



APPENDIX A SEDIMENT ANALYSIS



APPENDIX A

SEDIMENT ANALYSIS REPORT

Carteret County, North Carolina Sand Search Investigation

DRAFT Final Geotechnical Report

**Submitted to:
Moffatt & Nichol, Inc.**

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**August 23, 2012
Revised January 4, 2013
Final: March 1, 2013**



Executive Summary

This document presents the results of an advanced “Plans & Specs” level geotechnical investigation to identify the stratigraphy of potential borrow areas with beach-compatible sand to provide for future nourishment of Atlantic Ocean beaches in Carteret County, North Carolina. As part of the Moffatt & Nichol, Inc. (M&N) team, Coastal Tech herein presents the results of these investigations based upon offshore vibracores to delineate potential borrow areas with enough beach compatible sand to fulfill the long-term (up to 50 years) needs of Carteret County. M&N estimates this need at 15.7 to 26.9 million cubic yards (Mcy) over 30 years or 26 to 44.8 Mcy over 50 years.

Five main potential borrow areas were investigated – including (1) the main ebb channel of Bogue Inlet – a renewable source associated with maintenance of the inlet channel, (2) the Morehead City Outer Harbor – a renewable source associated with maintenance of the inlet channel, (3) the Current Ocean Dredge Material Disposal Site (ODMDS) in Federal waters offshore of Beaufort Inlet, (4) the Old ODMDS located directly north of the Current ODMDS across the Federal jurisdictional border in State waters, (5) Area Y, and (6) Area Z directly offshore of Emerald Isle in State waters. This investigation included the extraction of 164 twenty-foot vibracores in the Current and Old ODMDS, Areas Y and Z, and 5 ten-foot vibracores in Bogue Inlet by Alpine Ocean Seismic Survey, as well as bathymetric, seismic and backscatter surveys performed by Geodynamics offshore of Bogue Banks. Data from the Morehead City Outer Harbor were referenced from prior studies and reports by the USACE.

Based on analyses of these potential borrow areas, a total of approximately ~ 20 Mcy of sand from non-renewable offshore borrow areas is recommended for use as a sand source for nourishment of Carteret County beaches. These potential borrow areas are ranked “A”, where sufficient data is available to define the stratigraphy, and the data show that the borrow area material is consistent with the applicable State Rules and solidly compatible with the native beach. Approximately 1.4 Mcy of material was identified in what is ranked as “B” potential borrow areas due to lack of data or lower compatibility of the sediment. Finally about 2.2 Mcy of material is located in borrow areas ranked as “C” due to insufficient data or poor compatibility of material.

In addition to the non-renewable offshore borrow areas, several renewable borrow areas offer significant additional volumes of beach quality material. These include a possible ~15.3 Mcy over 30 years or about 25.5 Mcy over 50 years coming from maintenance of Bogue and Beaufort Inlets.

The total estimated volume available from the non-renewable and renewable borrow areas totals about 35 Mcy available over 30 years, or 45 Mcy over 50 years. These volumes meet the estimated long-term needs of the County.

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1.0 Offshore Borrow Area Investigation

1.1 Scope of Investigation

Coastal Tech was contracted by Moffat & Nichol, Inc. (M&N) to assimilate and review geotechnical investigation results associated with the Bogue Banks Master Beach Nourishment Plan and to identify beach-compatible sand resources for the long term beach-nourishment needs of Carteret County (County). M&N estimates the volume of sediment required to meet the 50-year needs of the County is between 26.0 and 44.8 million cubic yards (Mcy), while the required volume to meet the 30-year needs of the County is estimated to be between 15.7 and 26.9 Mcy. Coastal Tech herein examines the sand resources offshore of Carteret County located within the current and former Ocean Dredge Material Disposal Site (ODMDS), Bogue Inlet channel, the Morehead City Harbor outer channel, and Areas Y and Z, which are directly offshore of Emerald Isle in State waters. Figure 1.1 illustrates the location of these potential borrow areas and the general domain of this investigation. This document presents and summarizes results of the geotechnical investigation and delineates potential borrow areas for future nourishment of Carteret County beaches.

1.2 Geologic Setting

Bogue Banks is a southward facing barrier island located adjacent to Cape Lookout on a lower energy east-west trending shoreline in Onslow Bay. At 25.4 miles long, the island is the longest and widest in southeastern North Carolina (Cleary and Pilkey, 1996). Beaufort Inlet, which has a Federally maintained navigation channel, borders the island on the east, while the shallow draft Bogue Inlet borders the island on the west. The backbarrier of Bogue Banks features Bogue Sound, which is an open water lagoon with considerably less marsh vegetation than the backbarriers to the south (Cleary and Pilkey, 1996). Influx into Bogue Sound includes sources such as the White Oak River on the west and the Newport River on the east. The island is characterized by mature dunes with foredune elevations up to 33 feet NAVD88 (Kana et al., 2002). These higher oceanfront elevations impede washovers that would typically provide sedimentation to the backbarrier on which vegetation would take hold. Bogue Banks was at one time a regressive barrier from approximately 3000 years-before-present (ybp) to 1100 ybp, after which time the absence of overwash material to the backbarrier led to backbarrier erosion and island narrowing with periodic breaching along the central portion of the island (Elliot, 2010). Initiation of overwash is the precursor to an island becoming transgressive (Cleary and Pilkey, 1996; Elliot, 2010).

The shoreface of Onslow Bay seaward of Bogue Banks is characterized by the outcropping of middle Tertiary sediments where barrier island transgression and sea-level rise has resulted in the removal of the majority of the more modern sediments (Hine and Snyder, 1984). Relic channels of Pleistocene and Holocene age incise the upper shoreface, but terminate where the edge of the modern sediments meets these exposed Tertiary sediments in the nearshore (Hine and Snyder, 1984).

Bogue Inlet, which separates Bogue Banks from Bear Island, occupies one of these historic channels incised by the White Oak River during lower sea level (Hine and Snyder, 1984). Bogue

Inlet is periodically dredged with a sidecast dredge by the US Army Corps of Engineers to maintain safe navigation. The inlet channel generally migrates eastward with associated spit growth on the updrift side. In 2005, the inlet channel was realigned to a more shore normal direction in an effort to provide the most beneficial orientation for the adjacent shorelines and alleviate erosion on the Emerald Isle shoulder (CPE, 2004).

Beaufort Inlet hosts the Morehead City Harbor and is Federally maintained as a deep draft port. The outer harbor is dredged to a depth of -47 feet NAVD88 with more shallow draft portions in the inner harbor. Sedimentation into the Morehead City Inner Harbor is from numerous sources, including the Newport River and the North River (USACE, 2001). Many references suggest that Beaufort Inlet has been recognized on maps since the 1600's (for example, Fisher, 1962; Wells and McNinch, 2001). The inlet has been dredged for navigation purposes since 1911 (Olsen, 2006) and is stabilized by a terminal groin at Ft. Macon.

The beaches of Bogue Banks are subject to the erosive forces of tropical systems or hurricanes, the effects of the adjacent inlets, and to a lesser extent due to their south-facing orientation, winter frontal storms or "nor'easters".

1.3 Previous Investigations

There have been many prior investigations of potential sand resources both offshore of Carteret County and within the adjacent inlets. The different segments of Morehead City Harbor were examined within Beaufort Inlet to determine whether the dredged material would be suitable for beach placement (USACE, 2001; USACE, 2009; USACE, 2010; Olsen, 2006). It was determined that material within the Inner Harbor was likely to contain silt in excess of 10% by weight, and thus be non-compatible with the native beach, while the Outer Harbor and main inlet channel produced beach quality material (USACE, 2010).

Coastal Science and Engineering (CSE) investigated the Current Ocean Dredged Material Disposal Site (Current ODMDS) in association with emergency fill projects for Emerald Isle, Indian Beach, and Pine Knoll Shores following Hurricanes Isabel and Ophelia. CSE developed a borrow area in the northern portion of the Current ODMDS with 14 vibracores in 2006 (CSE, 2007). Olsen and Associates also completed a desk-top estimation of the volume of beach quality material that may be available in the Current and Old ODMDS (Olsen, 2006).

Prior to the channel realignment in Bogue Inlet in 2005, Coastal Planning and Engineering (CPE) took jet probes and vibracores within the proposed channel template, which demonstrated that the material was suitable for beach placement (CPE, 2004). Additionally, in 2008 the USACE took vibracores within the inlet backbarrier in the Atlantic Intracoastal Waterway channel; the results of which indicate that this material is suitable for beach placement when dredging is required (Ben Lackey, personal communication).

CSE performed a multi-phase offshore sand search in association with the Bogue Banks Beach Nourishment Project where CSE attempted to find beach quality material in close proximity to the project areas. CSE extracted and analyzed vibracores from borrow areas offshore of central Emerald Isle to Pine Knoll Shores, including areas it identified as borrow areas A and B (CSE,

2001). In 2002, offshore of Bogue Banks, an extensive grid of vibracores was taken by the USACE. These core logs and sediment analysis results were obtained by the M&N Team for the purpose of planning this Plans & Specs level field investigation.

