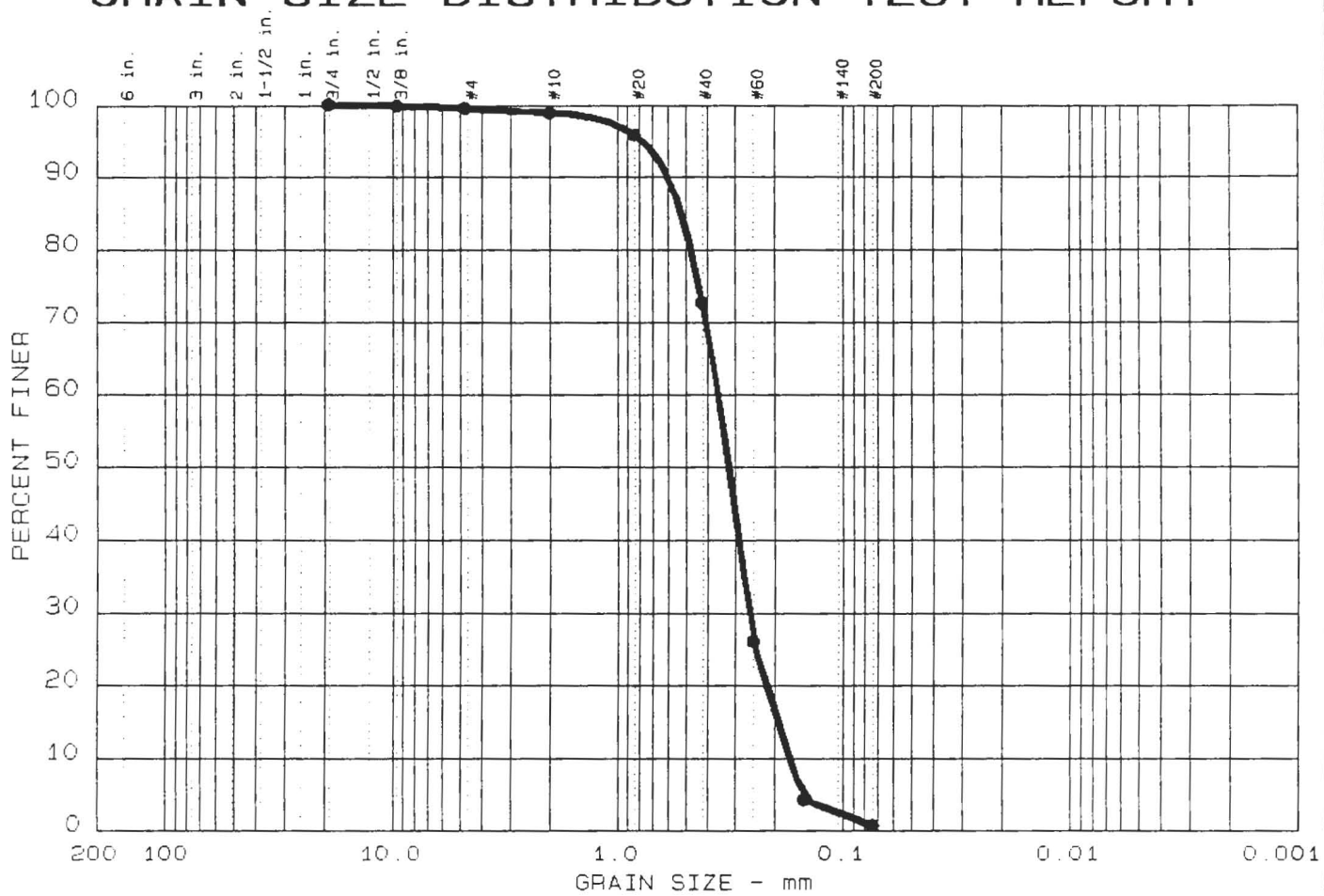
Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.5	98.8	0.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.52	0.36	0.32	0.261	0.1919	0.1704	1.12	2.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet, Brunswick, NC
● Location: SHI-4 Jar Sample 1 @ 1.0-1.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: JL CA

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 14

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-4 Jar Sample 1 @ 1.0-1.5 Ft.
Sample Description: Tan Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: JL CA Reviewed by: HJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	303.47
Tare =	0.00
Dry sample weight =	303.47

Tare for cumulative weight retained= 0

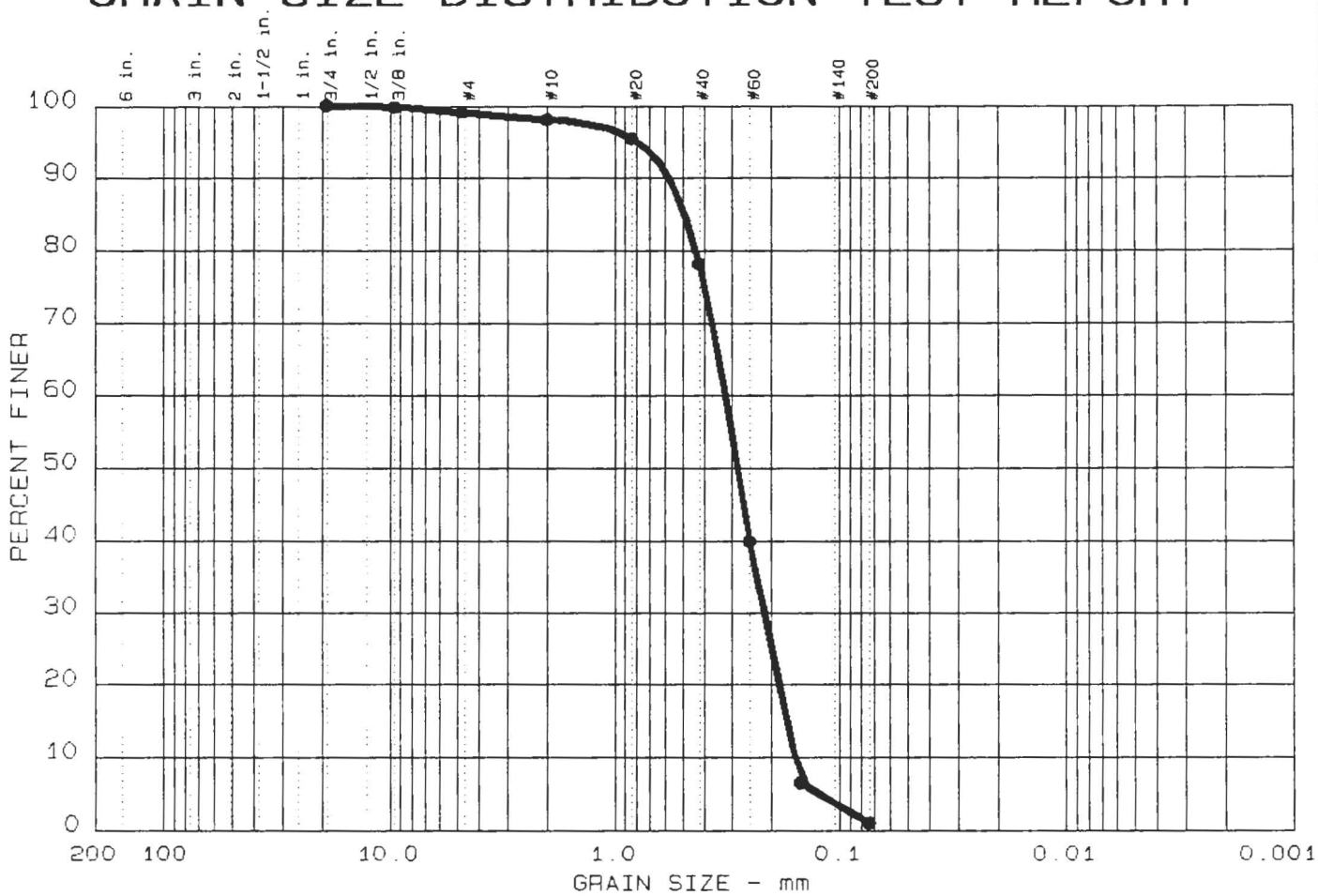
Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	0.39	99.9
# 4	1.48	99.5
# 10	3.40	98.9
# 20	12.67	95.8
# 40	82.80	72.7
# 60	224.19	26.1
# 100	290.46	4.3
# 200	301.34	0.7

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.5 % SAND = 98.8
% FINES = 0.7

D85= 0.52 D60= 0.355 D50= 0.320
D30= 0.2606 D15= 0.19187 D10= 0.17041
Cc = 1.1220 Cu = 2.0845

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	15	0.0	0.9	98.1	1.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.48	0.32	0.28	0.214	0.1698	0.1572	0.91	2.0

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-4 Jar Sample 3 @ 9.0-9.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 15

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-4 Jar Sample 3 @ 9.0-9.5 Ft.
Sample Description: Tan Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: CA JL Reviewed by: HJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	338.90
Tare =	0.00
Dry sample weight =	338.90

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	0.73	99.8
# 4	3.01	99.1
# 10	6.41	98.1
# 20	15.38	95.5
# 40	73.85	78.2
# 60	203.92	39.8
# 100	316.75	6.5
# 200	335.47	1.0

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.9 % SAND = 98.1
% FINES = 1.0

D85= 0.48 D60= 0.320 D50= 0.282
D30= 0.2143 D15= 0.16982 D10= 0.15722
Cc = 0.9131 Cu = 2.0347

Hole No. SHI-5

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

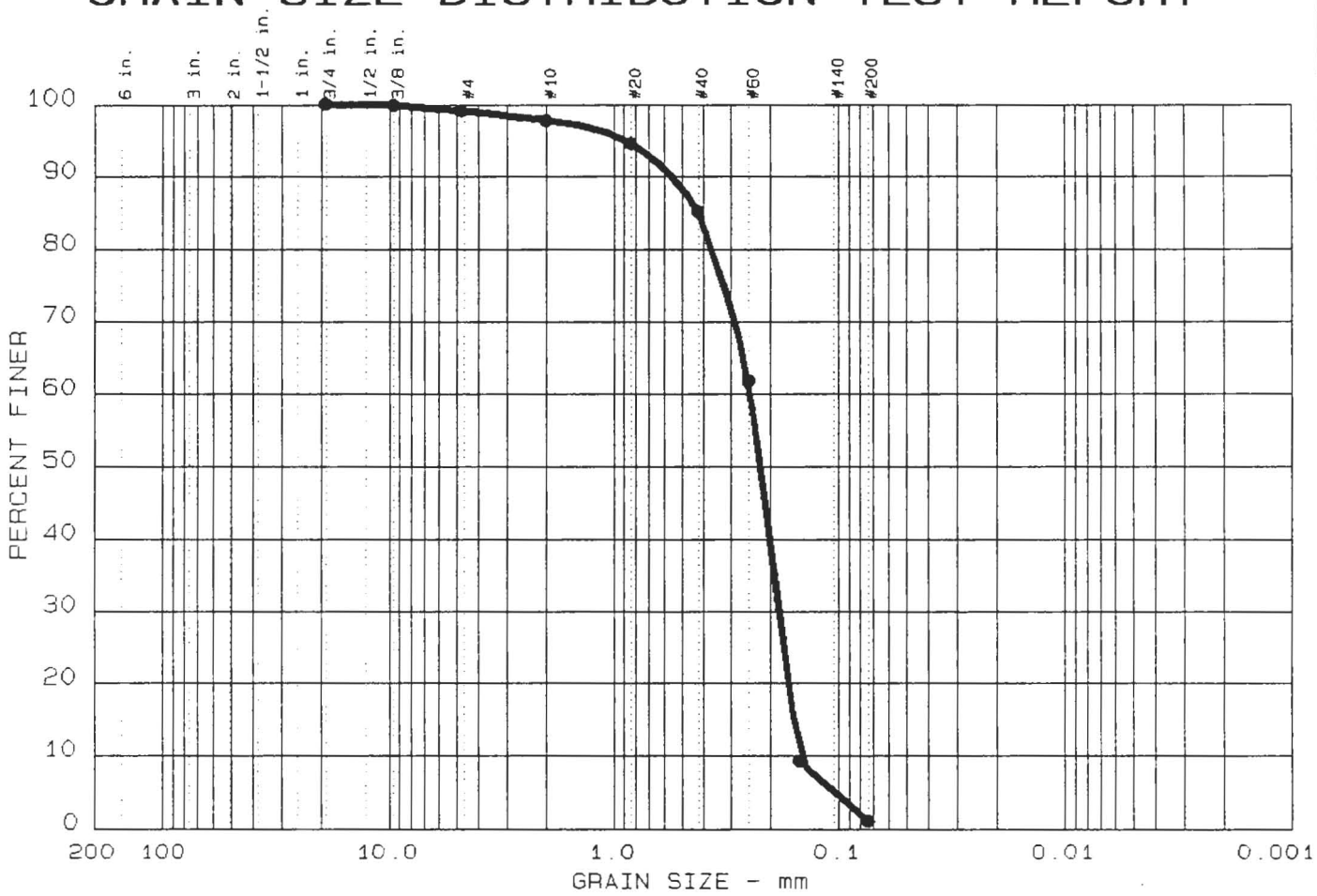
1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2187628 N 56867	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-5	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 2 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -2.7 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 11.0'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION	DEPTH	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-2.7	0		SP-Tan, coarse poorly graded sand with shell fragments		1	Time Began Vibracoring @ 10:15 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH. NOTE: Top of Hole at River Bottom LAB CLASSIFICATION Jar Number 1 Classification SP
	2					
	4					
	6					
	8					NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal.
	10				2	NOTE: The Vibracore run depth was not recorded.
-13.7	11		BOTTOM OF HOLE AT 11.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT SHALLOTTE INLET | HOLE NO. SHI-5

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	16	0.0	0.9	98.0	1.1	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.42	0.25	0.22	0.183	0.1576	0.1490	0.91	1.6

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-5 Jar Sample ~~3~~ 2 @ 10.0-10.5 Ft.