1.4 Bathymetric Survey

Data from two separate bathymetric surveys were utilized throughout this report to calculate the total estimated volume of sediment within a proposed borrow area above the designated cut elevation. These multibeam bathymetric surveys were performed by Geodynamics in 2009 and 2011. The 2009 data set covers the Old Ocean Dredge Material Disposal Site and Bogue Inlet, while the 2011 survey covers the currently active Ocean Dredge Material Disposal Site and Area Y. The two data sets were successfully merged by Geodynamics and the data set that was utilized for each volume calculation is referenced throughout this report for clarity. The location and elevation of all data were collected and reported using the North Carolina State Plane (NAD83), U.S. Survey Feet horizontal datum and NAVD88 vertical datum. Survey lines through each potential borrow area were spaced at 200-foot intervals and soundings were collected continuously with a maximum point spacing of 10-foot along the profile line (Geodynamics, 2011).

1.5 Seismic and Backscatter Surveys

A seismic survey was conducted by Geodynamics, under contract with M&N, in July 2011 for the purpose of establishing the extent of the upper layer of sand throughout the Current ODMDS and Area Y. This survey was performed simultaneously with the multibeam backscatter and bathymetry surveys. Data from 2009 Geodynamics surveys were used for the Old ODMDS, Area Z and Bogue Inlet. Sub-bottom profile data were collected and analyzed for acoustic reflectors and anomalies that can indicate the presence and quantities of beach re-nourishment resources. Multibeam backscatter surveys were conducted to identify surficial anomalies as well as the presence of hardbottom. All surveys were conducted in accordance with State and Federal regulations (Geodynamics, 2011).

1.6 Geotechnical Investigation

In December 2012, a total of 164 20-foot vibracores were extracted by Alpine within the potential offshore borrow areas including the Old ODMDS, the Current ODMDS, Area Y, and Area Z. In April 2012, five 10-foot vibracores were taken in Bogue Inlet channel. The locations of these vibracores are shown in Figure 1.1. Vibracore locations were designed to define the stratigraphy of the potential borrow areas including the horizontal and vertical extent of the upper layer of sand in each area, and to meet current and future state rules for sediment investigations. Historical data were reviewed from a series of existing vibracores from across the nearshore of Onslow Bay previously obtained in association a USACE study performed in 2002. These data included general vibracore logs, as well as granulometric data from representative sediment samples.

Representative samples from the 2012 vibracores were analyzed in Coastal Tech's *Coastal Geology and Sediments Lab* to characterize texture and composition. Potential borrow area boundaries were refined from that previously outlined in prior studies, using the bathymetric, seismic survey data, vibracore logs and sedimentologic sample data.

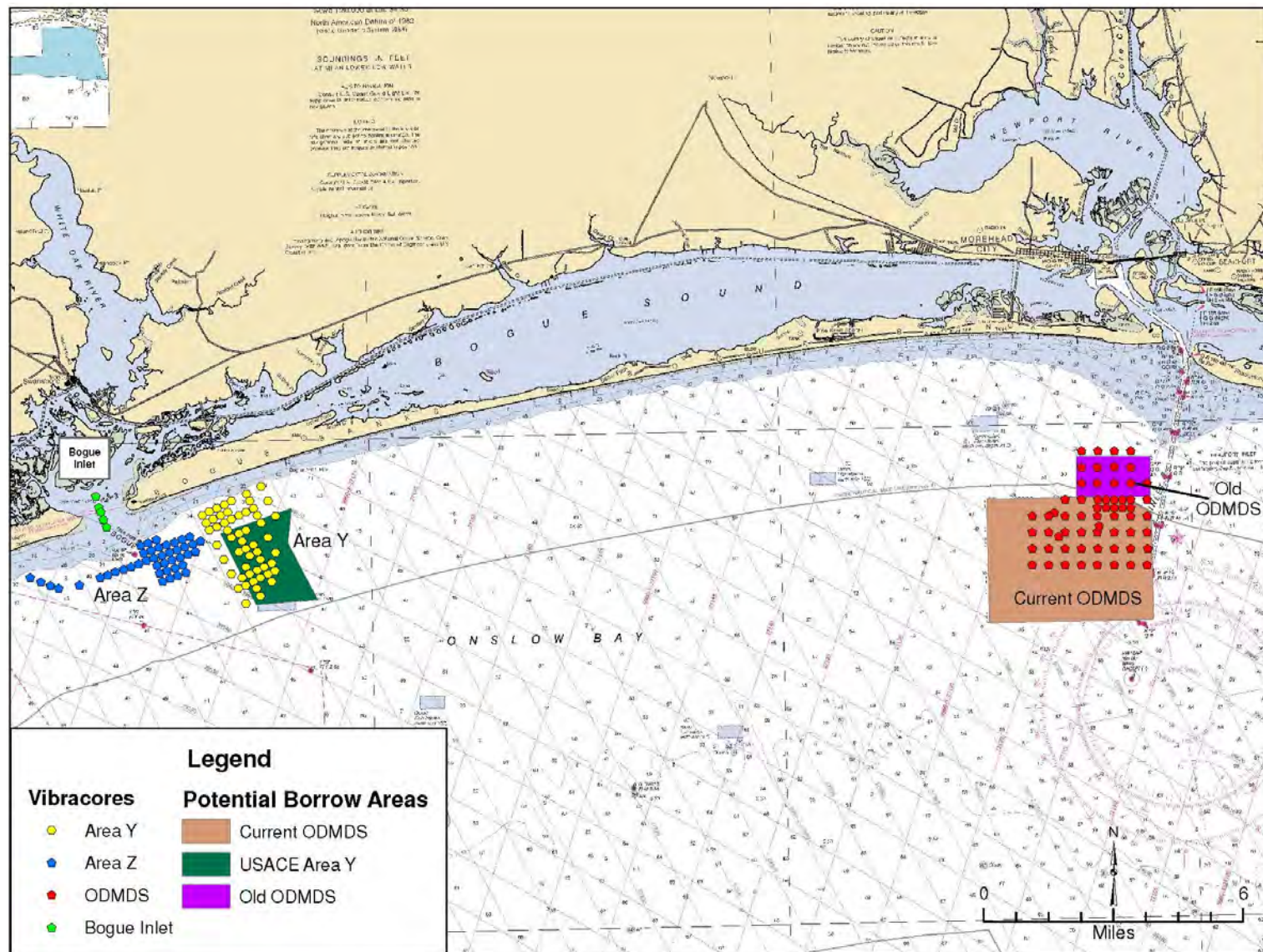


Figure 1.1 – Location of Potential Borrow Areas & 2012 Vibracores

boundaries were refined from that previously outlined in prior studies, using the bathymetric, seismic survey data, vibracore logs and sedimentologic sample data.

2.0 Laboratory Analyses

A total of 599 representative sediment samples were obtained by Alpine from the 2012 vibracores and transferred to Coastal Tech's *Coastal Geology and Sediments Lab* in Melbourne, Florida. These samples were analyzed using standard laboratory methods to characterize texture and composition. Sediment texture was quantified using nested sieves consistent with USACE procedures, and described in accordance with the Unified Soils Classification (USC) System. These methods are consistent with State Rules, including Rule 15A NCAC 07H.0312 Technical Standards for Beach fill Projects.

Gradation analysis was performed using 20 sieves ranging from -4.25 ϕ to +4 ϕ at $\frac{1}{2}\phi$ intervals, including the -2.25 ϕ and +3.75 ϕ sieves. Samples that appeared to contain flocculated fines were wet sieved prior to dry sieving. This entailed obtaining a dry sample weight, soaking the sample in a 5% $(\text{NaPO}_3)_6$ solution overnight, washing the sample over a #230 sieve, and obtaining a new dry weight to accurately quantify the amount of fines in the sample. The samples that contained fines in excess of 5% or more by weight passing through the #200 sieve were assigned a Unified Soils Classification Code on the basis of visual examination by a registered professional geologist.

Composition was determined through Loss on Ignition. This process entails burning a ~20g sample in a crucible at 550°C for two hours to burn off the organic material, and again at 1000°C for three hours to burn off the calcium carbonate material. The weight percent lost after the 550°C burn corresponds to the weight percent organic material in the sample. The weight percent lost after the 1000°C burn corresponds to the amount of CO_2 burned off of the CaCO_3 molecules in the sample. The molecular weight of the CO_2 molecule is 44% of the molecular weight of the CaCO_3 molecule, so the weight loss is then multiplied by 2.27 to ascertain the percent CaCO_3 that was in the sample.

Laboratory results of the sediment sample analyses conducted by Coastal Tech are summarized throughout the report and provided in digital format (see enclosed discs) within this report as follows:

- Appendix 1 – CD-ROM containing 2012 Alpine Ocean Seismic Survey report with Coastal Tech sediment results
- Appendix 2 – CD-ROM Containing gINT and Other Digital Files

3.0 Native Beach

Previous sampling and analysis of native beach sediments was utilized to determine compatibility of the potential borrow areas with Carteret County beaches. In 2001, CSE obtained 64 samples from the dune, berm beachface, and low tide terrace at 16 evenly spaced transects between stations 48 and 78. Four of these dune samples were excluded from this analysis because the samples were obtained from dunes that were formed with sand excavated from the

lower beach, and do not reflect sand naturally occurring in the dune. The 28 samples from adjacent transects were physically combined and analyzed together to define the composite characteristics of the native beach. These data represent the beach characteristics prior to the Bogue Banks Beach Restoration projects in 2002 (Phase I) and 2003 (Phase II). The resulting native beach composite is fine grained, moderately well sorted quartz sand with less than 1% fines and less than 2% gravel. The CSE report indicates that the material had an average of 15-20% shell content. The composite has a mean grain size of 0.30 mm (CSE, 2001).