Date: Feb 20, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

Tested by: CA JL

Reviewed by: HJ

Typo as per John Daily, Law, Raleigh, NC 919-876-0416 5 April 99 JPB

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA Test No.: 16

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

5 Apr 1999
Typo as per John Daly Law, Raleigh, NC 919-876-0416

Location of Sample: SHI-5 Jar Sample 2 @ 10.0-10.5 Ft.
Sample Description: Tan Poorly Graded Sand with Shell Fragments
USCS Class: SP Liquid limit:
AASHTO Class: Plasticity index:

Notes

JPB

Remarks: Tested by: CA Reviewed by: HJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	302.80
Tare =	0.00
Dry sample weight =	302.80

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	0.32	99.9
# 4	2.71	99.1
# 10	6.82	97.7
# 20	16.47	94.6
# 40	44.80	85.2
# 60	115.64	61.8
# 100	274.75	9.3
# 200	299.45	1.1

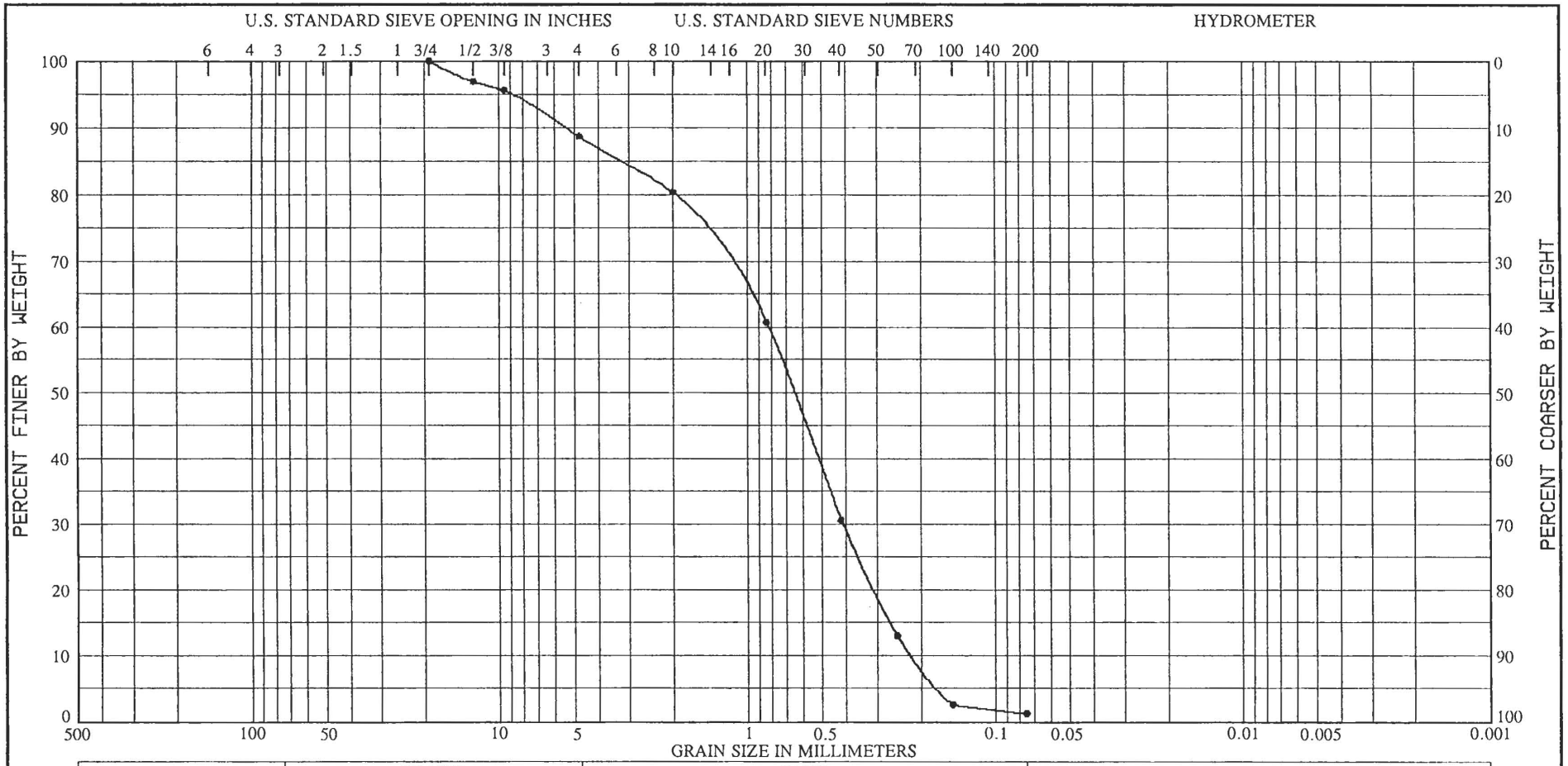
Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.9 % SAND = 98.0
% FINES = 1.1

D85= 0.42 D60= 0.245 D50= 0.222
D30= 0.1826 D15= 0.15758 D10= 0.14900
Cc = 0.9116 Cu = 1.6475

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



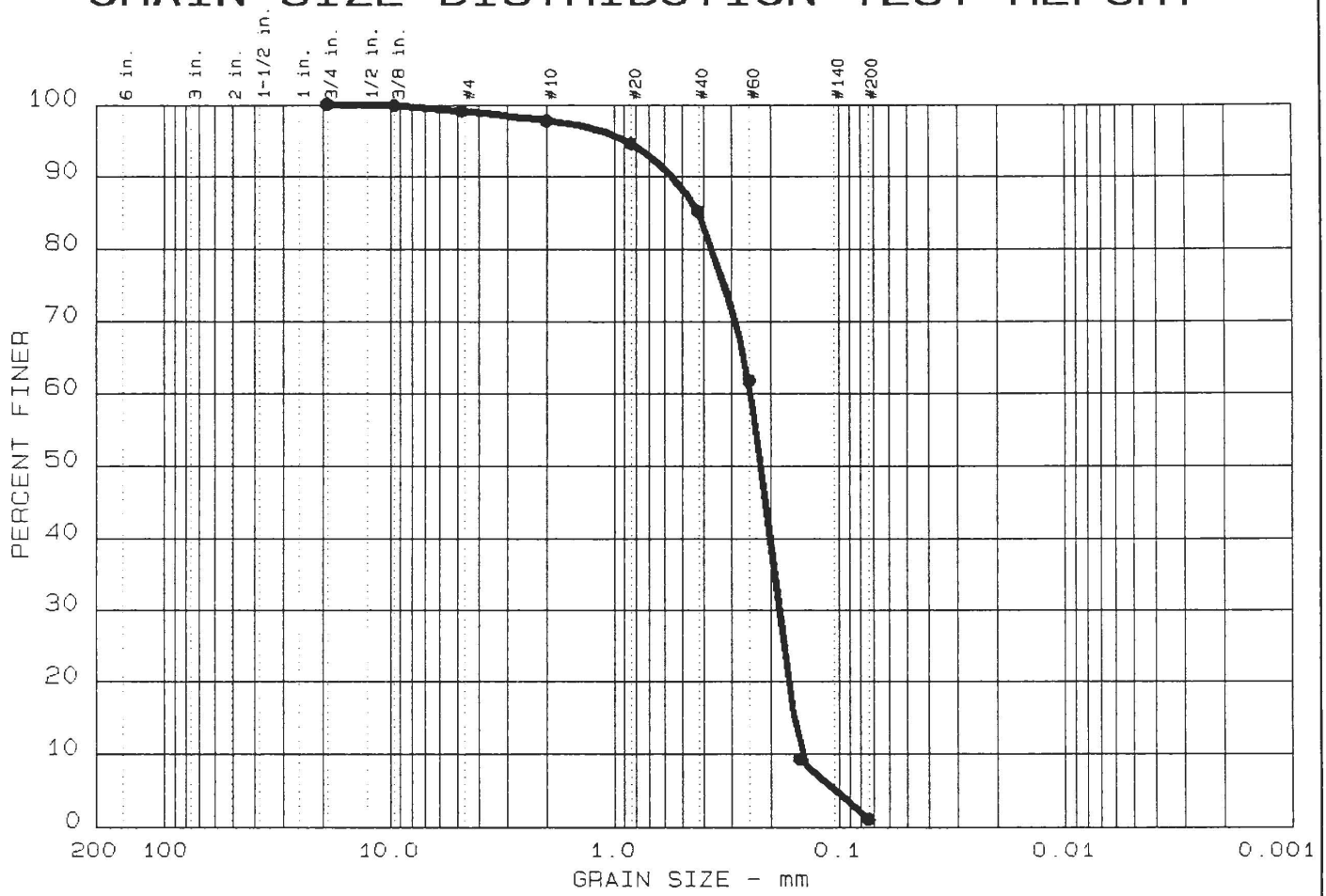
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.0 - 1.5	TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZE AND A TRACE OF SAND SIZE SHELL FRAGMENTS.	12.8			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6014
Hole No. SHI-5
Date 05/26/98

GRADATION CURVES

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	16	0.0	0.9	98.0	1.1	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.42	0.25	0.22	0.183	0.1576	0.1490	0.91	1.6

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet, Brunswick, NC
● Location: SHI-5 Jar Sample 3 @ 10.0-10.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 16

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-5 Jar Sample 3 @ 10.0-10.5 Ft.
Sample Description: Tan Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: CA JL Reviewed by: HJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	302.80
Tare =	0.00
Dry sample weight =	302.80

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	0.32	99.9
# 4	2.71	99.1
# 10	6.82	97.7
# 20	16.47	94.6
# 40	44.80	85.2
# 60	115.64	61.8
# 100	274.75	9.3
# 200	299.45	1.1

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.9 % SAND = 98.0
% FINES = 1.1

D85= 0.42 D60= 0.245 D50= 0.222
D30= 0.1826 D15= 0.15758 D10= 0.14900
Cc = 0.9116 Cu = 1.6475

Hole No. SHI-6

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

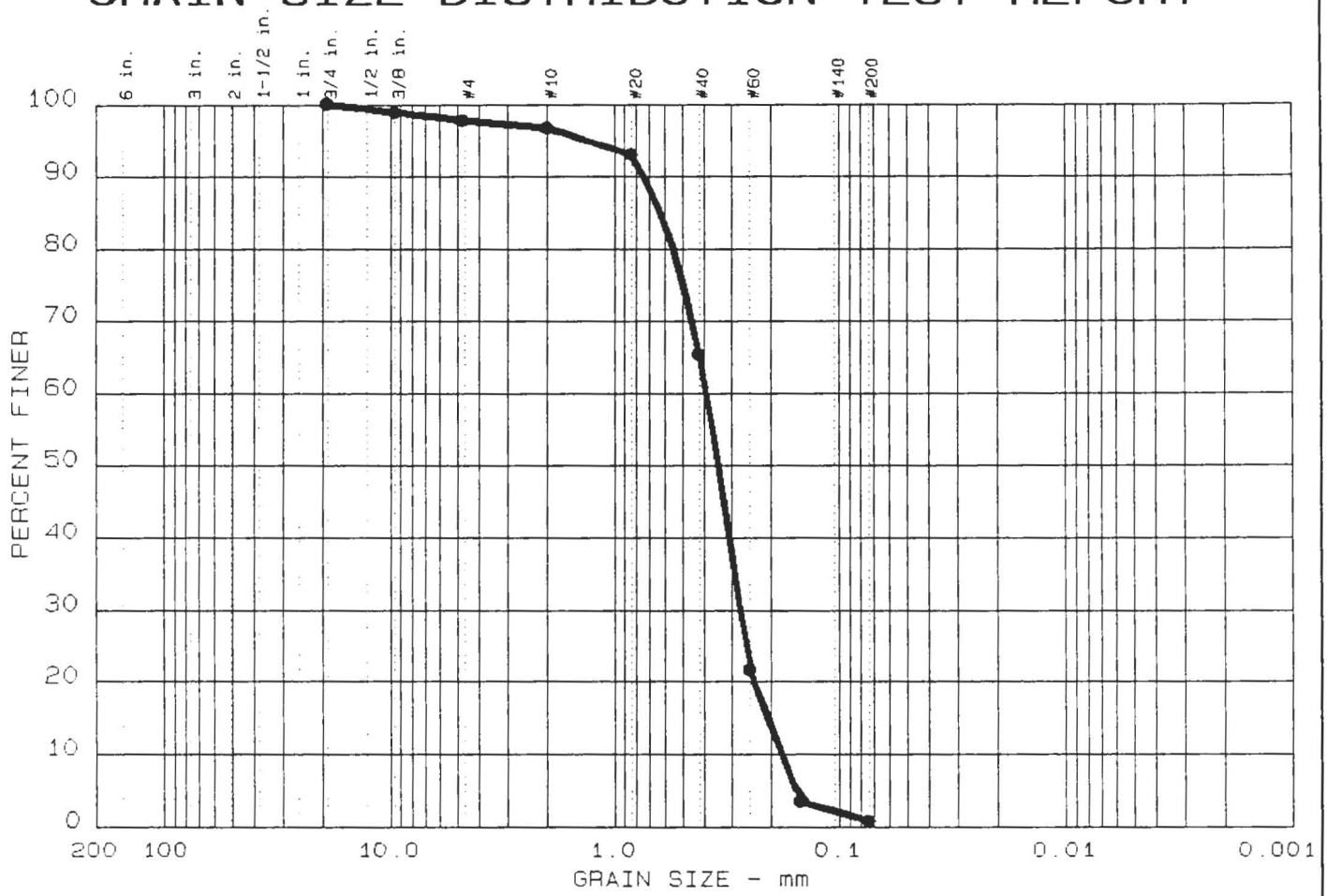
1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2187441 N 56371	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-6	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 2 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -2.7 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 9.0'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION	DEPTH	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-2.7	0		SP-Tan, coarse poorly graded sand with shell fragments			Time Began Vibracoring @ 10:55 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH.
					1	
	2					NOTE: Top of Hole at River Bottom
	4					LAB CLASSIFICATION Jar Number 2 — Classification SP
	6				2	
	8					NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal.
-11.7	9		BOTTOM OF HOLE AT 9.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			NOTE: The Vibracore run depth was not recorded.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT SHALLOTTE INLET | HOLE NO. SHI-6

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	17	0.0	2.2	97.0	0.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.62	0.39	0.34	0.275	0.2065	0.1793	1.09	2.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-6 Jar sample 1 @ 1.0-1.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 17

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-6 Jar sample 1 @ 1.0-1.5 Ft.
Sample Description: Tan Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: CA Reviewed by: HJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	315.43
Tare =	0.00
Dry sample weight =	315.43

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	3.57	98.9
# 4	6.98	97.8
# 10	10.25	96.8
# 20	21.88	93.1
# 40	109.06	65.4
# 60	247.20	21.6
# 100	304.33	3.5
# 200	312.80	0.8

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 2.2 % SAND = 97.0
% FINES = 0.8

D85= 0.62 D60= 0.388 D50= 0.343
D30= 0.2754 D15= 0.20654 D10= 0.17927
Cc = 1.0914 Cu = 2.1627

GRAIN SIZE DISTRIBUTION TEST REPORT

	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	17	0.0	2.2	97.0	0.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.62	0.39	0.34	0.275	0.2065	0.1793	1.09	2.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-6 Jar sample 1 @ 1.0-1.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA FL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 17

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-6 Jar sample 1 @ 1.0-1.5 Ft.
Sample Description: Tan Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: CA Reviewed by: HJ
ZL

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	315.43
Tare =	0.00
Dry sample weight =	315.43

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	3.57	98.9
# 4	6.98	97.8
# 10	10.25	96.8
# 20	21.88	93.1
# 40	109.06	65.4
# 60	247.20	21.6
# 100	304.33	3.5
# 200	312.80	0.8