The proposed borrow area material must meet the characteristics prescribed by North Carolina Administrative Code “Technical Standards for Beach Fill Projects” (15A NCAC 07H .0312) herein referred to as the “Rule”. The Rule requires that the weight percent fines, gravel and granular size material not exceed the native beach weight percent by more than 5%. However, if the material is dredged from a federally maintained navigation channel the Rule only stipulates that it must contain less than 10% fines by weight. In addition, the weight percent calcium carbonate may not exceed the native by more than 15%. The native beach characteristics and the resulting parameters required of the borrow material are shown in Table 3.1.

Characteristic	2001 Native	Rule Requirements	Required Borrow Site Parameters
Fines <#230	Reported: 0%, Assumed: <1%	<1% + 5%	≤ 6%
Sand (> #230 & <#10)	Reported at 98.68%	-	-
Granular (>#10 & < #4)	Reported combined at 1.32%, Assumed 0.7% each	0.7% + 5%	≤ 6%
Gravel (>#4)		0.7% + 5%	≤ 6%
Calcium Carbonate	Reported at 15-20%	20% + 15%	≤ 35%

Table 3.1 – Native Beach Characteristics and Rule Parameters

4.0 Borrow Area Delineation and Compatibility Analysis

Potential borrow areas were delineated, and compatibility for use as beach fill was assessed based upon the following:

- (1) vibrocore sedimentology (i.e., texture and composition), and stratigraphy,
- (2) volume weighted composite vibrocore and borrow area granularmetrics and organic / carbonate contents – from 2012 vibrocores,
- (3) the composite native beach granularmetrics,
- (4) the Rule parameters (Table 3.1), and
- (5) the Overfill Factor (R_a) per the *Coastal Engineering Manual* (USACE, 2002).

Note that borrow area composites were formulated using only data from vibrocores obtained by Alpine under contract with M&N in 2012. Data from vibrocores obtained by USACE in 2002 and others were consulted for general consistency and compatibility, but were not included in the calculation of composites presented herein because these potential borrow areas were adequately covered with modern cores.

Surficial sediments within potential borrow areas are assessed based on overall sediment quality. Sediment in the upper layer of each vibrocore is characterized as either:

- Good - if the samples in this layer have low fines and gravel size content (<3%), appear to be light in color per the core photographs, and the layer thickness would be worth dredging (>3 feet);
- Poor - if the samples in the upper layer contain appreciable fines or gravel (>5%), were very dark in color in the core photographs, or if the upper layer was very thin (<2 feet);
- Moderate: if any of the sample characteristics were between “Good” and “Poor”.

Color-coding (Good = green; Poor = red; Moderate = orange) these vibrocore characterizations in the plan-view maps assisted in visually determining where there were clusters of “Good” material from which borrow areas could be delineated after further study of the full granulometrics. These color codes are shown in some of the plan-view figures in this report.

The potential borrow areas are delineated around clusters of “Good” vibrocores, where a proposed cut-depth was identified at 2 feet above the underlying non-compatible material. Composite characteristics were then calculated for each area and compatibility with the native beach was assessed. Each sample was weighted within the vibrocore to develop vibrocore composite characteristics, and each vibrocore composite was weighted within the potential borrow area to develop potential borrow area composite characteristics. Textural compatibility was assessed by comparison of composite sample mean grain sizes, grain size distribution, and sorting coefficients for the native beach and each potential borrow area.

Potential borrow areas are ranked based on (a) confidence in the stratigraphy per the available vibrocore data, and (b) the quality and compatibility of the potential borrow area material with the native beach sediments and the Rule - per the following:

- A - If the stratigraphy of a potential borrow area is well defined, and the material is highly compatible with the native beach and the Rule, it is ranked as an “A” level borrow area.
- B - If a potential borrow area needs some more vibrocores to confidently define the stratigraphy, has a moderately high overfill factor, and/or may have a characteristic that is slightly out of compliance with the Rule, it is given a “B” ranking.
- C - Finally, if a potential borrow area has insufficient data to define the stratigraphy, has a high overfill factor, and/or poor or questionable compatibility of material with the native beach, it is given a “C” ranking.

A preliminary maximum cut elevation was selected for each vibrocore where the sample analyses indicated sediment consistent with the Rule. This cut elevation was established to be two feet above the boundary with non-compatible material. This two foot buffer is often used in practice to provide for a margin of error in dredging, recognize uncertainties in extrapolation of conditions from core to core, and ultimately to avoid dredging of non-compatible material. Once all maximum cut elevations were delineated for each vibrocore, the investigation areas were divided into separate potential borrow areas where the vibrocores point to a similar cut elevation. A final cut elevation was selected for each potential borrow area based on the lowest common cut elevation that still allowed for a two foot buffer above non-compliant material.

The Overfill Factors shown in Appendix 4 and summarized in this report were calculated for reference, but the compliance of material with the Rule is the basis used herein for delineation or exclusion of potential borrow areas. The Overfill Factor is a common design element in coastal engineering practice used for simple comparison of potential borrow source material to native beach material. The Overfill Factor seeks to estimate, based on grain-size distributions, what volume of borrow source fill is necessary to functionally replace a “unit” of native beach sand. The Overfill Factor was estimated via methods prescribed by the USACE *Coastal Engineering Manual* and was calculated for each potential borrow area.

Conceptual geologic cross sections were drawn for the Ocean Dredge Material Disposal Site as determined through examination of the vibracore sediment samples and interpolation of likely stratigraphy between the cores. The stratigraphy within the Ocean Dredge Material Disposal Site is not naturally occurring, and is meant only to show the extent of the surficial (uppermost) layer of sediment. In these cross-sections the vibracore is presented with the actual Unified Soil Classification (USC) code represented in the stratigraphy within the core, while the stratigraphy between the cores is presented as a USC code that generalizes the nature of the adjacent strata for ease of interpretation. For example, adjacent samples may differ in USC code based on a slight percentage difference in fines or gravel, so the most common USC code (from all the surrounding cores) is chosen to represent the stratigraphy between cores.

Potential borrow area composite and compatibility data calculated by Coastal Tech are provided within this report as follows:

- Appendix 3 – Potential Borrow Area Composite Curves
- Appendix 4 – Potential Borrow Area Overfill Factor Calculations

4.1 The Old ODMDS

The previously utilized dredge disposal area referred to herein as the Old ODMDS is located directly north of the currently utilized disposal area. The two are separated by the approximate State/Federal water jurisdictional boundary located three miles offshore. The largest mound of disposal material straddles the boundary between the Old ODMDS in State waters and the currently active ODMDS in Federal waters (Figure 4.1). The majority of this mound is located within the boundaries of the Old ODMDS. This mound was separated into two potential borrow areas, designated Old ODMDS 1 and Old ODMDS 2 (Figure 4.2), with cut depths that differ by one foot; this separation maximizes the potential borrow area volume, while still maintaining a two foot buffer above non-compatible material.

4.1.1 Old ODMDS 1

The largest portion of the mound was designated Old ODMDS 1 (Figure 4.2). The majority of disposal material appears to be clean sand, while the material below roughly -54 feet NAVD88 contains >6% silt, which is not compliant with the Rule parameters and therefore not compatible with the native beach. Figure 4.3 exhibits the conceptual stratigraphy of the main ODMDS mound based on the vibracores extracted. Using a maximum cut to elevation -52 feet NAVD88,

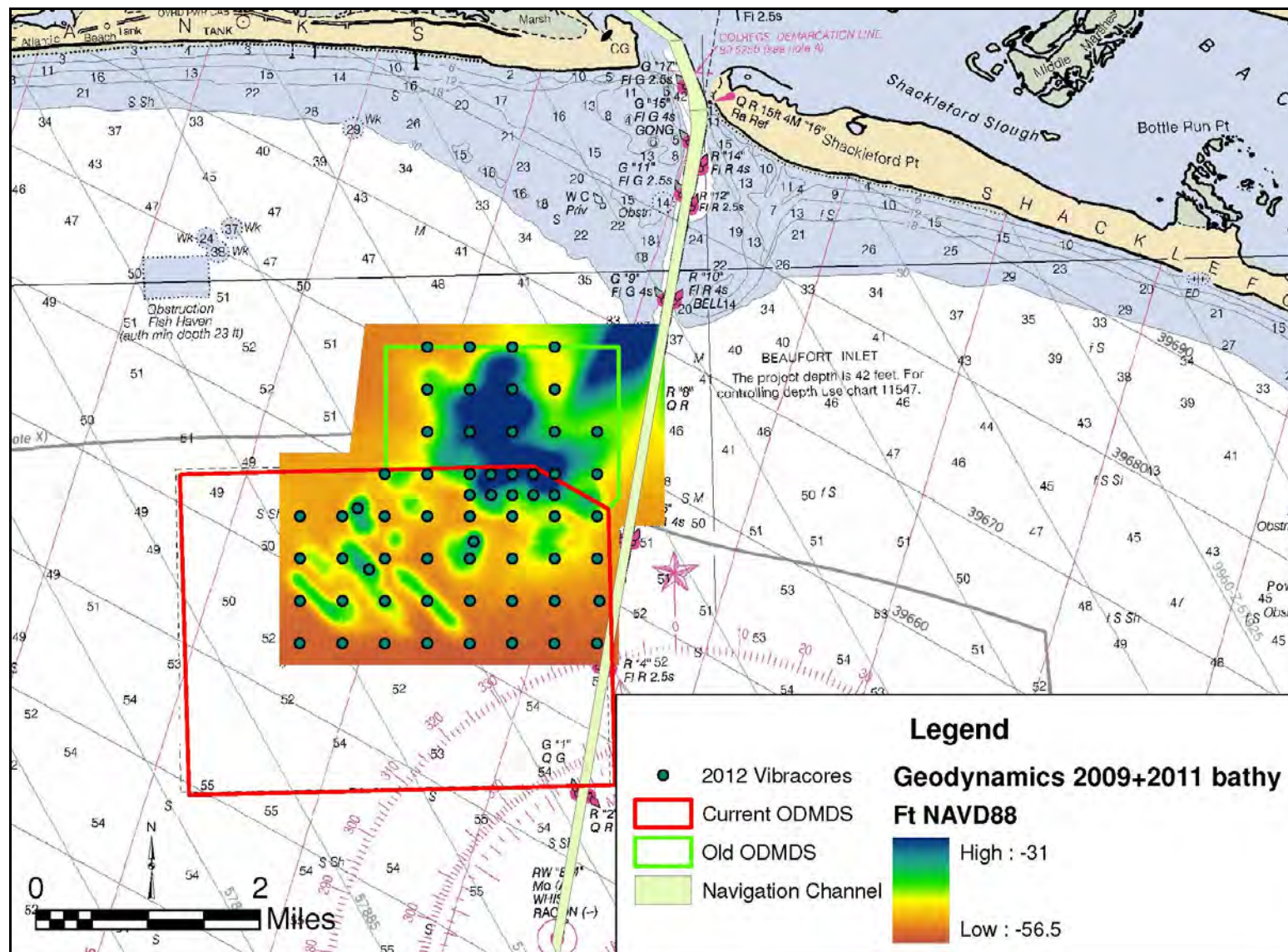


Figure 4.1 – Old and Current Ocean Dredge Material Disposal Sites

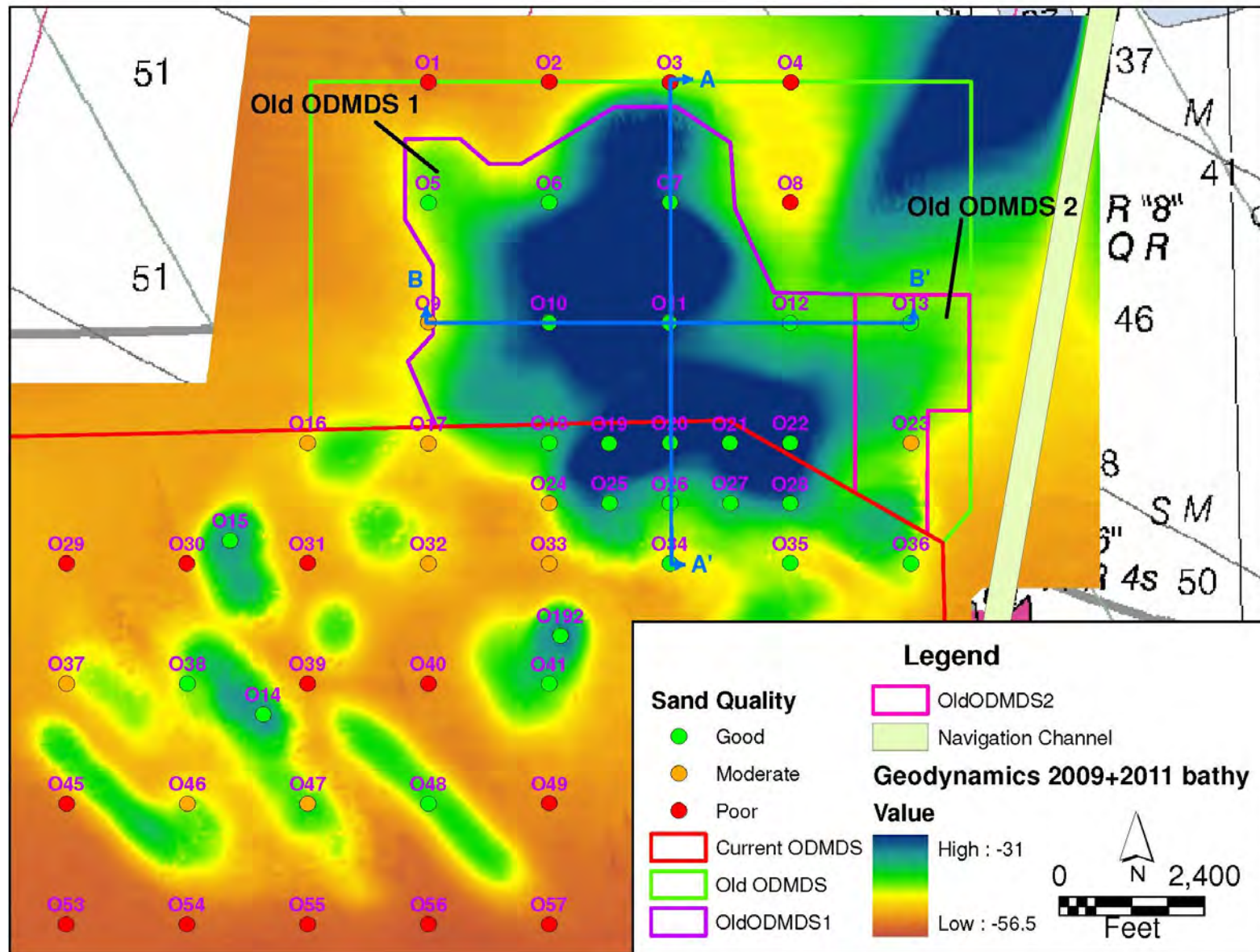


Figure 4.2 – Old ODMDS Potential Borrow Areas

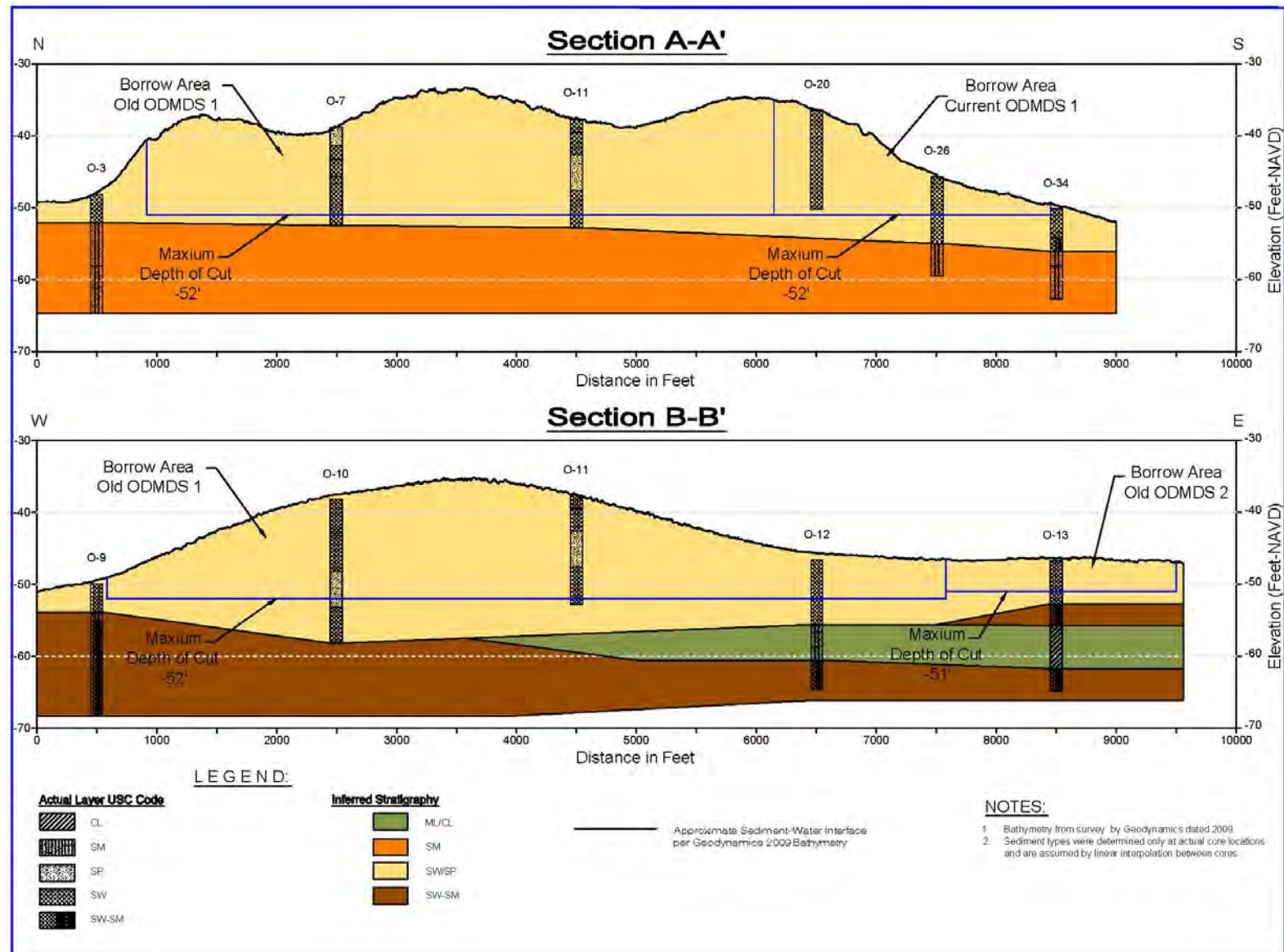


Figure 4.3 – Primary ODMDS Mound Cross-Section

and the 2009 bathymetry provided by Geodynamics, this area is estimated to contain about 13.14 Mcy of beach compatible material, as defined by twenty vibracores.