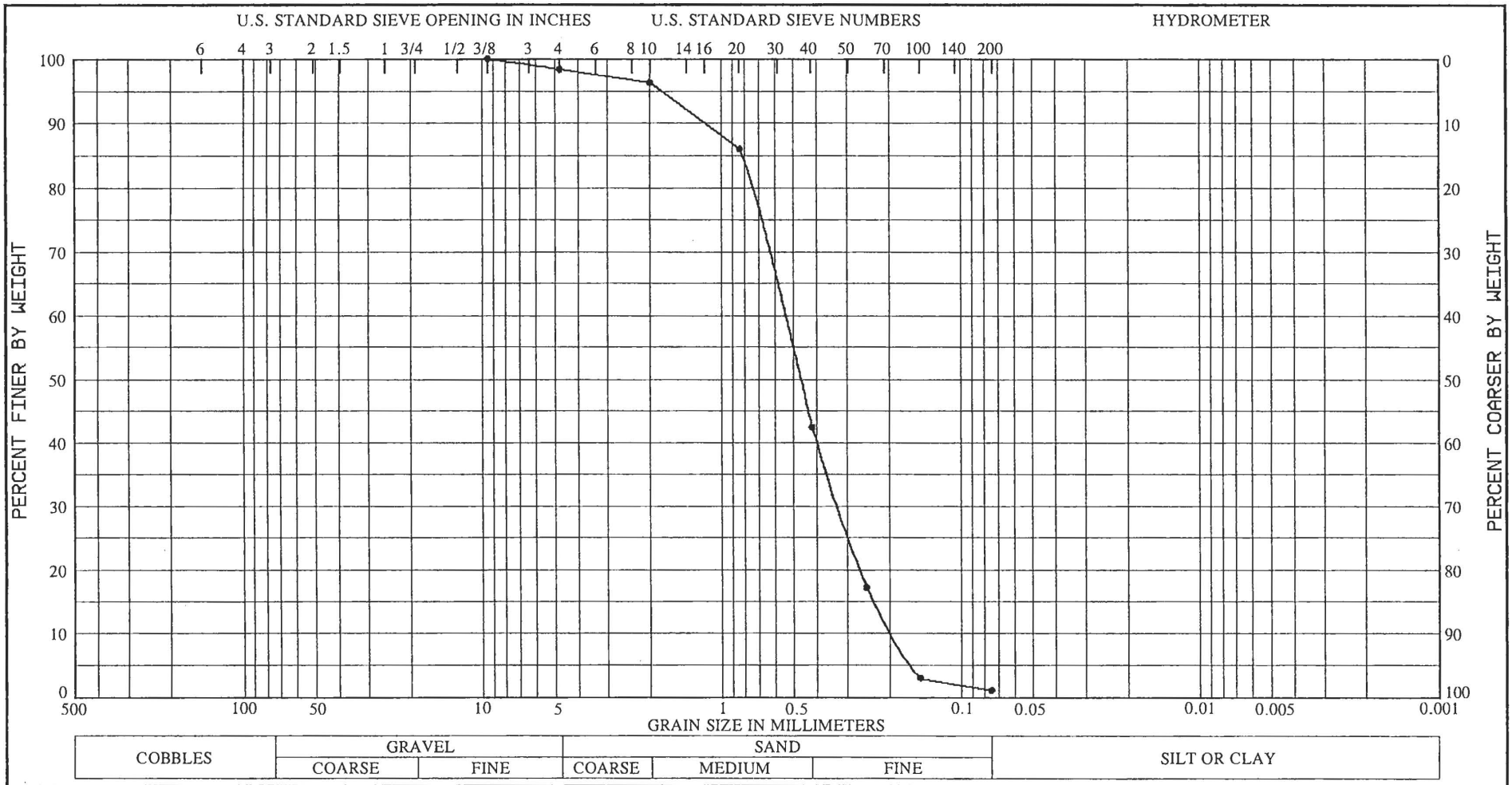
Fractional Components

% + 3 in. = 0.0 % GRAVEL = 2.2 % SAND = 97.0
% FINES = 0.8

D85= 0.62 D60= 0.388 D50= 0.343
D30= 0.2754 D15= 0.20654 D10= 0.17927
Cc = 1.0914 Cu = 2.1627

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	6.0 - 6.5	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZE AND SAND SIZE SHELL FRAGMENTS.	17.9			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6015
Hole No. SHI-6
Date 05/26/98

GRADATION CURVES

Hole No. SHI-7

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

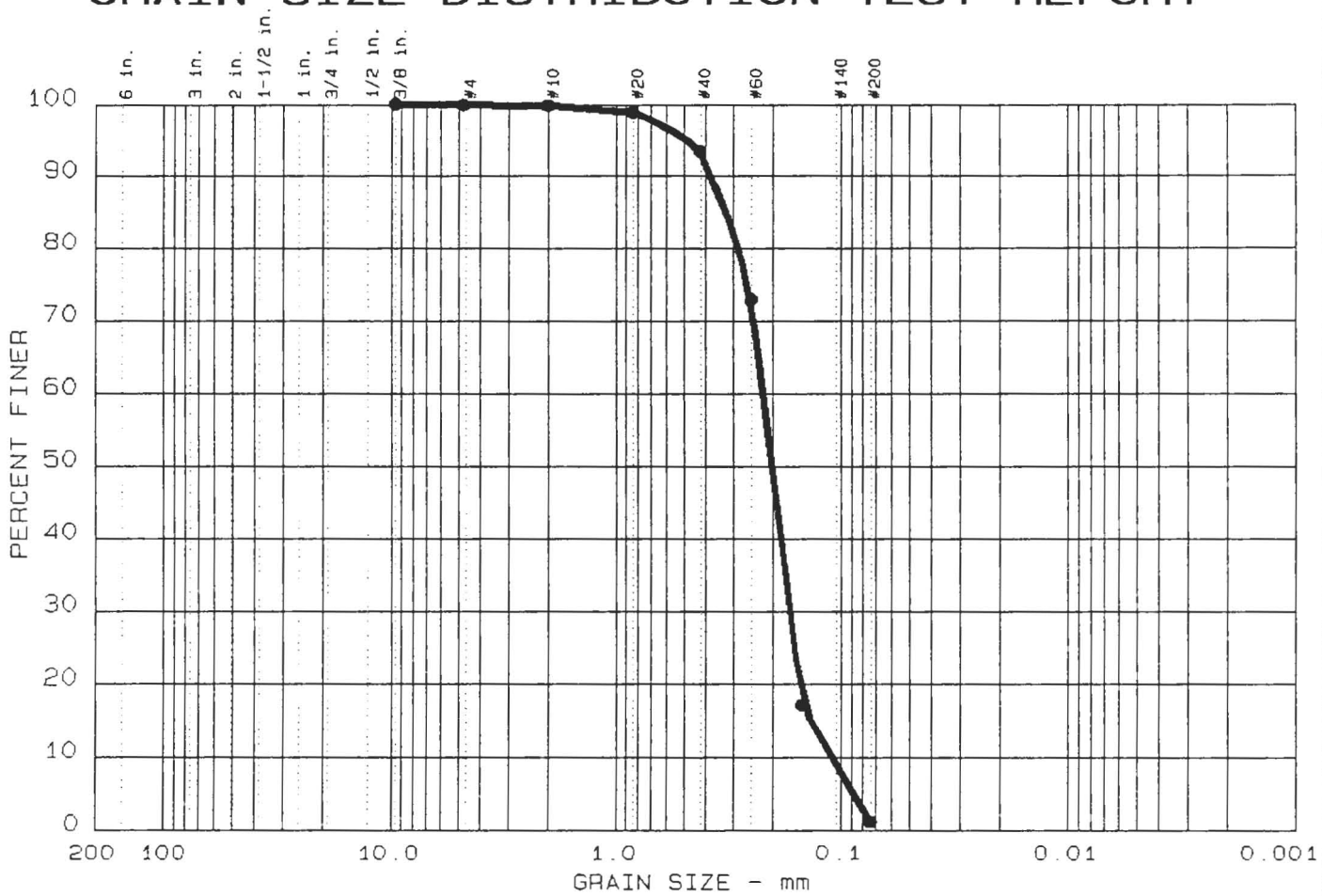
1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2188097 N 56318	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-7	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 2 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -6.8 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 7.2'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION	DEPTH	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-6.8	0		SP-Tan, coarse poorly graded sand with shell fragments		1	Time Began Vibracoring @ 10:30 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH. NOTE: Top of Hole at River Bottom
	2					
	4					LAB CLASSIFICATION Jar Number 1 — Classification SP
			Trace of shell fragments		2	
	6					
-14.0	7.2		BOTTOM OF HOLE AT 7.2' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibracore run depth was not recorded.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT SHALLOTTE INLET | HOLE NO. SHI-7

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	18	0.0	0.1	98.7	1.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.32	0.22	0.20	0.168	0.1347	0.1083	1.17	2.0

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-7 Jar Sample 2 @ 5.0-5.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 18

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-7 Jar Sample 2 @ 5.0-5.5 Ft.
Sample Description: Brown Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: CA JC Reviewed by: HJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	301.95
Tare =	0.00
Dry sample weight =	301.95

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.375 inches	0.00	100.0
# 4	0.27	99.9
# 10	0.62	99.8
# 20	3.37	98.9
# 40	19.83	93.4
# 60	81.77	72.9
# 100	250.16	17.2
# 200	298.36	1.2

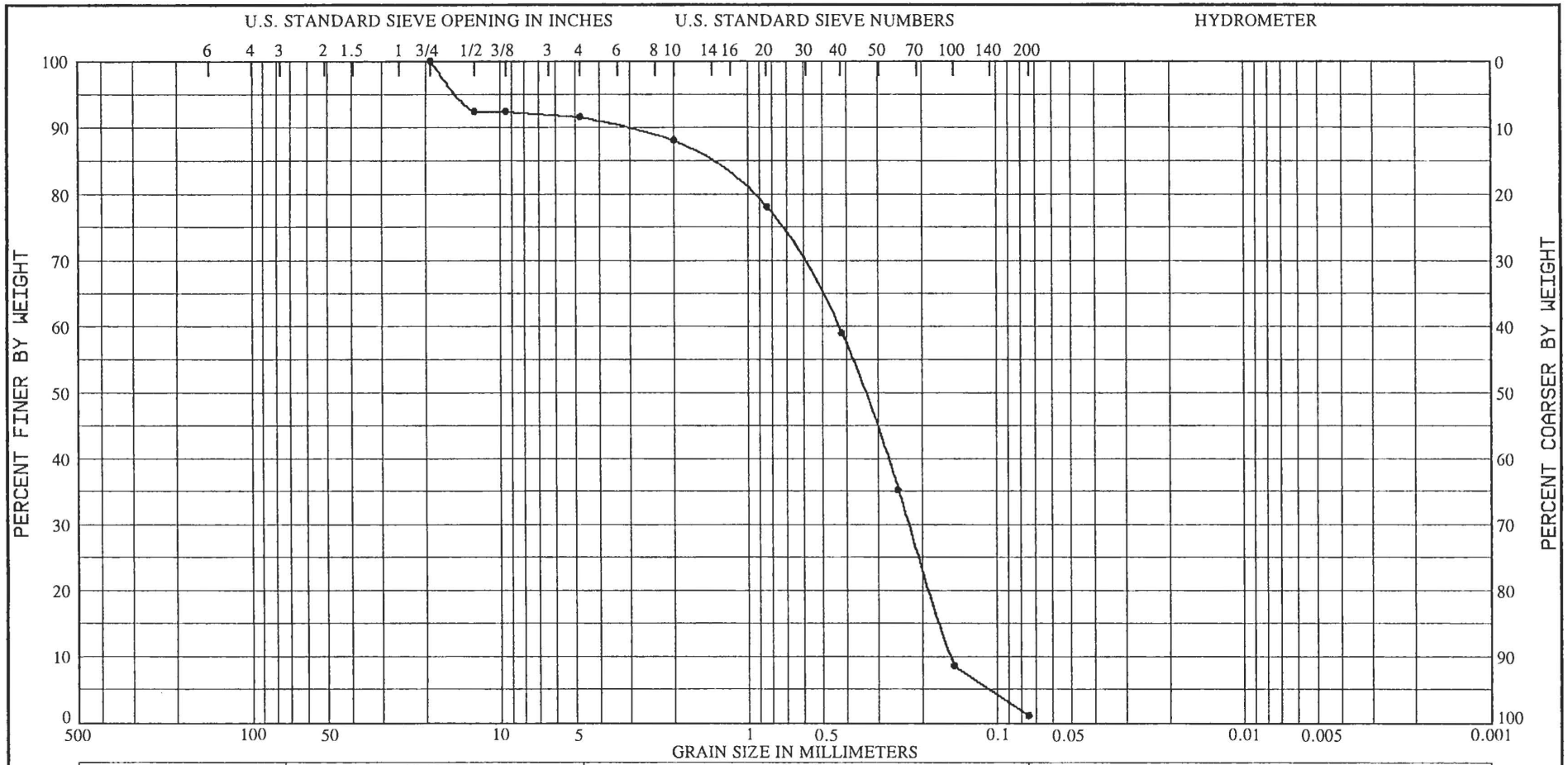
Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.1 % SAND = 98.7
% FINES = 1.2

D85= 0.32 D60= 0.222 D50= 0.202
D30= 0.1677 D15= 0.13474 D10= 0.10827
Cc = 1.1722 Cu = 2.0464

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



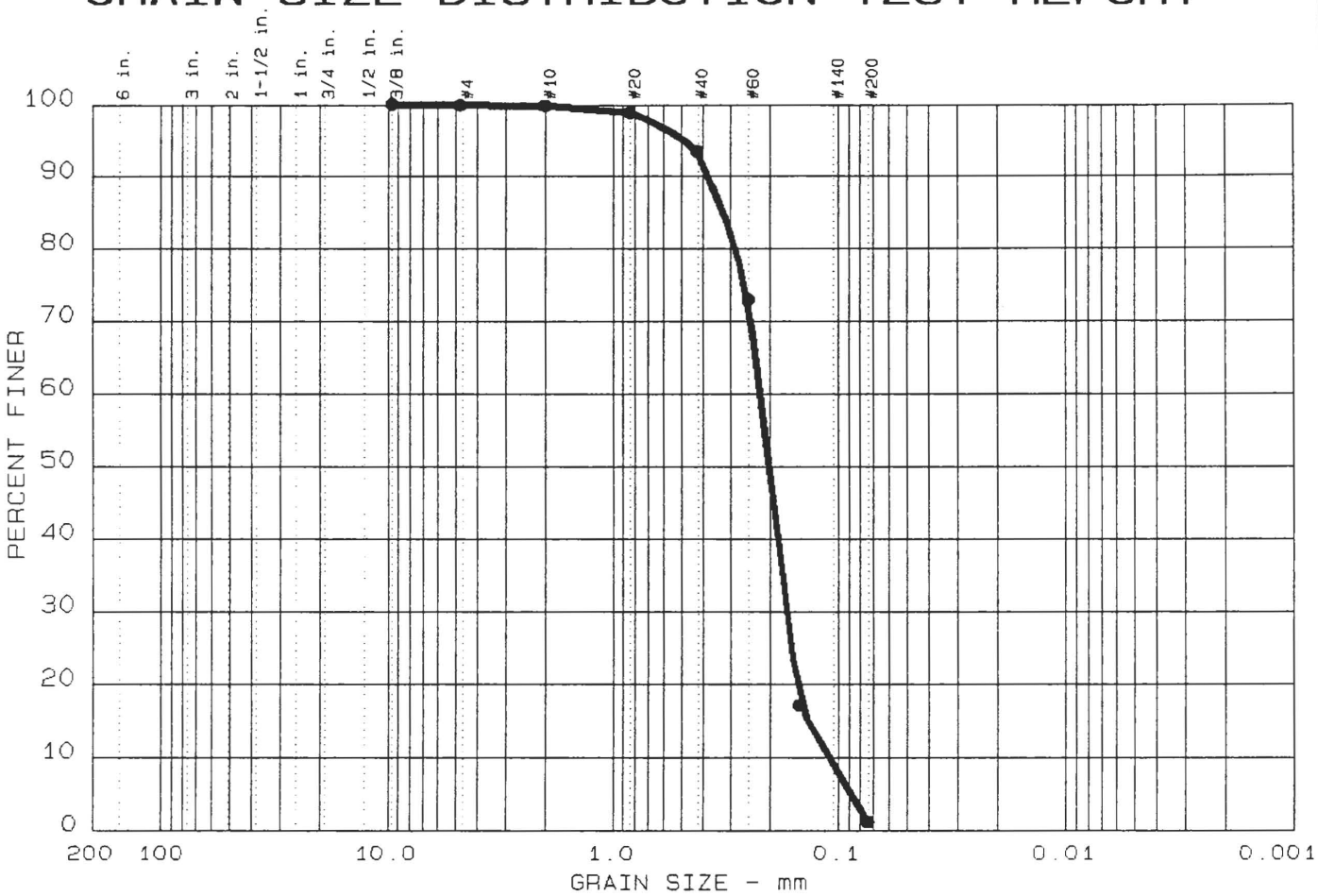
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.0 - 1.5	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZE AND SAND SIZE SHELL FRAGMENTS.	17.1			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6016
Hole No. SHI-7
Date 05/26/98