Fine grained (0.30 mm), poorly sorted quartz sand comprises the Old ODMDS 1 borrow area. This is the same mean grain size as the native beach composite, although the native beach material is better sorted (with a sorting coefficient of 0.61 for the native and 1.11 for the borrow area). The composition includes 13.6% carbonate material in the form of shell hash, which is similar to the reported native carbonate content of 15-20%. The characteristics of this material are compliant with the parameters set forth by the Rule shown in the center column of Table 4.1. A comparison of the grain size distribution curves of the Old ODMDS 1 borrow area and the 2001 native beach composite curve shows that the distributions are quite similar (see Figure A3.1 in Appendix 3). The overfill factor for the Old ODMDS 1 borrow area is calculated to be 1.30.

Characteristic	Required Borrow Site Parameters	Old ODMDS 1
Fines <#230	≤ 6%	0.53%
Sand (> #230 & <#10)	-	96.00%
Granular (>#10 & < #4)	≤ 6%	2.14%
Gravel (>#4)	≤ 6%	1.33%
Calcium Carbonate	≤ 35%	13.55%

Table 4.1 – Old ODMDS 1 Composite Characteristics and Rule Parameters

4.1.2 Old ODMDS 2

Adjacent to the Old ODMDS 1 potential borrow area is the Old ODMDS 2 potential borrow area, where the cut elevation is raised one foot to maintain the two foot buffer above non-compatible material. This borrow area is on the northeast flank of the large mound in the Old ODMDS (Figures 4.2 and 4.3) and is defined by two vibracores. Based on the bathymetric survey performed by Geodynamics in 2009 and using a maximum cut to elevation -51 feet NAVD88, this area is estimated to contain about 1.1 Mcy of beach compatible material. This potential borrow area has a composite mean grain size of 0.32 mm, which is only slightly coarser than the native beach sand. It contains less than 1% gravel and fines, and 13.6% calcium carbonate. This composite is quite similar to the Old ODMDS 1 composite, as well as the native beach, as reflected in the grain size distribution curve shown in Figure A3.2 in Appendix 3. The material has an estimated Overfill Factor of 1.25, meets the parameters set forth by the Rule (see Table 4.2), and is thus deemed compatible with the native beach.

Characteristic	Required Borrow Site Parameters	Old ODMDS 2
Fines <#230	≤ 6%	0.20%
Sand (> #230 & <#10)	-	96.30%
Granular (>#10 & < #4)	≤ 6%	2.49%
Gravel (>#4)	≤ 6%	1.01%
Calcium Carbonate	≤ 35%	13.57%

Table 4.2 – Old ODMDS2 Composite Characteristics and Rule Parameters

4.2 The Current ODMDS

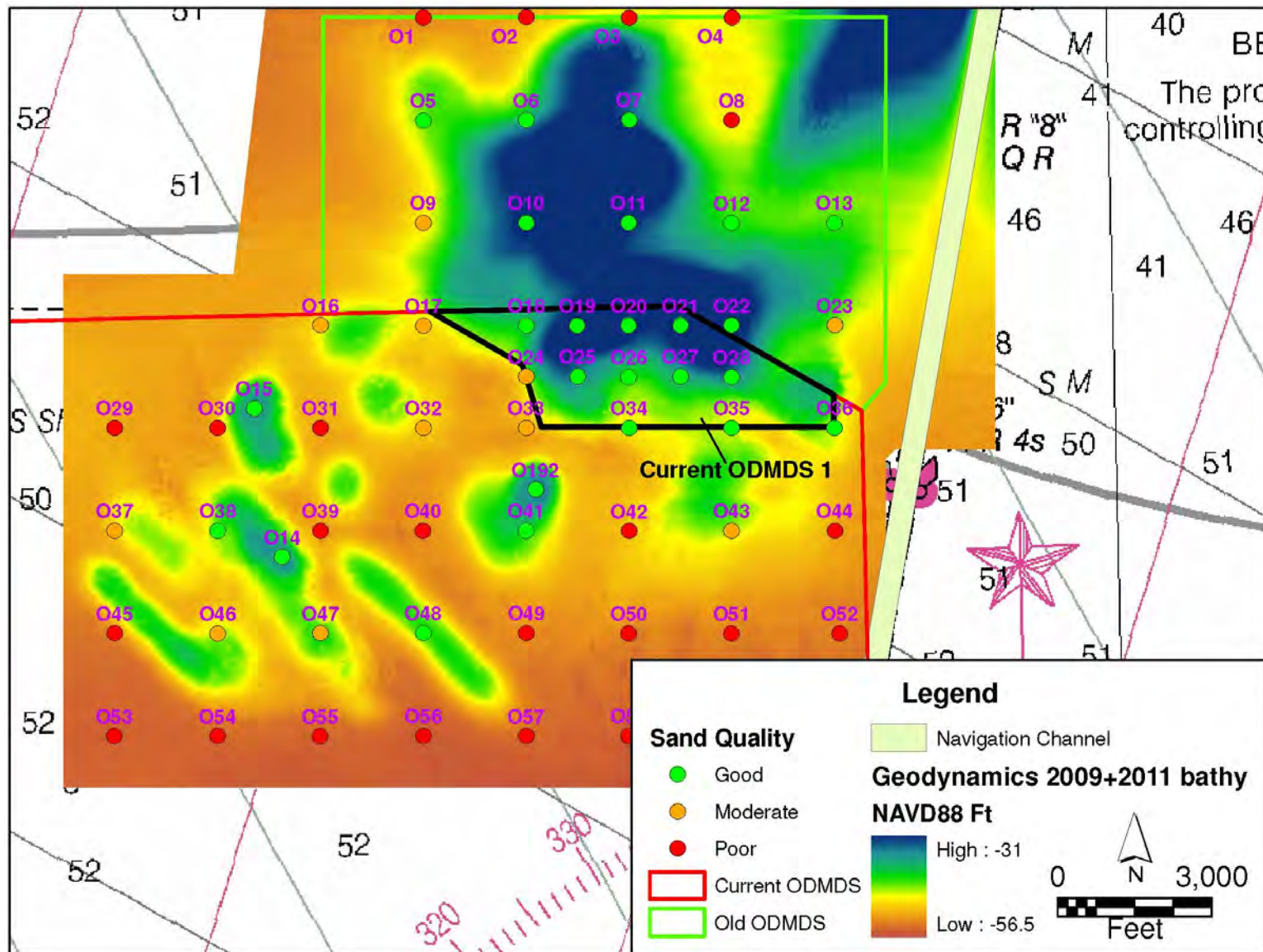
The currently active ODMDS is located across the 3-mile jurisdictional line that separates State and Federally regulated waters (Figure 4.1). The Morehead City ODMDS was established by the EPA in 1972 by Section 102(c) of the Marine Protection, Research, and Sanctuaries Act of 1972, and the Final Rule (Vol. 52 No. 157) effective in 1987 per the Morehead City Ocean Dredged Material Disposal Site: Site Management and Monitoring Plan (USACE, 2009). The USACE Ocean Disposal Database lists disposal amounts for the current ODMDS beginning in 1989. Placement of material in the current ODMDS has declined since 1995 with the advent of use of the Nearshore disposal area, which (a) is located on the seaward flank of the Beaufort Inlet ebb tidal delta and (b) was established in an effort to dispose of beach quality material in a zone that would keep it within the littoral system. However, material is still disposed of in the ODMDS when (a) the wave climate does not allow dredges to approach the relatively shallow Nearshore area, which is estimated to be at -26 feet to -40 feet (datum unknown) (Olsen, 2006) or (b) when the disposal material contains fines in excess of 10% by weight.

The Current ODMDS was divided into several potential borrow areas. The large mound that includes Old ODMDS 1 and 2 also extends across the federal water boundary into the Current ODMDS, where it comprises the potential borrow area deemed Current ODMDS 1, as shown in Figure 4.4. Current ODMDS 1, is discussed below followed by the smaller disposal mounds present in the Current ODMDS. These smaller mounds have varying degrees of certainty with respect to their granularmetric characteristics based on the number of vibracores that penetrate the thickest portion of the mounds. These mounds will be presented based on the degree of confidence that the data provide in the granularmetrics.

4.2.1 Current ODMDS 1

Current ODMDS 1 is the Federal water extension of the large mound that also includes Old ODMDS 1 and 2 (Figure 4.2 and 4.4). Based on the bathymetric survey performed by Geodynamics in 2011 and a maximum cut to elevation -52 feet NAVD88, this area may contain about 4.23 Mcy of beach compatible material. This portion of the large mound is defined by fourteen (14) vibracores. The sediment composite for this borrow area reflects poorly sorted fine grained quartz sand with a mean grain size of 0.30mm, which is the same as the native beach composite. This material has less than 1% fines and less than 2% gravel, with approximately 13.3% carbonate material in the form of shell hash. The grain size distribution curve is quite similar to the native beach, with slightly more of the coarsest material present in the borrow area (Figure A3.3 in Appendix 3).

Based on the Rule parameters, this material is compatible with the native beach (Table 4.3). Volume-weighted average composite mean grain size and sorting coefficients for Current ODMDS 1 and the Carteret County native beach composite calculated from the CSE 2001 data were compared to calculate the Overfill Factor of 1.25. This is quite similar to the other portions of this large mound and it is illustrative to see the comparison of the three granularmetric



frequency distribution curves together on one plot to see the similarity of the curves, and thus the consistency of the material throughout this large disposal mound as shown in Figure A3.4 in Appendix 3.

Characteristic	Required Borrow Site Parameters	Current ODMDS 1
Fines <#230	≤ 6%	0.52%
Sand (> #230 & <#10)	-	96.06%
Granular (>#10 & < #4)	≤ 6%	2.06%
Gravel (>#4)	≤ 6%	1.36%
Calcium Carbonate	≤ 35%	13.29%

Table 4.3 – Current ODMDS 1 Composite Characteristics and Rule Parameters

4.2.2 Higher Confidence Mounds

The higher confidence mounds include those that have at least one vibrocore that penetrates the thickest part of the mound within a potential borrow area, allowing the stratigraphy to be better defined. These mounds were named for the defining core(s) out of simplicity. These mounds include Mounds O-15, O-192, O-48 and the adjoining Mound O-14/O-47 (Figure 4.5). If multiple vibrocore composites were used in preparing the composite for the mound, they were weighted equally within the borrow area. The sedimentology, volumes, and compatibility of these mounds are discussed below.

4.2.2.1 Mound O-15

Mound O-15 is located west of the main ODMDS mound and is penetrated only by Core O-15, so this vibrocore composite was used to define the mound sedimentology (Figure 4.5). Using the bathymetric survey performed by Geodynamics in 2011 and a maximum cut to elevation -50 feet NAVD88, this mound may contain approximately 356,000 cubic yards (cy) of beach quality material. Fine grained, moderately sorted quartz sand comprises this mound; the composite of Core O-15 has a mean grain size of 0.24 mm, which is finer than the native beach composite (0.30mm). This finer mean grain size may be because Mound O-15 contains a slightly lower carbonate shell content of 10%.

A comparison of the Mound O-15 composite grain size distribution curve and that of the native composite reveals the generally finer nature of the mound composite (Figure A3.5 in Appendix 3). For example, when comparing only the percent finer than the 2 ϕ sieve, the curve shows that 65% of the Mound material is finer than the 2 ϕ sieve, while only 42% of the native composite is finer than the same sieve. As a result of this finer mean grain size, the Mound O-15 Overfill Factor is 1.60, which is higher than the previously discussed borrow areas. However, the material still falls within the parameters set forth by the Rule as shown in Table 4.4, and is thus still compatible with the native beach, although it is not expected to perform quite as well as the previously discussed borrow sites. Due to the higher overfill factor, Mound O-15 was assigned a “B” ranking.

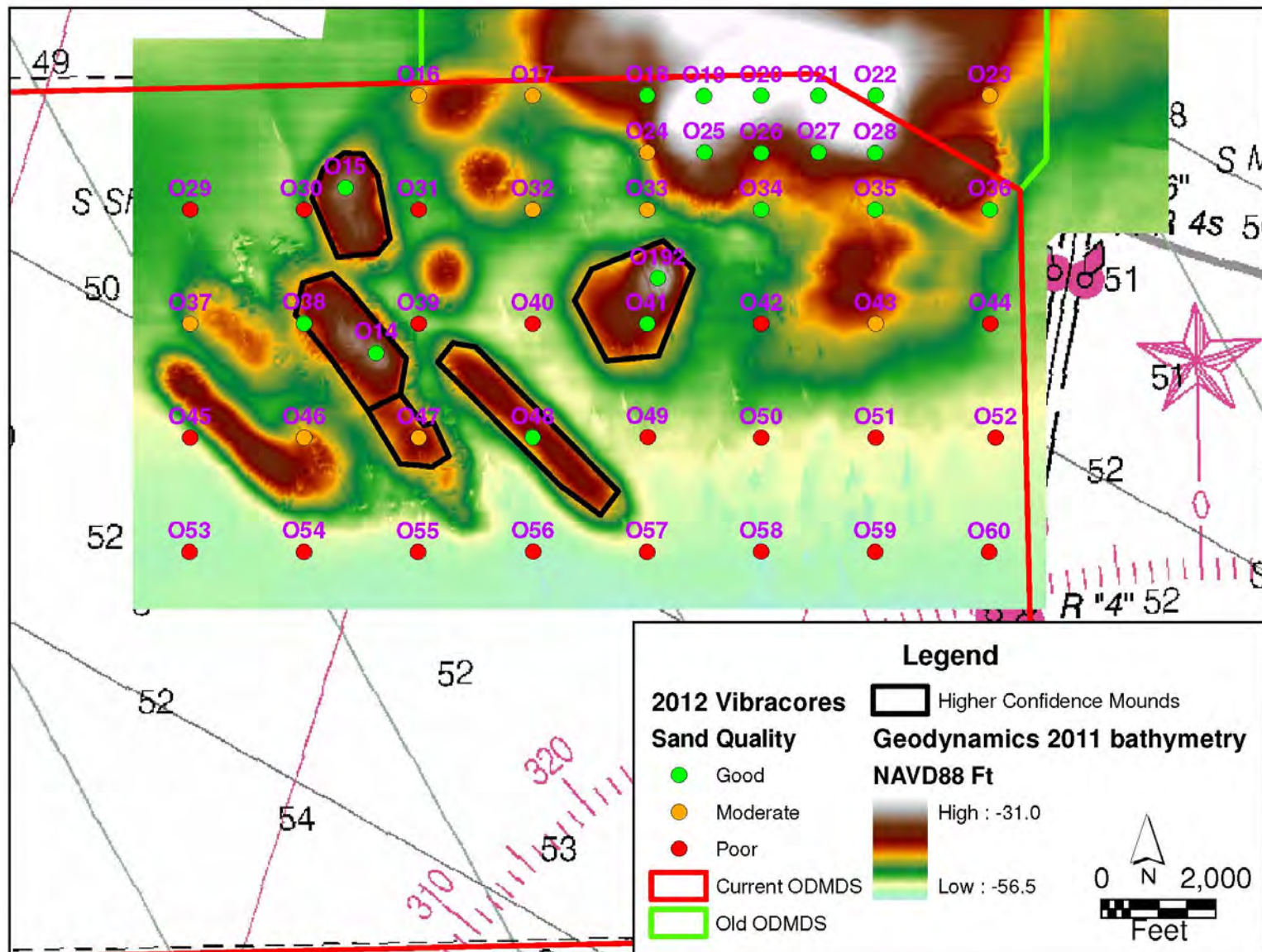


Figure 4.5 – Current ODMDS Higher Confidence Mounds

Characteristic	Required Borrow Site Parameters	Mound O-15
Fines <#230	$\leq 6\%$	0.07%
Sand (> #230 & <#10)	-	99.23%
Granular (>#10 & < #4)	$\leq 6\%$	0.54%
Gravel (>#4)	$\leq 6\%$	0.16%
Calcium Carbonate	$\leq 35\%$	10.10%

Table 4.4 – Mound O-15 Composite Characteristics and Rule Parameters**4.2.2.2 Mound O-192**

Mound O-192 is southwest of Current ODMDS 1 (Figure 4.5). Vibracores O-192 and O-41 penetrated this mound and these vibracore composites were given equal weight in preparing the mound composite. Using the bathymetric survey performed by Geodynamics in 2011 and a maximum cut to elevation -53 feet NAVD88, this mound may contain approximately 785,270 cy of beach quality material. Mound O-192 is characterized by fine grained, poorly sorted quartz sand with about 20% carbonate content in the form of shell hash. Generally the material shows a trend of fine gray sand interbedded with coarser tan shell hash.

The mean grain size is 0.36mm, which is coarser than the other borrow areas previously presented, as well as the native beach (0.30mm). This may be due to the higher shell content relative to the other borrow areas. A comparison of the grain size distribution curve for Mound O-192 and the native beach curve illustrates the divergence of the curves in the larger grain sizes where Mound O-192 has a higher percentage of coarser material, as well as the otherwise similar nature of the curve in the finer grain sizes (Figure A3.6 in Appendix 3). The O-192 mound material falls within the parameters set forth in the Rule as shown in Table 4.5, and is thus considered compatible with the native beach. The Overfill factor was calculated to be 1.25. This mound is given an “A” ranking.