GRADATION CURVES

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	18	0.0	0.1	98.7	1.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.32	0.22	0.20	0.168	0.1347	0.1083	1.17	2.0

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-7 Jar Sample 2 @ 5.0-5.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA — Test No.: 18

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-7 Jar Sample 2 @ 5.0-5.5 Ft.
Sample Description: Brown Poorly Graded Sand with Shell Fragments
USCS Class: SP — Liquid limit:
AASHTO Class: — Plasticity index:

Notes

Remarks: Tested by: JC Reviewed by: HJ

Fig. No.:

Mechanical Analysis Data

Initial
Dry sample and tare= 301.95
Tare = 0.00
Dry sample weight = 301.95
Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.375 inches	0.00	100.0
# 4	0.27	99.9
# 10	0.62	99.8
# 20	3.37	98.9
# 40	19.83	93.4
# 60	81.77	72.9
# 100	250.16	17.2
# 200	298.36	1.2

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.1 % SAND = 98.7
% FINES = 1.2

D85= 0.32 D60= 0.222 D50= 0.202
D30= 0.1677 D15= 0.13474 D10= 0.10827
Cc = 1.1722 Cu = 2.0464

Hole No. SHI-8

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

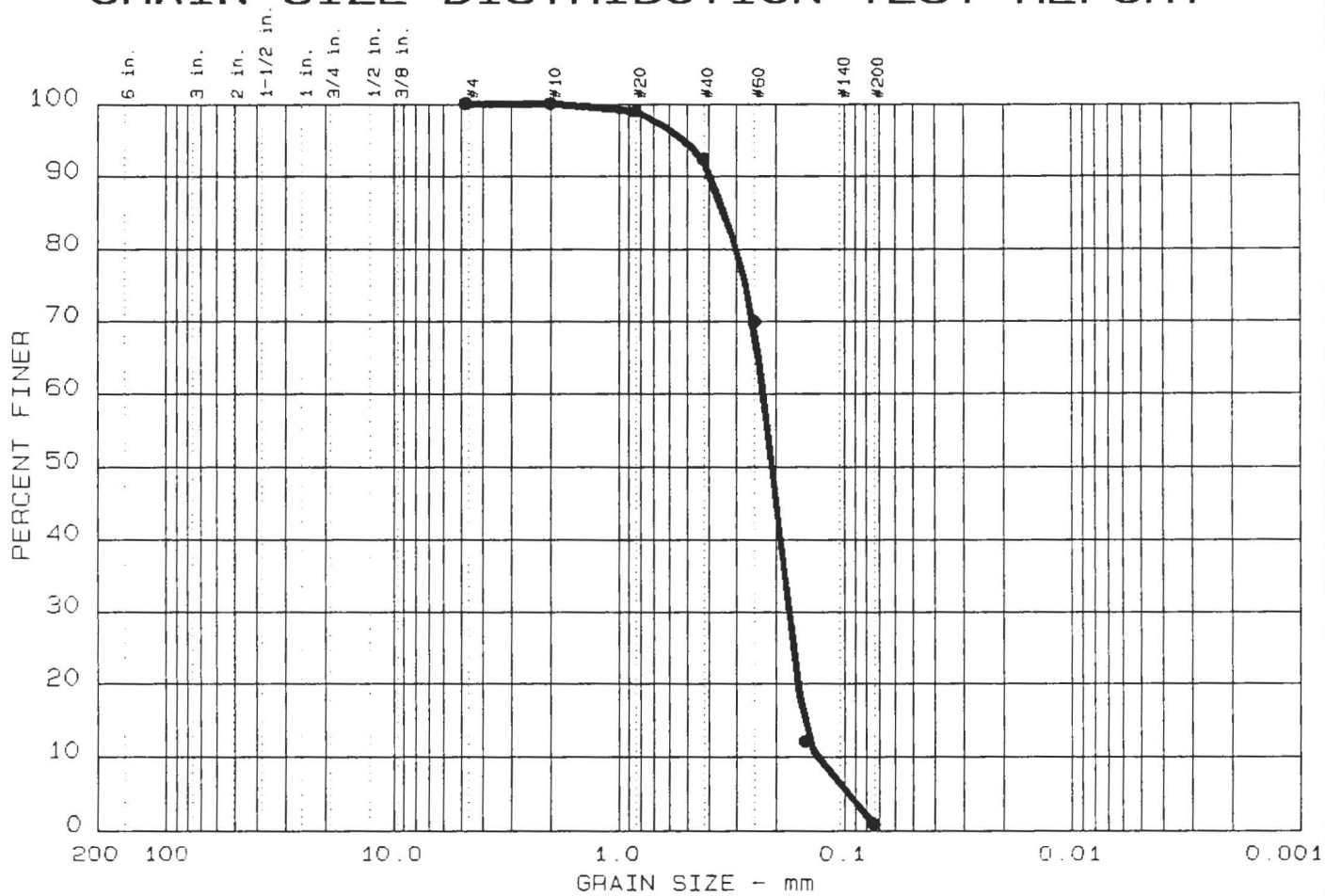
1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2188328 N 55679	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-8	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 2 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE +0.5 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 10.8'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION +0.5	DEPTH 0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP-Tan, coarse poorly graded sand, trace of shell fragments		1	Time Began Vibracoring @ 11:25 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH. NOTE: Top of Hole at River Bottom LAB CLASSIFICATION Jar Number 2 Classification SP
	2					
	4					
	6				2	
	8					NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibracore run depth was not recorded.
	10					
-10.3	10.8		BOTTOM OF HOLE AT 10.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT SHALLOTTE INLET | HOLE NO. SHI-8

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	19	0.0	0.0	99.1	0.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.34	0.23	0.21	0.175	0.1529	0.1302	1.03	1.8

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-8 Jar Sample 1 @ 1.0-1.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 19

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-8 Jar Sample 1 @ 1.0-1.5 Ft.
Sample Description: Brown Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: CA JL Reviewed by: UJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	324.23
Tare =	0.00
Dry sample weight =	324.23

Tare for cumulative weight retained= 0

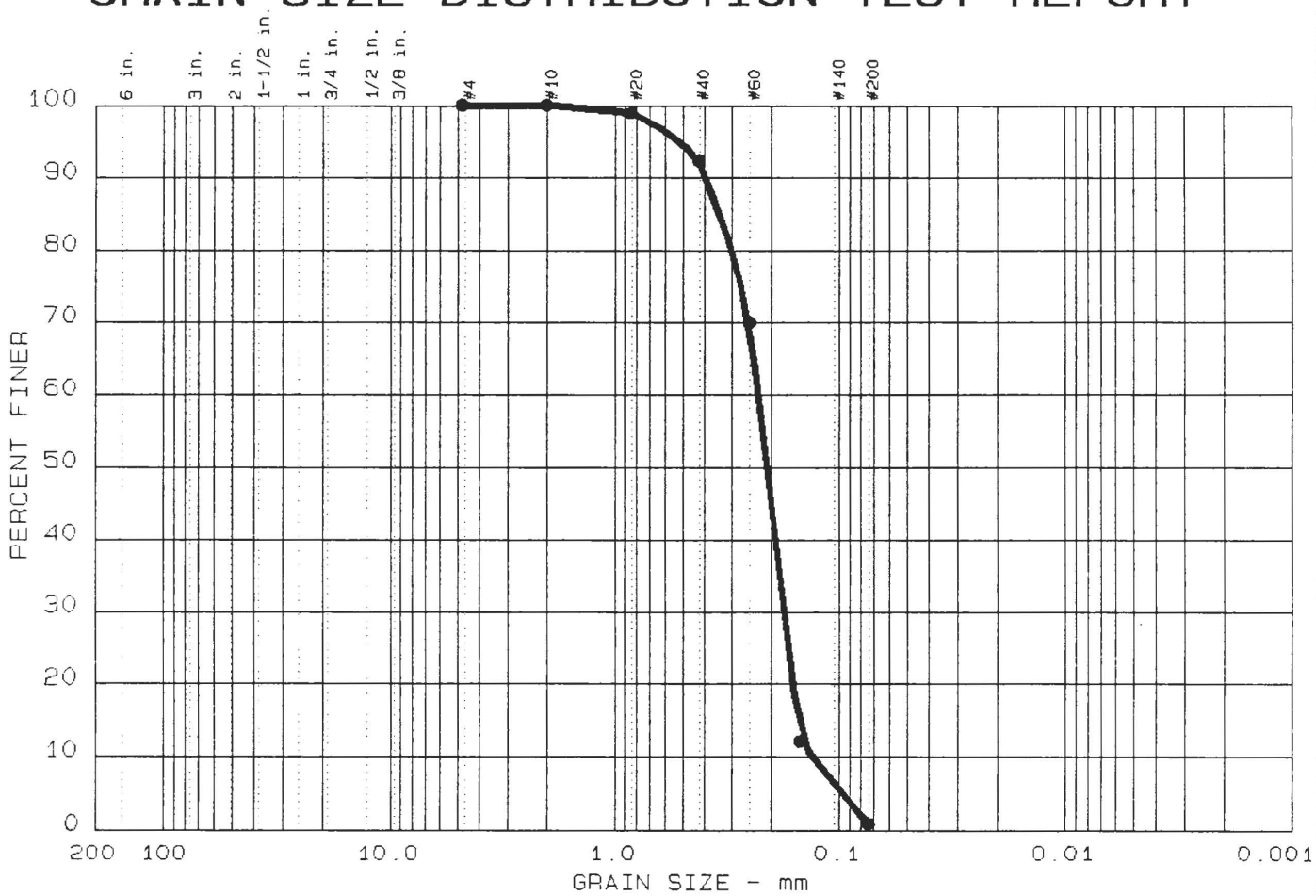
Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.07	100.0
# 20	3.40	99.0
# 40	24.60	92.4
# 60	97.49	69.9
# 100	285.09	12.1
# 200	321.32	0.9

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.0 % SAND = 99.1
% FINES = 0.9

D85= 0.34 D60= 0.229 D50= 0.209
D30= 0.1748 D15= 0.15293 D10= 0.13017
Cc = 1.0268 Cu = 1.7559

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	19	0.0	0.0	99.1	0.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.34	0.23	0.21	0.175	0.1529	0.1302	1.03	1.8

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-8 Jar Sample 1 @ 1.0-1.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 19

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-8 Jar Sample 1 @ 1.0-1.5 Ft.
Sample Description: Brown Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: CA JL Reviewed by: 4J

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	324.23
Tare =	0.00
Dry sample weight =	324.23

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
# 4	0.00	100.0
# 10	0.07	100.0
# 20	3.40	99.0
# 40	24.60	92.4
# 60	97.49	69.9
# 100	285.09	12.1
# 200	321.32	0.9

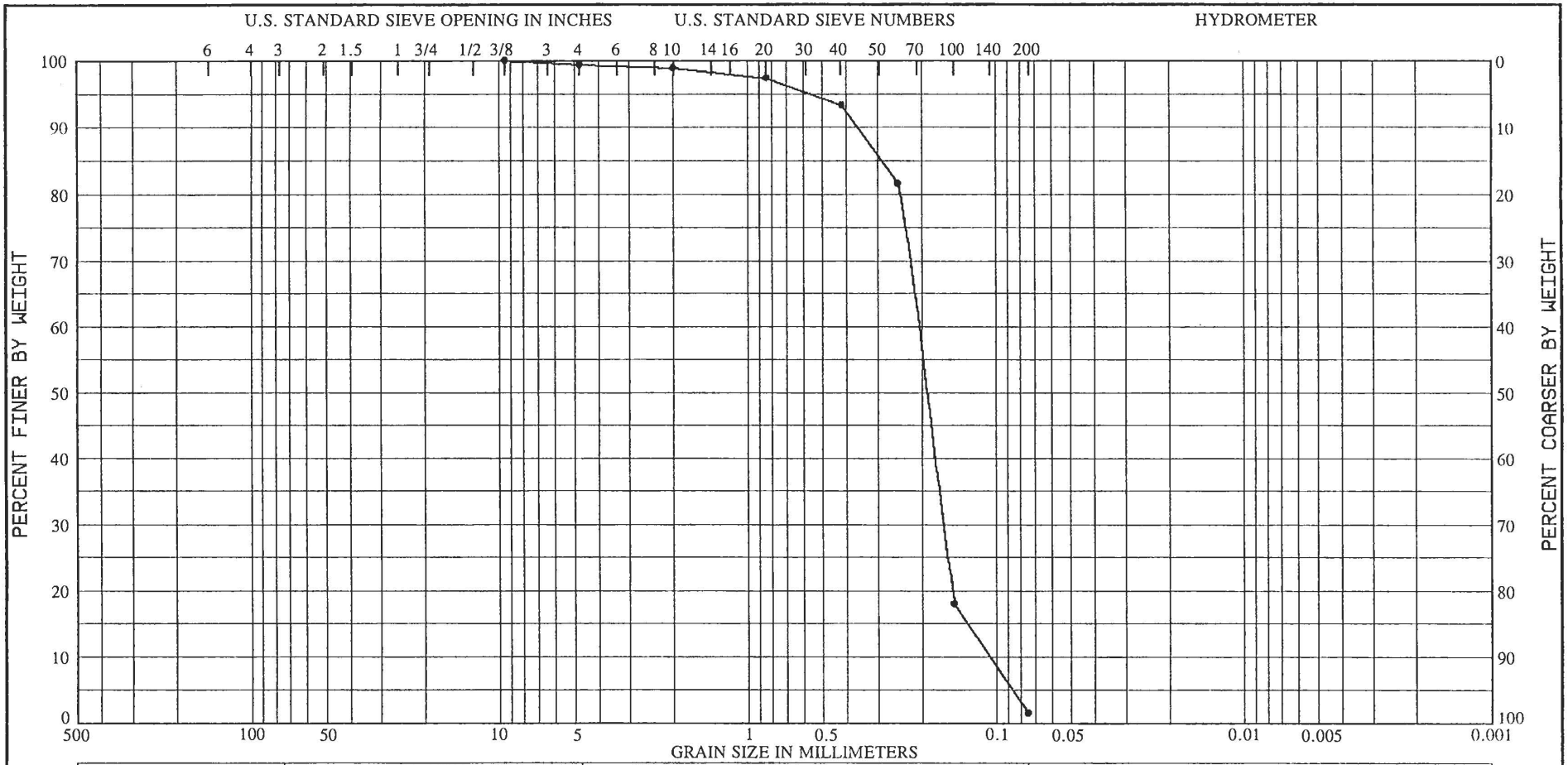
Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.0 % SAND = 99.1
% FINES = 0.9

D85= 0.34 D60= 0.229 D50= 0.209
D30= 0.1748 D15= 0.15293 D10= 0.13017
Cc = 1.0268 Cu = 1.7559

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	7.0 - 7.5	GRAYISH TAN, POORLY GRADED SAND (SP), WITH A TRACE OF SAND SIZE SHELL FRAGMENTS.	20.1			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6017
Hole No. SHI-8
Date 05/26/98

GRADATION CURVES

Hole No. SHI-12

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2188483 N 54209	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-12	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 2 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN N/A	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
8. DEPTH DRILLED INTO ROCK 0.0'	17. ELEVATION TOP OF HOLE -9.5 Ft.
9. TOTAL DEPTH OF HOLE 8.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION	DEPTH	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-9.5	0		SP-Tan, coarse poorly graded sand with shell fragments		1	Time Began Vibracoring @ 15:10 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH. NOTE: Top of Hole at River Bottom LAB CLASSIFICATION Jar Number 2 — Classification SP
	2					
	4					
	6		Gray, medium to coarse grain sizes, trace of shell fragments		2	
-17.5	8		BOTTOM OF HOLE AT 8.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibracore run depth was not recorded.

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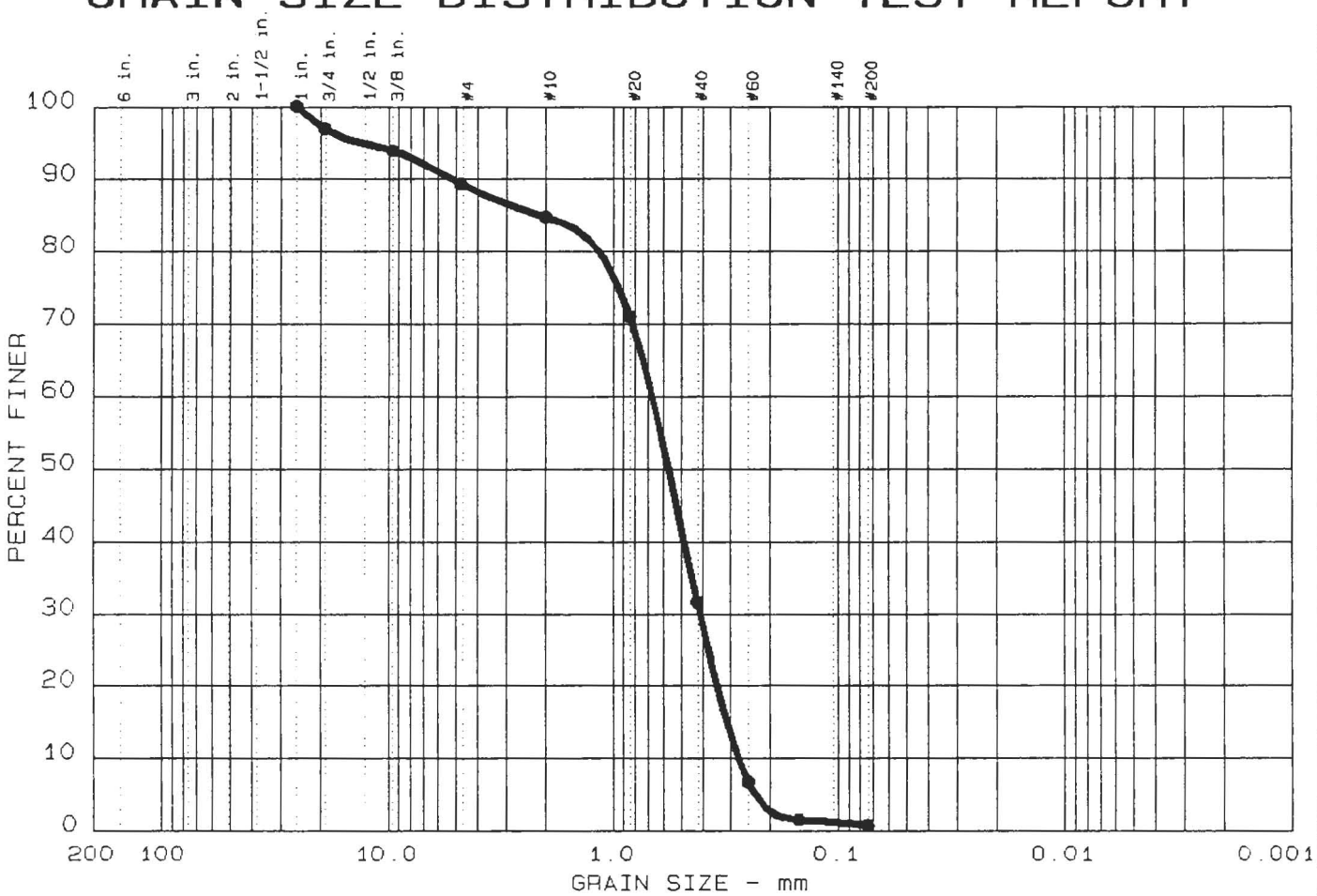
PROJECT SHALLOTTE INLET | HOLE NO. SHI-12

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	20	0.0	10.6	88.6	0.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			2.11	0.67	0.56	0.409	0.3101	0.2764	0.90	2.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Gravel & Shell Frag.	SP	

Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet, Brunswick, NC
● Location: SHI-12 Jar Sample 1 @ 0.0-0.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: SAJC

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 20

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-12 Jar Sample 1 @ 0.0-0.5 Ft.
Sample Description: Tan Poorly Graded Sand with Gravel & Shell Frag.
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

CAJC 16

Remarks: Tested by: Reviewed by:

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	328.34
Tare =	0.00
Dry sample weight =	328.34

Tare for cumulative weight retained= 0

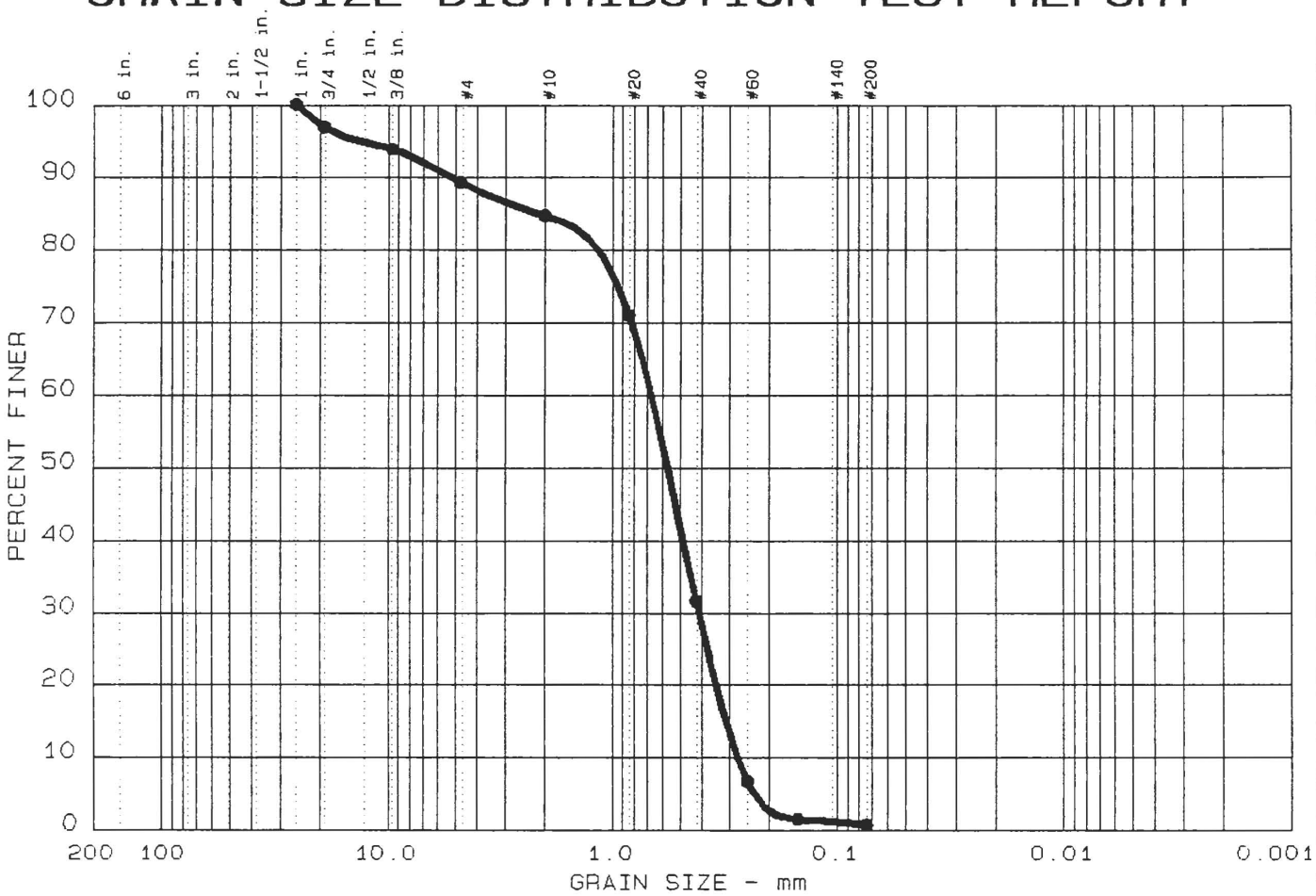
Sieve	Cumul. Wt. retained	Percent finer
1 inches	0.00	100.0
0.75 inches	10.16	96.9
0.375 inches	20.18	93.9
# 4	34.94	89.4
# 10	50.16	84.7
# 20	95.18	71.0
# 40	224.62	31.6
# 60	306.43	6.7
# 100	323.41	1.5
# 200	325.94	0.7

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 10.6 % SAND = 88.6
% FINES = 0.8

D85= 2.11 D60= 0.668 D50= 0.562
D30= 0.4088 D15= 0.31010 D10= 0.27638
Cc = 0.9047 Cu = 2.4182

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	20	0.0	10.6	88.6	0.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			2.11	0.67	0.56	0.409	0.3101	0.2764	0.90	2.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Gravel & Shell Frag.	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-12 Jar Sample 1 @ 0.0-0.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: SRJC

Reviewed by: HJ

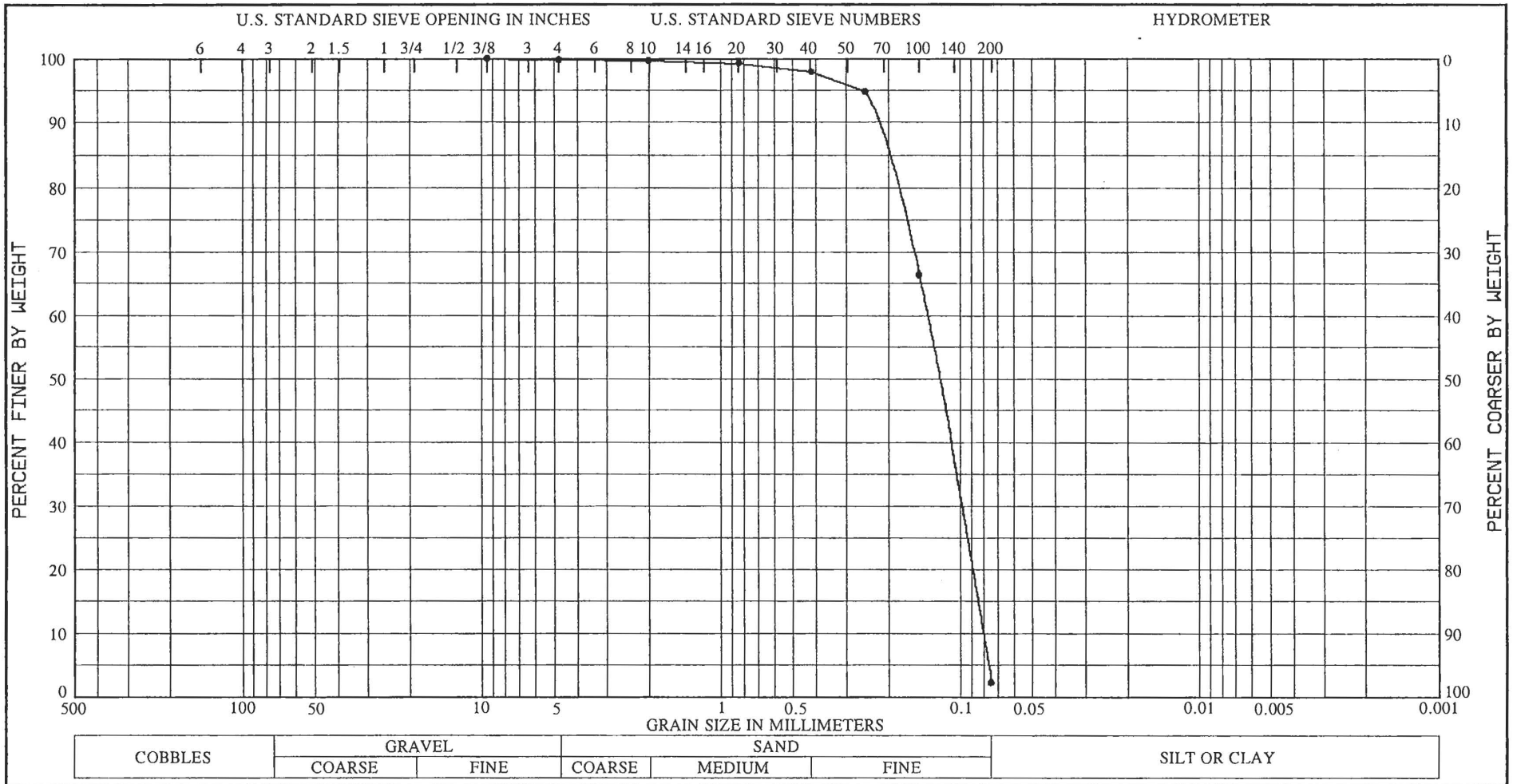
GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	6.0 - 6.5	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.	26.2			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6018
Hole No. SHI-12
Date 05/26/98

GRADATION CURVES

Hole No. SHI-13

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2187457 N 53902	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-13	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 2 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -7.9 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 4.9'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-7.9	0		SP-Tan, coarse poorly graded sand with shell fragments			Time Began Vibracoring @ 14:35 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH.
	1				1	
	2					NOTE: Top of Hole at River Bottom
	3				2	LAB CLASSIFICATION Jar Number 1 — Classification SP
	4					
-12.8	4.9		BOTTOM OF HOLE AT 4.9' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibracore run depth was not recorded.