Characteristic	Required Borrow Site Parameters	Mound O-192
Fines <#230	$\leq 6\%$	0.13%
Sand (> #230 & <#10)	-	93.07%
Granular (>#10 & < #4)	$\leq 6\%$	3.43%
Gravel (>#4)	$\leq 6\%$	3.37%
Calcium Carbonate	$\leq 35\%$	19.59%

Table 4.5 – Mound O-192 Composite Characteristics and Rule Parameters

4.2.2.3 Mound O-48

Mound O-48 is a northwest/southeast trending mound located in the center part of the Current ODMDS and is penetrated only by Core O-48, so this vibracore composite was used to define the mound sedimentology (Figure 4.5). Using the bathymetric survey performed by Geodynamics in 2011 and a maximum cut to elevation -52 feet NAVD88, this mound may contain approximately 468,740 cy of beach quality material. Fine grained, moderately sorted quartz sand comprises this mound. Mound O-48 has a mean grain size of 0.20 mm which is significantly finer than the native beach composite (0.30mm). This finer mean grain size may be due to the slightly lower carbonate shell content of less than 8% that this mound contains.

A comparison of the Mound O-48 composite grain size distribution curve and that of the native composite illustrates the finer nature of the mound composite (Figure A3.7 in Appendix 3). For example, when comparing only the percent finer than the 2 ϕ sieve, the curve shows that 82% of the Mound material is finer than the 2 ϕ sieve, while only 42% of the native composite is finer than the same sieve. The finer nature of the Mound O-48 material results in a high Overfill Factor of 2.25. This mound composite also approaches the compatibility threshold with respect to fines content as the mound contains 5.91% fines, nearing the 6% threshold (Table 4.6). As a result of the high Overfill Factor, relatively higher fines content, and lack of additional vibracores, Mound O-48 should be a low priority sand source with a “C” ranking.

Characteristic	Required Borrow Site Parameters	Mound O-48
Fines <#230	$\leq 6\%$	5.91%
Sand (> #230 & <#10)	-	92.83%
Granular (>#10 & < #4)	$\leq 6\%$	1.11%
Gravel (>#4)	$\leq 6\%$	0.15%
Calcium Carbonate	$\leq 35\%$	7.76%

Table 4.6 – Mound O-48 Composite Characteristics and Rule Parameters

4.2.2.4 Mound O-14/O-47

The mound that is penetrated by vibracores O-14, O-47, and O-38 is located directly west of Mound O-48 (Figure 4.5). This mound was assigned two different cut depths to maximize the volume of beach quality material that may be excavated from it. However, one composite was developed from the two areas because it is assumed the mound might be excavated as one borrow site. Using the 2011 Geodynamics bathymetry and the a maximum cut to elevation -49 feet NAVD88 for the portion of the mound including vibracores O-14 and O-38, and a maximum cut to elevation -53 feet NAVD88 for the area including vibracore O-47, this mound may contain approximately 566,028 cy of beach quality material. These vibracores show the same fine gray sand inter-bedded with coarser tan shell hash that is typical of this disposal area.

This mound is characterized by fine grained, poorly sorted quartz sand with less than 1% fines, less than 2% gravel and about 20% carbonate content in the form of shell hash. The mean grain size of 0.38 mm is coarser than the native (0.30mm) and may be attributable to the relatively

higher carbonate content of this mound compared to some of the other potential borrow areas. A comparison of the grain size distribution curve with that of the native beach composite shows that the curves diverge in the coarser grain sizes where the mound material contains more of the coarse material (Figure A3.8 in Appendix 3). The granulometric characteristics of this mound fall within the parameters set forth by the Rule, indicating that this material is compatible with the native beach (Table 4.7). The Overfill Factor was calculated to be 1.20. This mound is assigned an “A” ranking.

Characteristic	Required Borrow Site Parameters	Mound O-14 / O-47
Fines <#230	≤ 6%	0.23%
Sand (> #230 & <#10)	-	93.43%
Granular (>#10 & < #4)	≤ 6%	4.71%
Gravel (>#4)	≤ 6%	1.63%
Calcium Carbonate	≤ 35%	19.80%

Table 4.7 – O-14 / O-47 Mound Composite Characteristics and Rule Parameters

4.2.3 Lower Confidence Mounds

The lower confidence mounds (ranked as “B” or “C”) include those that only have vibracores on the flanks, and none that penetrate the thickest portion of the mounds, such that the stratigraphy of the mound has not be adequately defined (Figure 4.6). As a result, the characteristics of the mound material can only be inferred from the adjacent vibracores. It is recommended that these mounds be sampled with additional vibracores in the thickest portion of the mounds to confirm the sediment characteristics inferred from the existing cores. There are two mounds that fall into this category of Lower Confidence Mounds; discussed below.

4.2.3.1 Mound O-35

Mound O-35 is located directly south of Current ODMDS 1, and in fact shares the composite data from core O-35 with Current ODMDS 1 (Figure 4.6). The other vibracore used in the composite of Mound O-35 was vibracore O-43 on the southern end of the mound. These core composites were weighted equally in the mound composite. Using the 2011 Geodynamics bathymetric data and a maximum cut to elevation -52 feet NAVD88, this mound may contain approximately 499,500 cy of beach quality material. Vibracore O-43 shows the same fine gray sand inter-bedded with coarser tan shell hash seen in previous mounds in the ODMDS.

Fine grained, poorly sorted quartz sand comprises Mound O-35. The cores suggest this mound may contain less than 1% fines or gravel and 15% carbonate in the form of shell hash. These characteristics are quite similar to the native beach, and all required parameters fall within the requirements set forth by the Rule (Table 4.8). The grain size distribution curve is similar to the native beach (Figure A3.9 in Appendix 3). Using these data the Overfill Factor was calculated to be 1.30. This mound is assigned a “B” ranking because it only has two vibracores on opposite flanks, with no sampling of the main part of the mound.

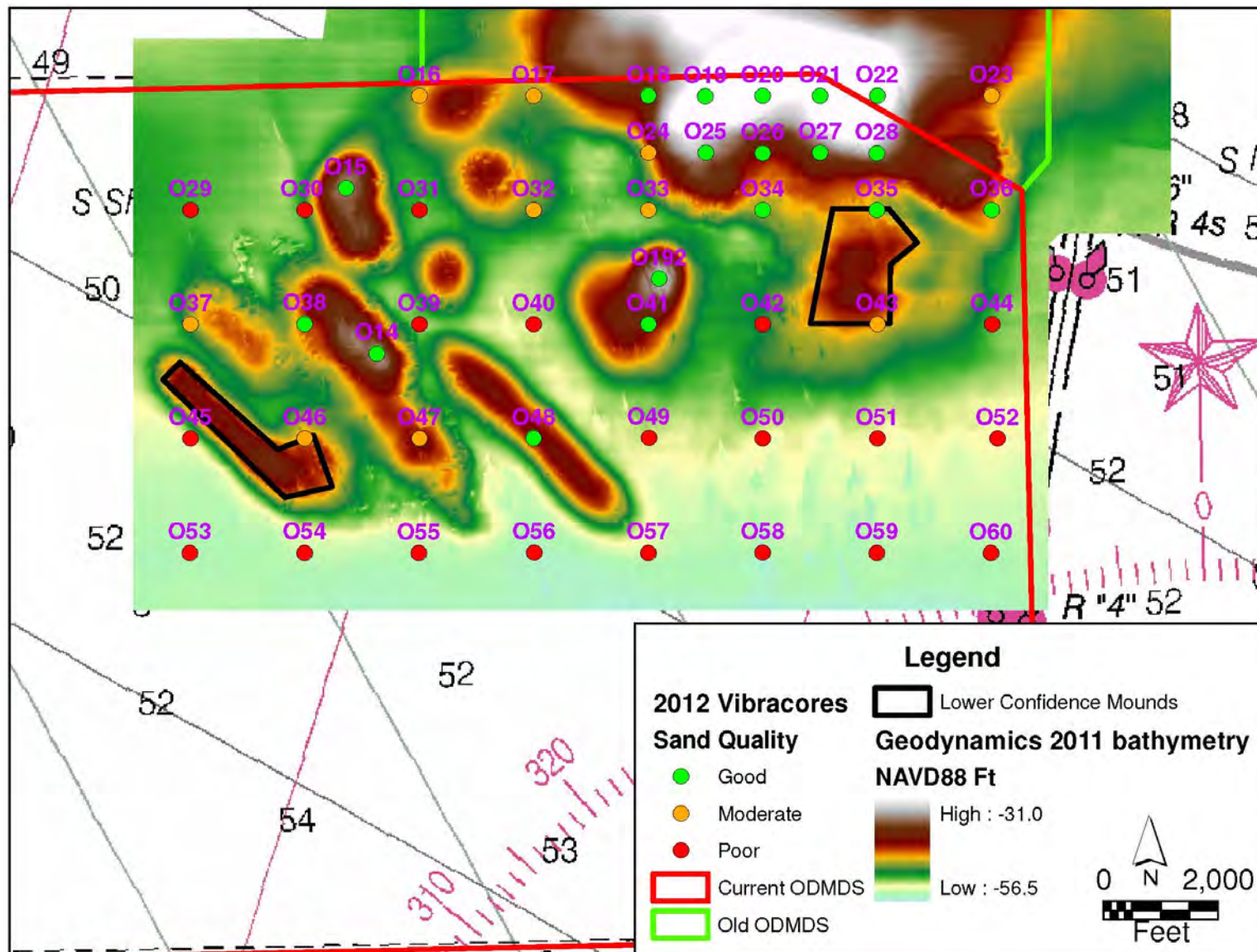


Figure 4.6 – Current ODMDS Lower Confidence Mounds

Characteristic	Required Borrow Site Parameters	Mound O-35
Fines <#230	≤ 6%	0.31%
Sand (> #230 & <#10)	-	96.08%
Granular (>#10 & < #4)	≤ 6%	2.65%
Gravel (>#4)	≤ 6%	0.96%
Calcium Carbonate	≤ 35%	15.20%

Table 4.8 –Mound O-35 Composite Characteristics and Rule Parameters

4.2.3.2 Mound O-46

Mound O-46 is the southwestern-most mound in the Current ODMDS (Figure 4.6). Vibracore O-46 was the only core used in the composite calculation. Using the Geodynamics 2011 bathymetric data and a maximum cut to elevation -53 feet NAVD88, this mound may contain 493,564 cy of beach quality material. This vibracore shows the similar fine gray sand inter-bedded with coarser tan shell hash that is typical of the ODMDS. This material overlays dark gray silty material.