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PROJECT SHALLOTTE INLET | HOLE NO. SHI-13

GRAIN SIZE DISTRIBUTION TEST REPORT

	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	5.6	93.6	0.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			1.15	0.63	0.55	0.412	0.3069	0.2783	0.96	2.3

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Poorly Graded Sand with Gravel & Shell Frag.	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-13 Jar Sample 2 @ 3.0-3.5 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 1

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-13 Jar Sample 2 @ 3.0-3.5 Ft.
Sample Description: Tan Poorly Graded Sand with Gravel & Shell Frag.
USCS Class: SP Liquid limit:
AASHTO Class: Plasticity index:

Notes

Remarks: Tested by: CA JL Reviewed by: KJ

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	342.31
Tare =	0.00
Dry sample weight =	342.31

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
1 inches	0.00	100.0
0.75 inches	7.48	97.8
0.375 inches	11.98	96.5
# 4	19.21	94.4
# 10	35.38	89.7
# 20	84.76	75.2
# 40	236.18	31.0
# 60	327.04	4.5
# 100	337.91	1.3
# 200	339.62	0.8

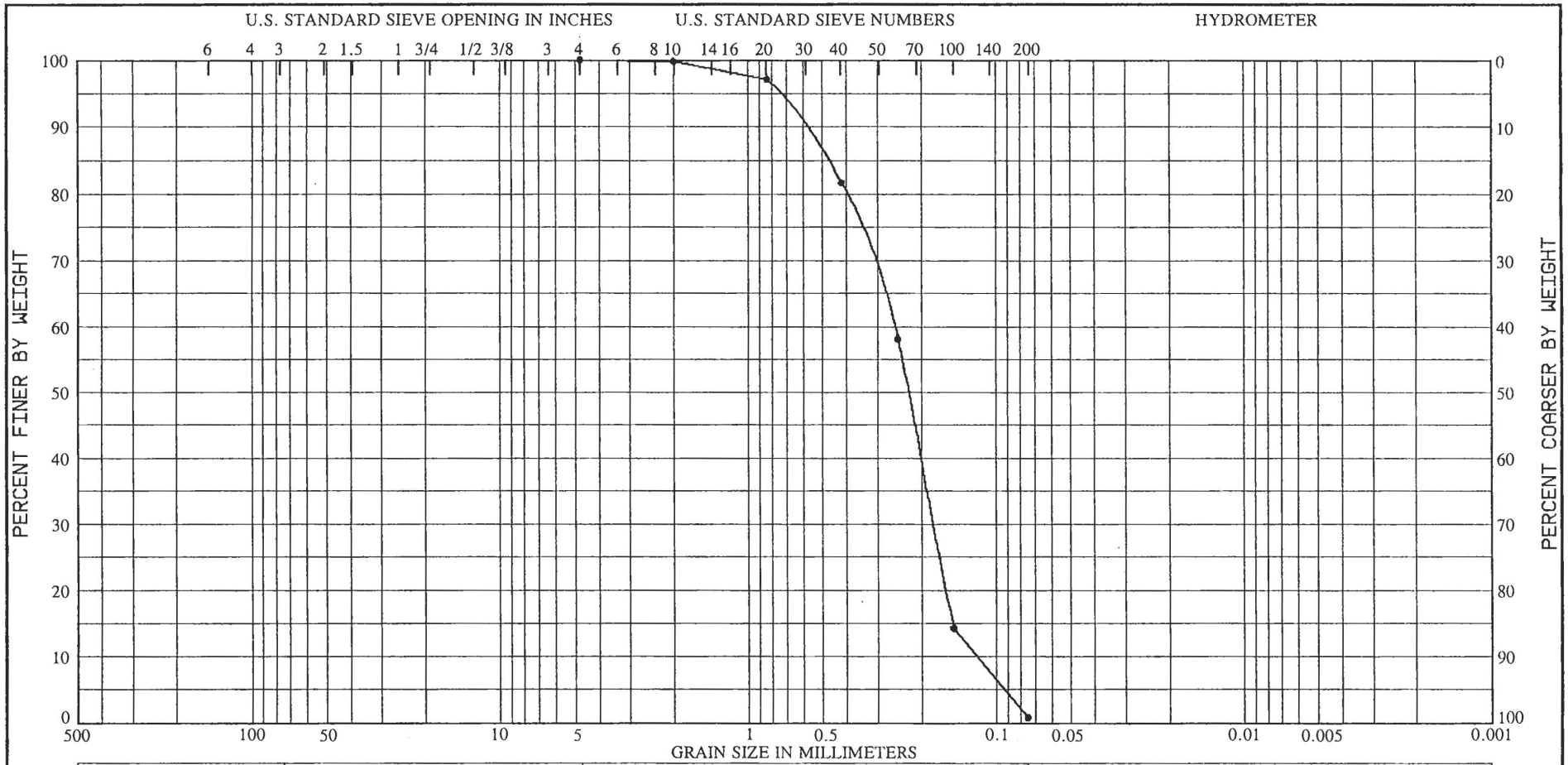
Fractional Components

% + 3 in. = 0.0 % GRAVEL = 5.6 % SAND = 93.6
% FINES = 0.8

D85= 1.15 D60= 0.632 D50= 0.546
D30= 0.4116 D15= 0.30690 D10= 0.27829
Cc = 0.9627 Cu = 2.2725

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.0 - 1.5	GRAYISH TAN, POORLY GRADED SAND (SP), WITH A TRACE OF SAND SIZE SHELL FRAGMENTS.	19.6			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6019
Hole No. SHI-13
Date 05/26/98

GRADATION CURVES

Hole No. SHI-14

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT 1 1

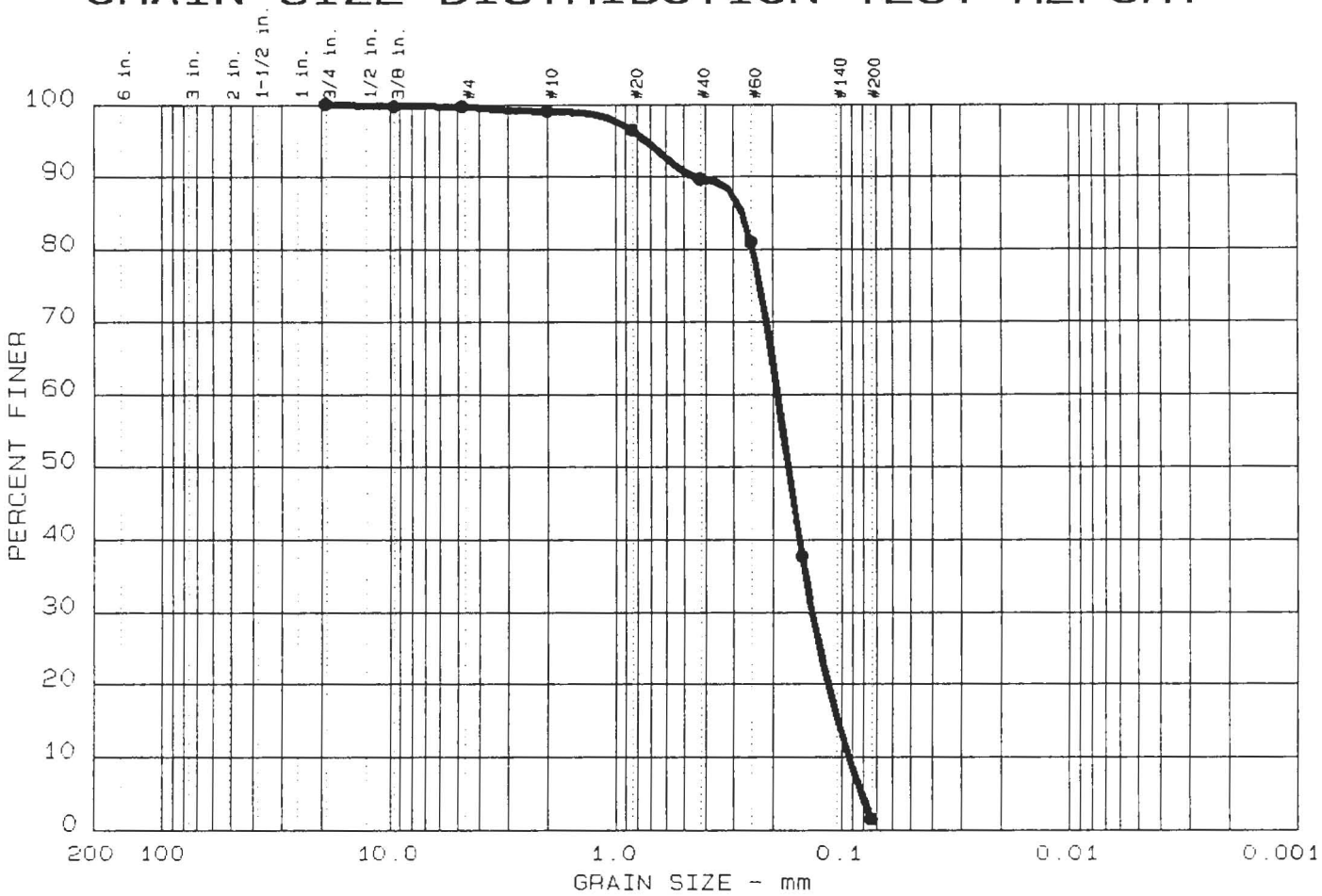
1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2188003 N 53643	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-14	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 4 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -11.4 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 13.8'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION -11.4	DEPTH 0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP-Tan, coarse poorly graded sand with shell fragments		1	Time Begon Vibracoring @ 14:00 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH.
	2					
			Gray		2	NOTE: Top of Hole at River Bottom
	4					
	6					LAB CLASSIFICATION Jar Number / Classification 2 SP 3 SP-SM 4 SC
	8					
-21.2	10		SM-Gray, fine to medium silty sand with shell fragments		3	
			With gray inorganic silt			NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal.
-23.2	12		ML-Grayish tan sandy silt with rock fragments		4	NOTE: The Vibracore run depth was not recorded.
-25.2	13.8		BOTTOM OF HOLE AT 13.8' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.
MAR 71

PROJECT SHALLOTTE INLET | HOLE NO. SHI-14

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.3	98.2	1.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.27	0.19	0.17	0.134	0.1036	0.0924	1.03	2.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Poorly Graded Sand with Shell Fragments	SP	

Project No.: 50160-8-0025-W01-830

Project: Shallote Inlet, Brunswick, NC

● Location: SHI-14 Jar Sample 1 @ 0.5-1.0 Ft.

Date: Feb.20, 1999

Remarks:

Tested by: CA JL

Reviewed by: HJ

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 2

Date: Feb.20,1999
Project No.: 50160-8-0025-W01-830
Project: Shallote Inlet,Brunswick,NC

Sample Data

Location of Sample: SHI-14 Jar Sample 1 @ 0.5-1.0 Ft.
Sample Description: Brown Poorly Graded Sand with Shell Fragments
USCS Class: SP
Liquid limit:
AASHTO Class:
Plasticity index:

Notes

Remarks: Tested by: CA JL Reviewed by: 4J

Fig. No.:

Mechanical Analysis Data

	Initial
Dry sample and tare=	327.11
Tare =	0.00
Dry sample weight =	327.11

Tare for cumulative weight retained= 0

Sieve	Cumul. Wt. retained	Percent finer
0.75 inches	0.00	100.0
0.375 inches	0.90	99.7
# 4	1.05	99.7
# 10	3.22	99.0
# 20	11.77	96.4
# 40	33.72	89.7
# 60	62.02	81.0
# 100	203.99	37.6
# 200	322.12	1.5

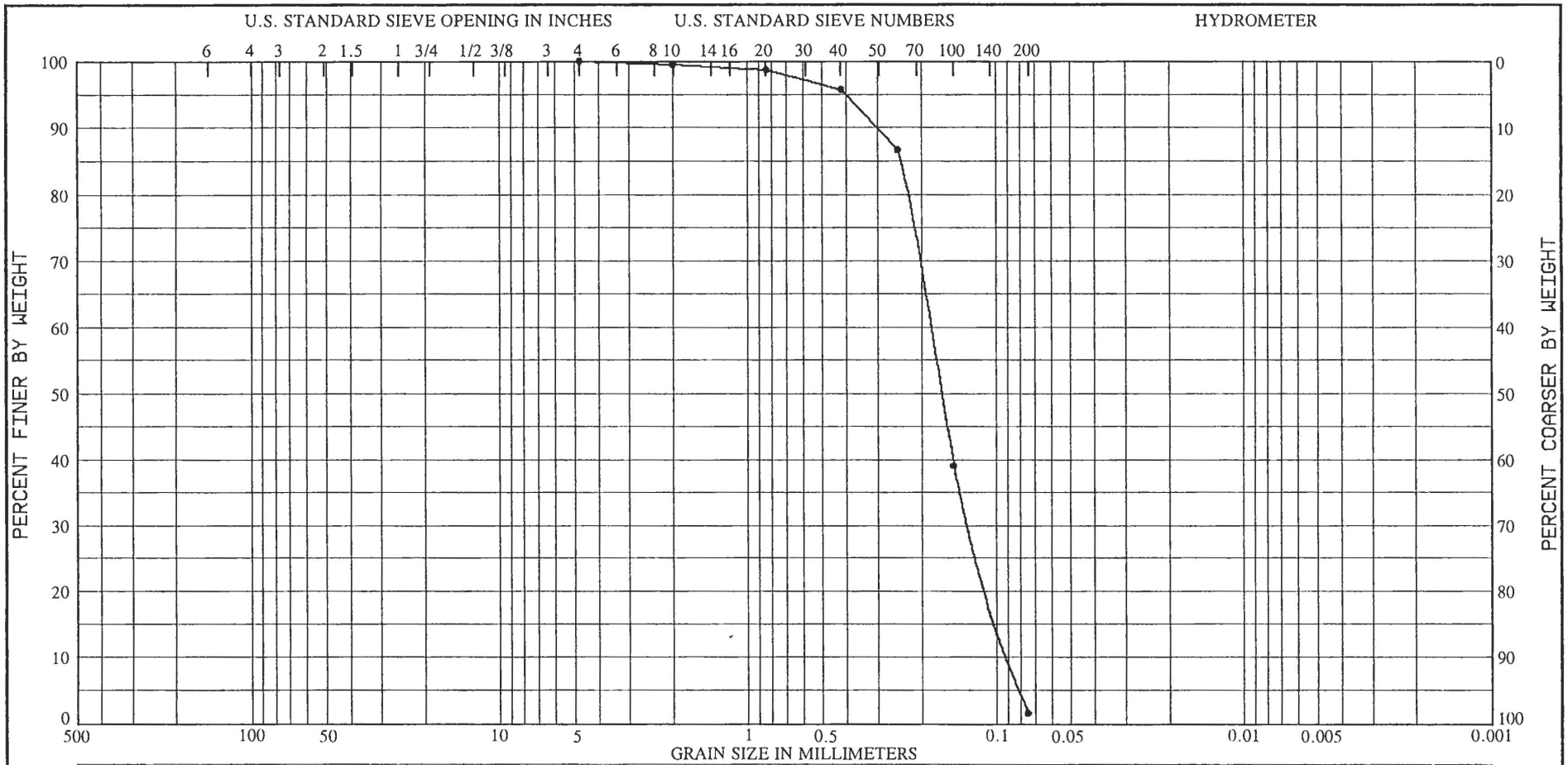
Fractional Components

% + 3 in. = 0.0 % GRAVEL = 0.3 % SAND = 98.2
% FINES = 1.5

D85= 0.27 D60= 0.191 D50= 0.171
D30= 0.1344 D15= 0.10363 D10= 0.09236
Cc = 1.0268 Cu = 2.0630

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

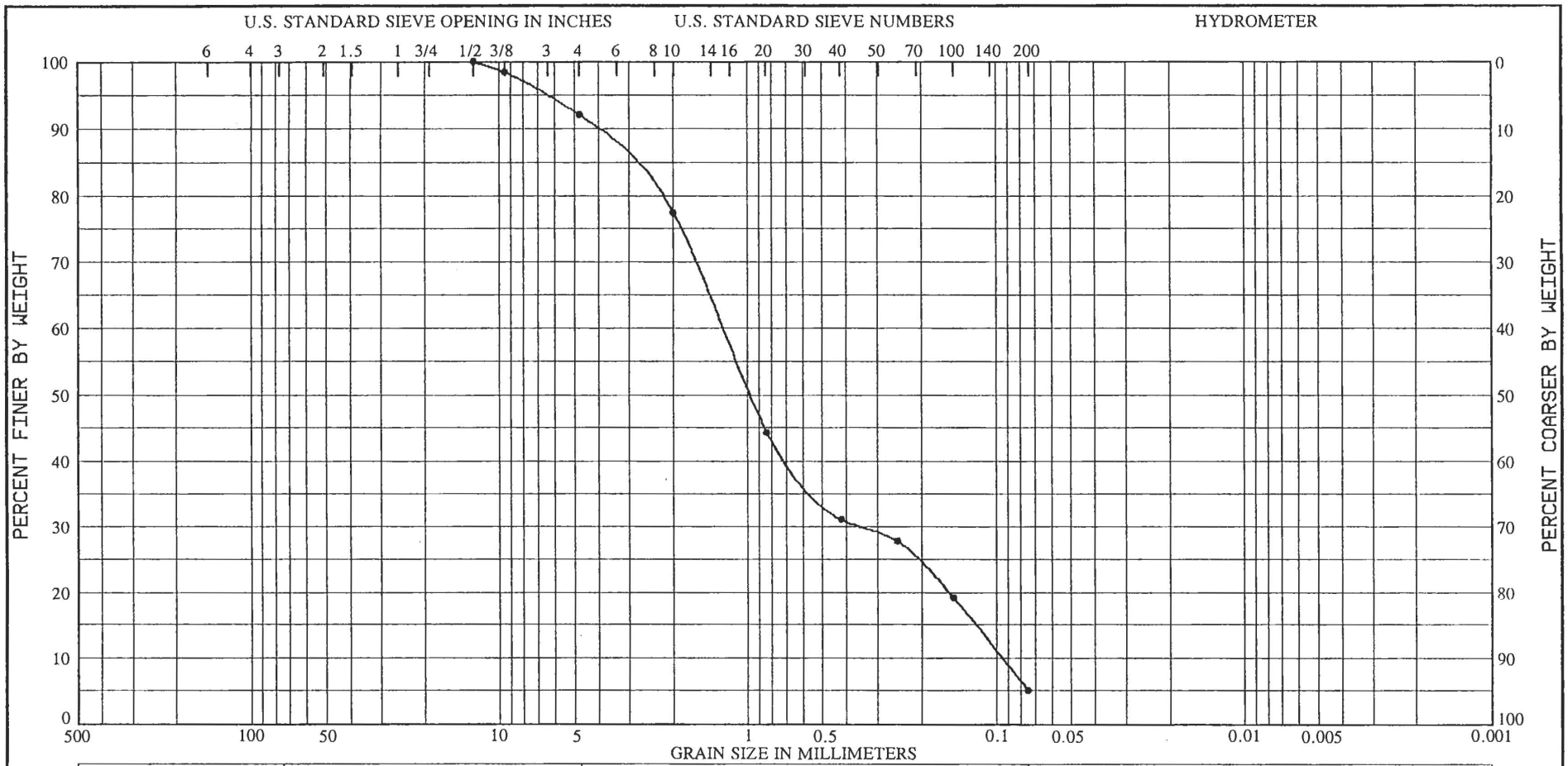
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	3.5 - 4.0	GRAYISH TAN, POORLY GRADED SAND (SP),	24.4			
		WITH A TRACE OF SAND SIZE SHELL				
		FRAGMENTS.				

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6020
Hole No. SHI-14
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

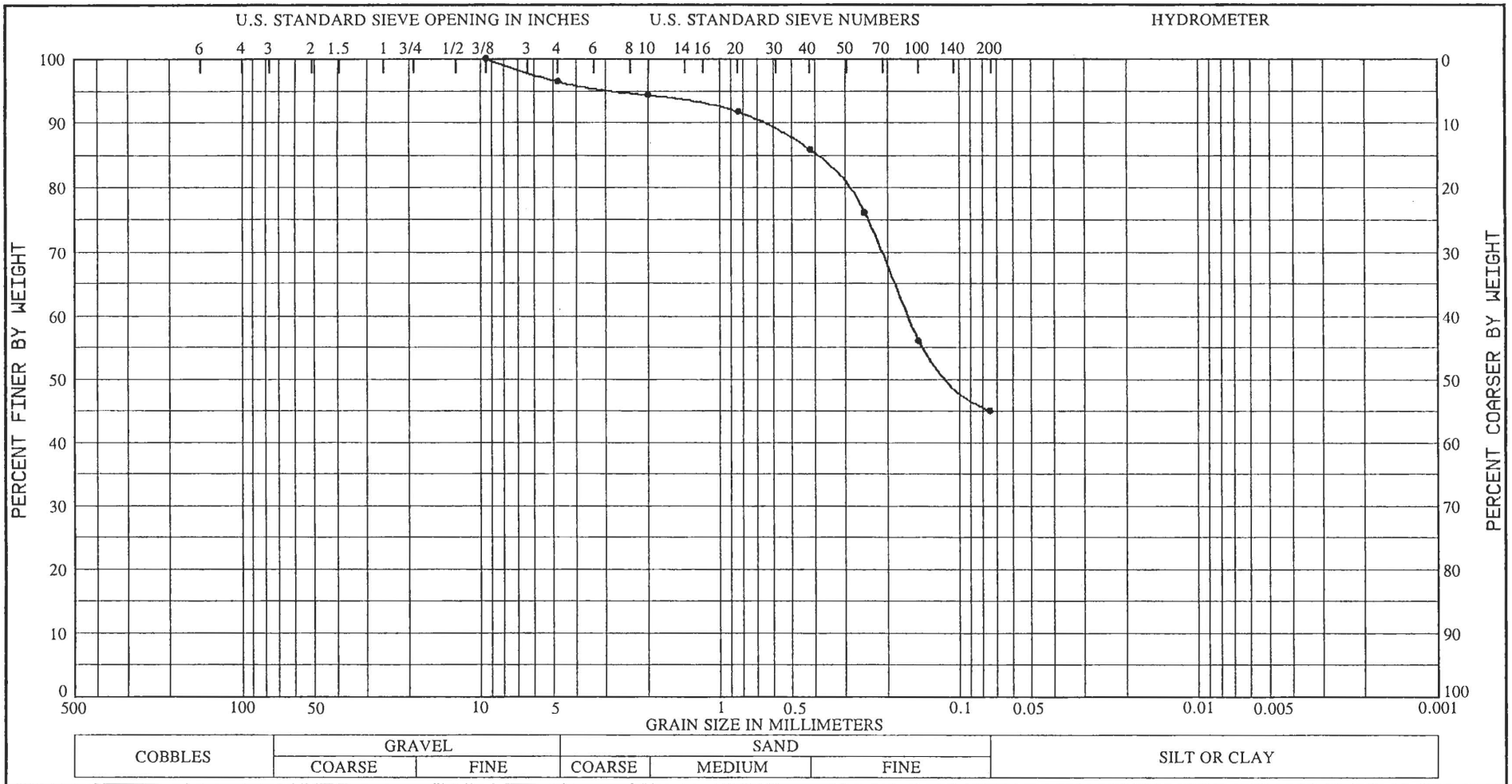
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	9.8 - 10.3	GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF GRAVEL SIZE AND A LITTLE SAND SIZE SHELL FRAGMENTS.	20.4			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6021
Hole No. SHI-14
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
4	12.0 - 12.5	GRAY, CLAYEY SAND (SC), WITH A TRACE OF GRAVEL.	27.9			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6022
Hole No. SHI-14
Date 05/26/98

GRADATION CURVES

Hole No. SHI-15

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2188632 N 53195	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-15	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 3 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -16.8 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 15.3'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION	DEPTH	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
-16.8	0		SP-Tan, coarse poorly graded sand		1	Time Began Vibracoring @ 13:25 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH. NOTE: Top of Hole at River Bottom LAB CLASSIFICATION Jar Number / Classification 1 SP 2 SP-SM 3 SC
	2					
	4					
-22.3	6		SM-Grayish tan, fine silty sand, trace of shell fragments		2	
	8		With shell fragments (Shell hash)			
-26.0			ML-Gray sandy silt with rock fragments		3	
	10					
	12					
	14					NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibrocore run depth was not recorded.
-32.1	15.3		BOTTOM OF HOLE AT 15.3' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

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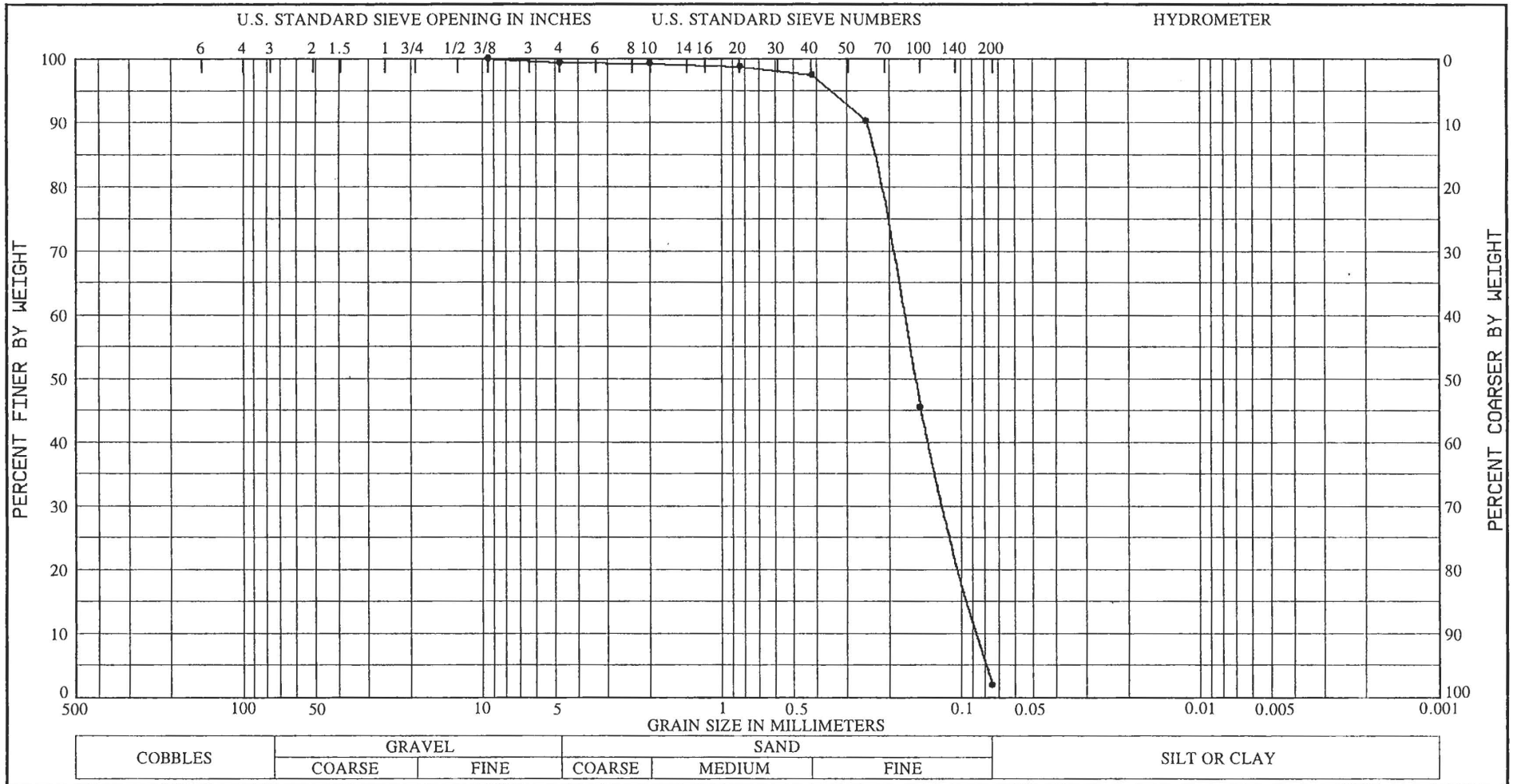
PROJECT SHALLOTTE INLET | HOLE NO. SHI-15

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



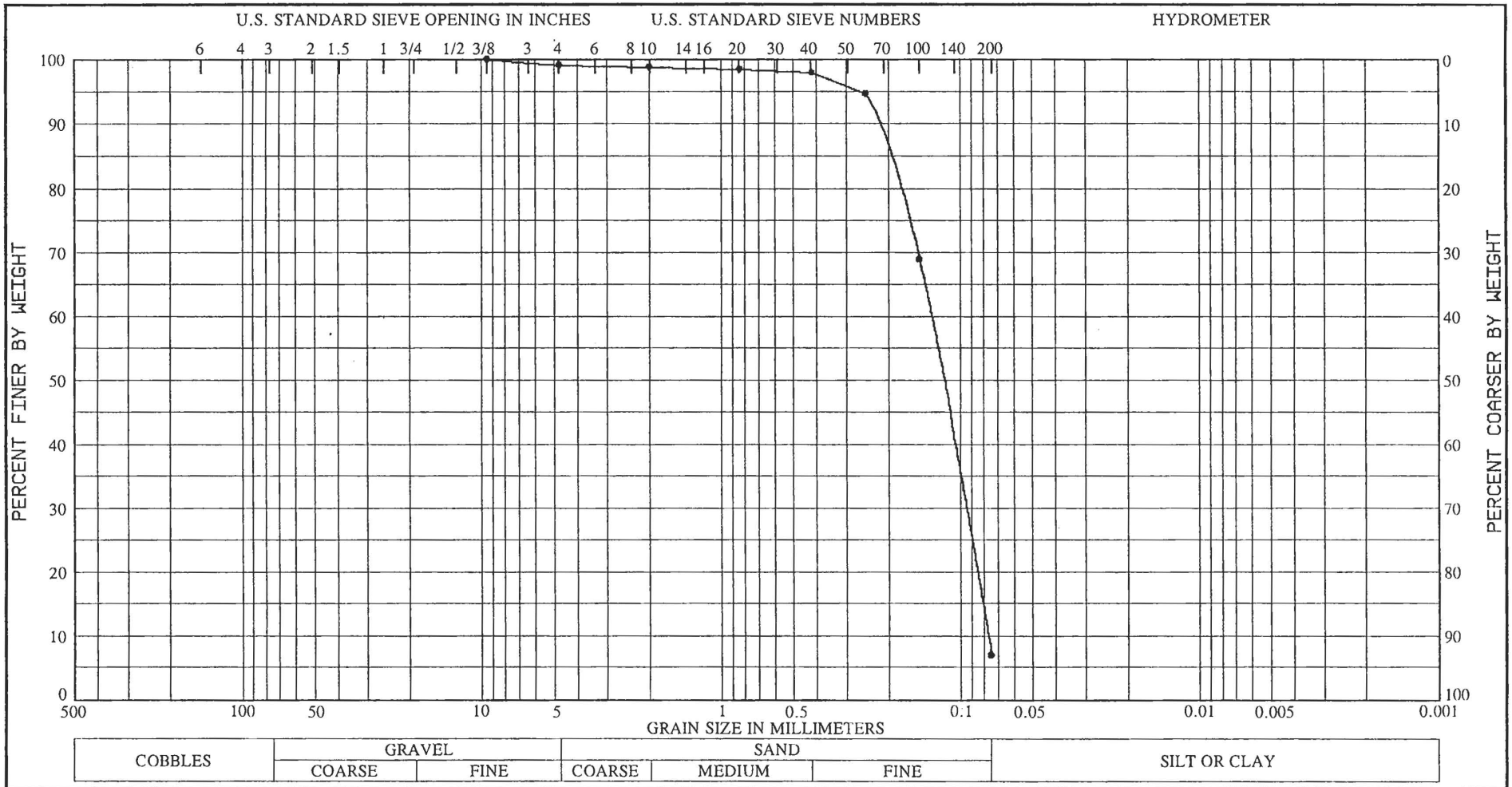
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.0 - 1.5	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF SAND SIZE SHELL FRAGMENTS.	27.4			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6023
Hole No. SHI-15
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	5.5 - 6.0	GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF SAND SIZE SHELL FRAGMENTS.	28.9			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6024
Hole No. SHI-15
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	9.2 - 9.7	GRAY, CLAYEY SAND (SC), WITH SOME GRAVEL.	26.3			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6025
Hole No. SHI-15
Date 05/26/98

GRADATION CURVES

Hole No. SHI-16

DRILLING LOG	DIVISION SOUTH ATLANTIC	INSTALLATION WILMINGTON DISTRICT	SHEET 1 OF 1 SHEETS

1. PROJECT SHALLOTTE INLET	10. SIZE AND TYPE OF BIT 4" VIBRACORE TUBE 20'
2. LOCATION (Coordinates or Station) E 2187394 N 52983	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW
3. DRILLING AGENCY WILMINGTON DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL VIBRA-CORE (SNELL)
4. HOLE NO. (As shown on drawing title and file number) SHI-16	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 3 UNDISTURBED 0
5. NAME OF DRILLER JERRY FULCHER	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE STARTED 2/5/98 COMPLETED 2/5/98
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE -17.3 Ft.
8. DEPTH DRILLED INTO ROCK 0.0'	18. TOTAL CORE RECOVERY FOR BORING N/A %
9. TOTAL DEPTH OF HOLE 12.0'	19. SIGNATURE OF INSPECTOR KEITH BENTON

ELEVATION -17.3	DEPTH 0	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP-Grayish tan, coarse poorly graded sand, trace of shell fragments		1	Time Began Vibracoring @ 13:00 hours NOTE: CLASSIFIED ON 3/4/98 BY LARRY BENJAMIN CIVIL ENGINEER TECH. NOTE: Top of Hole at River Bottom LAB CLASSIFICATION Jar Number / Classification 1 SP 2 SM 3 SC
	2					
	4					
	6					
-24.3			SM-Grayish tan fine silty sand with shell fragments		2	
-25.3	8		ML-Grayish tan, sandy silt with rock fragments		3	
	10					NOTE: Hole Terminated as necessary for convenience, predetermined depth, or assumed vibracore refusal. NOTE: The Vibracore run depth was not recorded.
-29.3	12		BOTTOM OF HOLE AT 12.0' SOILS ARE FIELD VISUALLY CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM			

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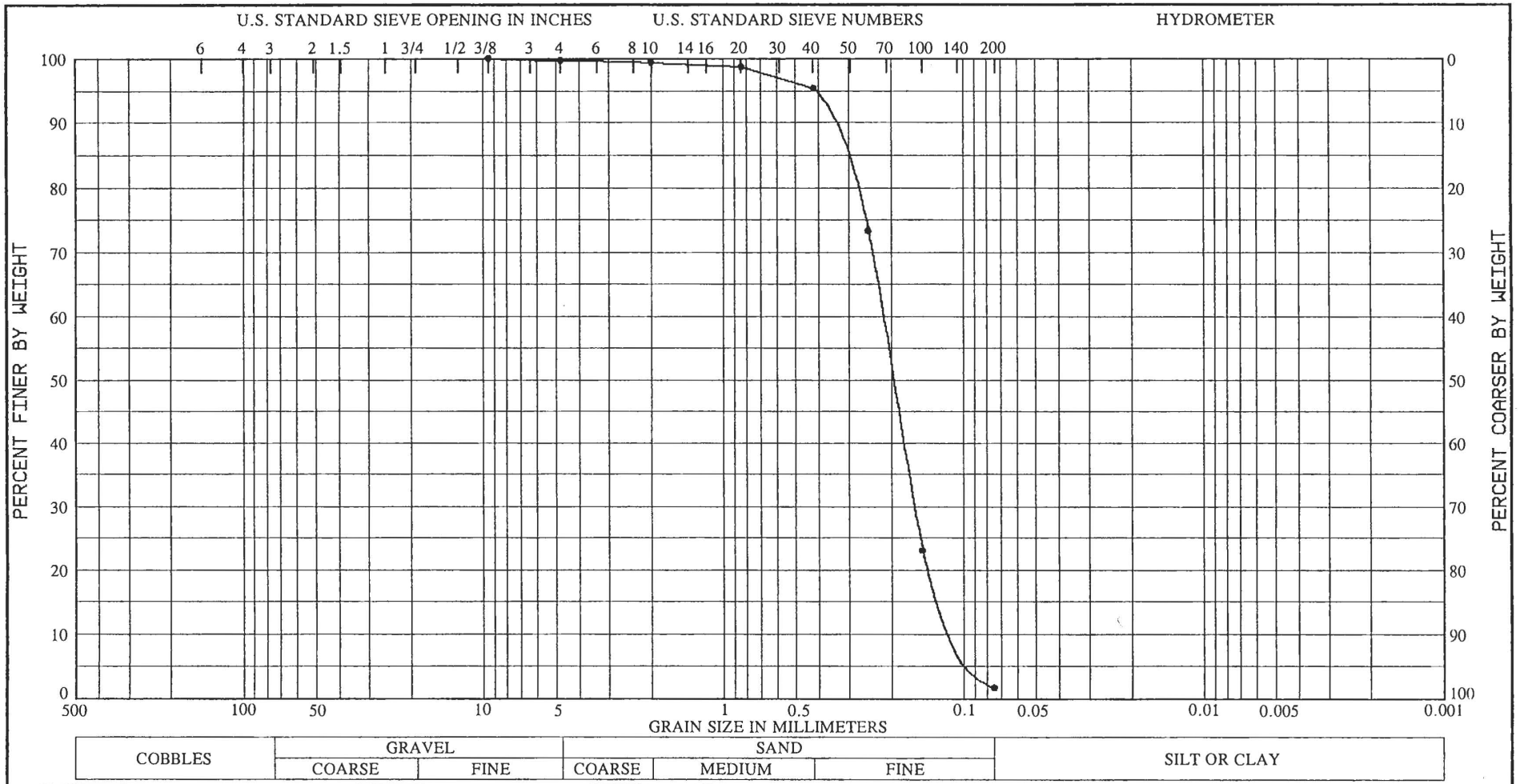
PROJECT SHALLOTTE INLET | HOLE NO. SHI-16

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

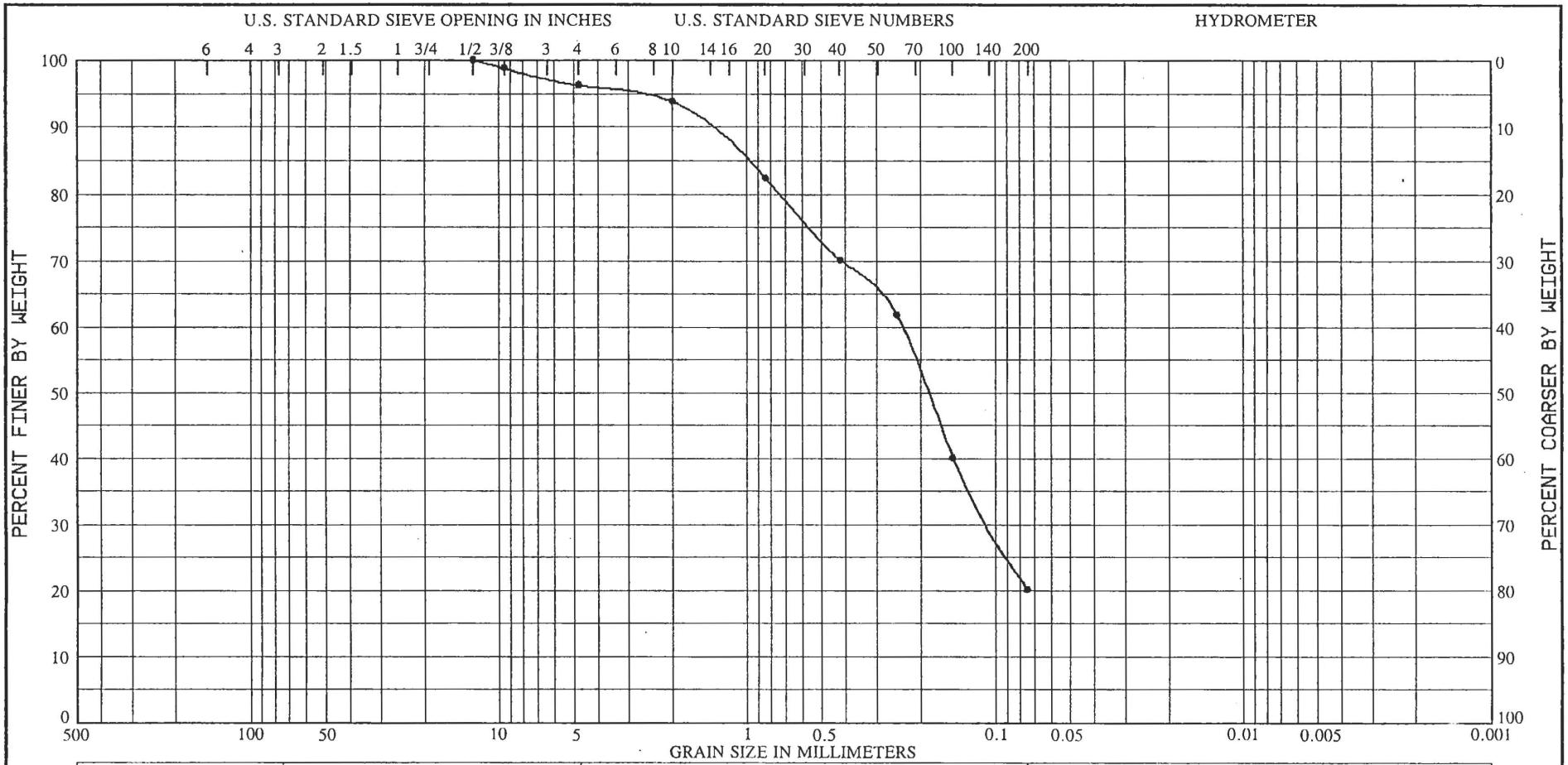
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.0 - 1.5	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF SAND SIZE SHELL FRAGMENTS.	28.4			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6026
Hole No. SHI-16
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

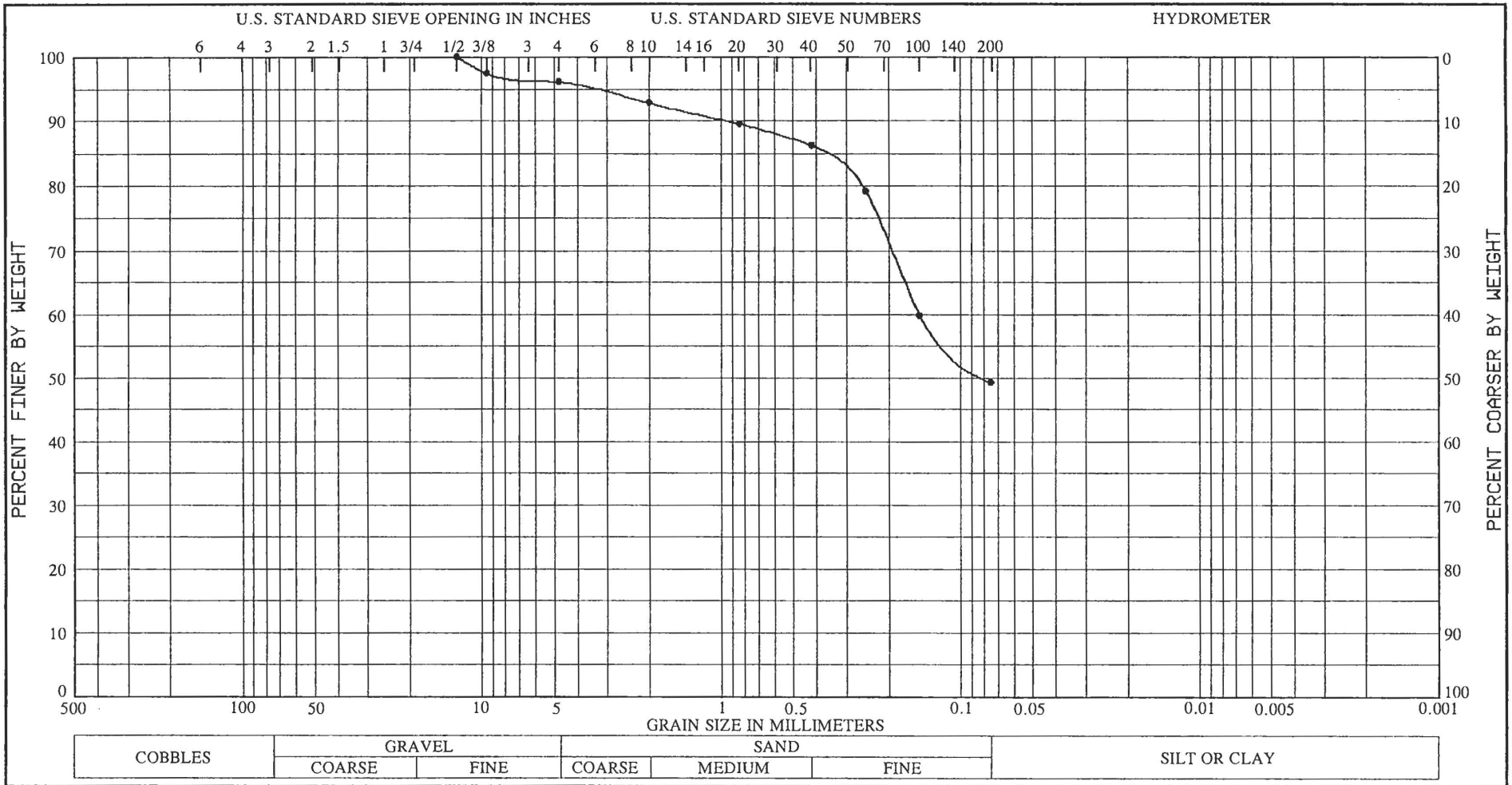
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	6.0 - 6.5	GRAY, SILTY SAND (SM), WITH A TRACE OF GRAVEL SIZE AND SAND SIZE SHELL FRAGMENTS, AND A TRACE OF MICA.	28.0			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6027
Hole No. SHI-16
Date 05/26/98

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8426
REQUISITION: W81LJ881245987



Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	7.0 - 7.5	GRAY, CLAYEY SAND (SC), WITH A TRACE OF GRAVEL.	22.8			

Project SHALLOTTE INLET
WILMINGTON DISTRICT
Lab No. 72/6028
Hole No. SHI-16
Date 05/26/98

GRADATION CURVES