Vibracore O-46 indicates that this mound may contain fine grained, poorly sorted quartz sand with less than 1% fines and less than 3% gravel. The O-46 vibracore composite had about 18% carbonate. The composite has a mean grain size of 0.40 mm, which is coarser than the other mound composites. The slightly higher carbonate content may be partially responsible for the higher mean grain size. This composite does just slightly exceed the Rule requirement for granular size material (Table 4.9), however, the composite meets the other Rule provisions. It is likely that with additional sampling of this mound, the composite weight percent granular may fall within compliance. The higher mean grain size results in a low Overfill Factor of 1.25. The Overfill Factor is likely still above 1 due to the high sorting coefficient of 1.5. The comparison of the grain size distribution curves illustrates the divergence in the higher grain size levels where the mound contains more of the coarse material (Figure A3.10 in Appendix 3). This mound is given a “B” ranking because it is only penetrated on the flank by one vibracore, and ideally further coring would be performed to delineate the horizontal and vertical extents of the beach quality material within the mound.

Characteristic	Required Borrow Site Parameters	Mound O-46
Fines <#230	≤ 6%	0.37%
Sand (> #230 & <#10)	-	90.60%
Granular (>#10 & < #4)	≤ 6%	6.27%
Gravel (>#4)	≤ 6%	2.76%
Calcium Carbonate	≤ 35%	18.17%

Table 4.9 –Mound O-46 Composite Characteristics and Rule Parameters

4.2.4 Contingency Mounds

The Contingency Mounds are the remaining mounds in the Current ODMDS that do not have any vibracores in them, and do not have cores that penetrate enough of the flanks to speculate as to the granular metrics of the mounds. Conceptual cut depths were inferred from surrounding vibracores for the purpose of calculating potential volumes. These mounds include those shown in Figure 4.7. The total volume of material above the proposed cut depths shown in Table 4.10 is about 320,000 cy.

Mound	Cut Elevation NAVD88	Volume (cy)
O-16	-50ft	95,326
O-39	-52ft	94,352
O-37/O-38	-51ft	71,233
O-32	-50ft	58,543
Total		319,454

Table 4.10 – Potential Volumes in Current ODMDS Contingency Mounds

4.4 Area Y

Area Y is located offshore of Emerald Isle in State waters (Figure 4.8). The material in Area Y is spatially highly variable, but the upper layers mostly consist of material that contains fines far in excess of those permitted by the Rule. Originally, vibracores were to be collected on a 1000 foot by 1000 foot grid, but initial vibracores showed poor material, so a wider spacing of 2000 feet by 2000 feet was used with additional vibracores being collected where better material was encountered. There were two areas where the material does not contain excessive fines, as defined by two adjacent vibracores, and preliminary estimates are made about volumes and sediment characteristics. However, in both cases the cores surrounding the two shore-perpendicular cores do not contain comparable clean sand, so it is impossible to reliably define the spatial extent of the resource.

4.4.1 Vibracores Y-80 / Y-75

Vibracores Y-80 and Y-75 are about 2000 feet apart (Figure 4.8). No vibracores were taken to the east or south of these vibracores due to hardbottom buffer requirements. The vibracores taken to the west of these are also 2000 feet away, and have one to two feet of dark gravel (non-compliant with the Rule) overlying the sand. Therefore, the upper layer of sediment in these adjacent cores is not beach-compatible. Although the characteristics of the upper layer in cores Y-80/Y-75 are defined herein, this area should be considered a low priority borrow area with a “C” ranking because there are insufficient vibracores to designate a reliable borrow area and most of the material appears to be of relatively poor quality.

Drawing a rectangle around the ocean bottom represented by the two cores, and using the Geodynamics 2011 bathymetry and a maximum cut to elevation -56 feet NAVD88, a potential volume of 1.08 Mcy is estimated. However, the rectangle is conceptual as the extent of the sand layer is not defined by the cores. The composite of the samples within this rectangle shows that the material is fine grained (0.23 mm), moderately well sorted sand with less than 3% fines and no gravel material. This material is dark in color and contains almost no shell. These

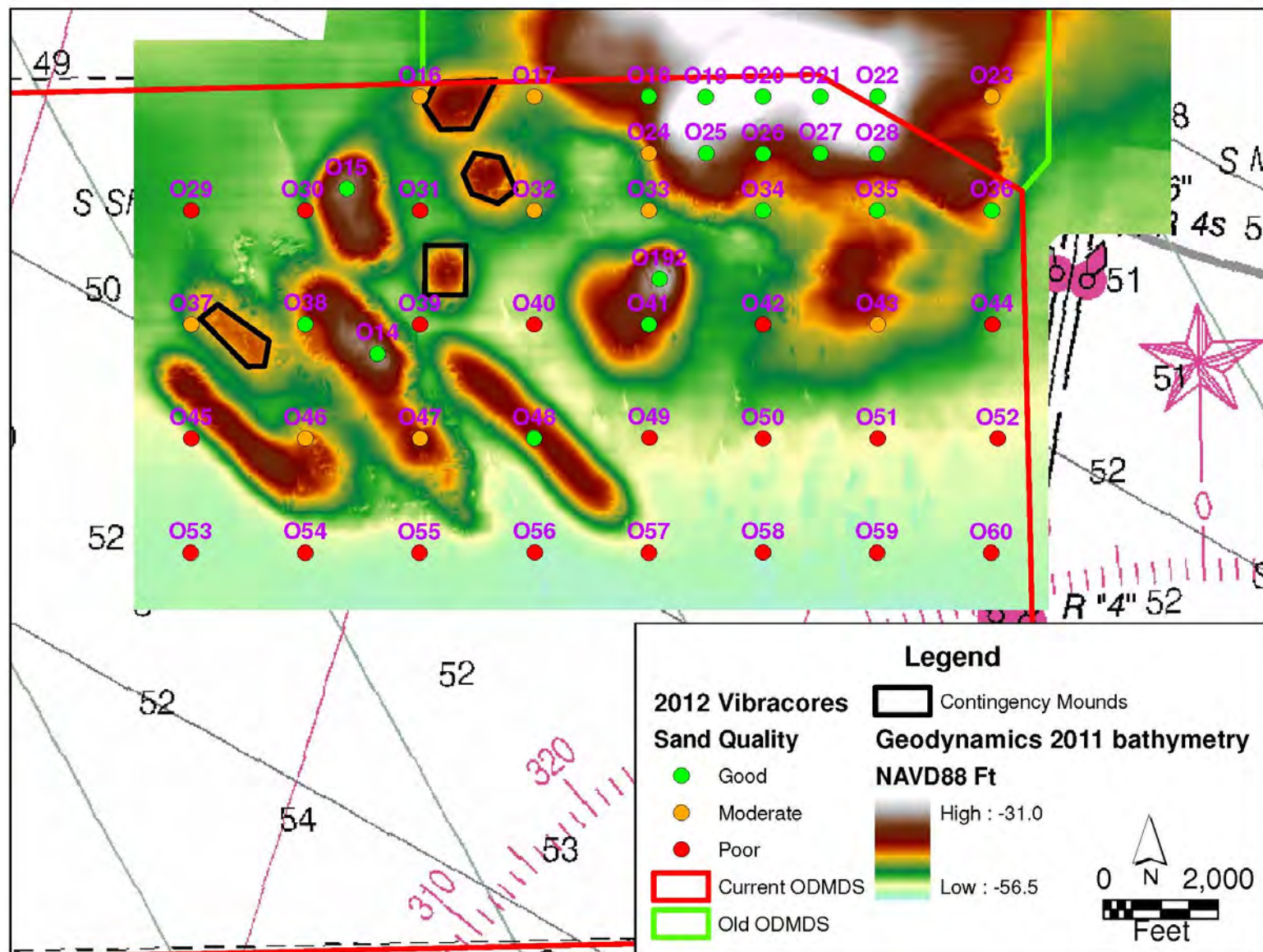


Figure 4.7 – Current ODMDS Contingency Mounds

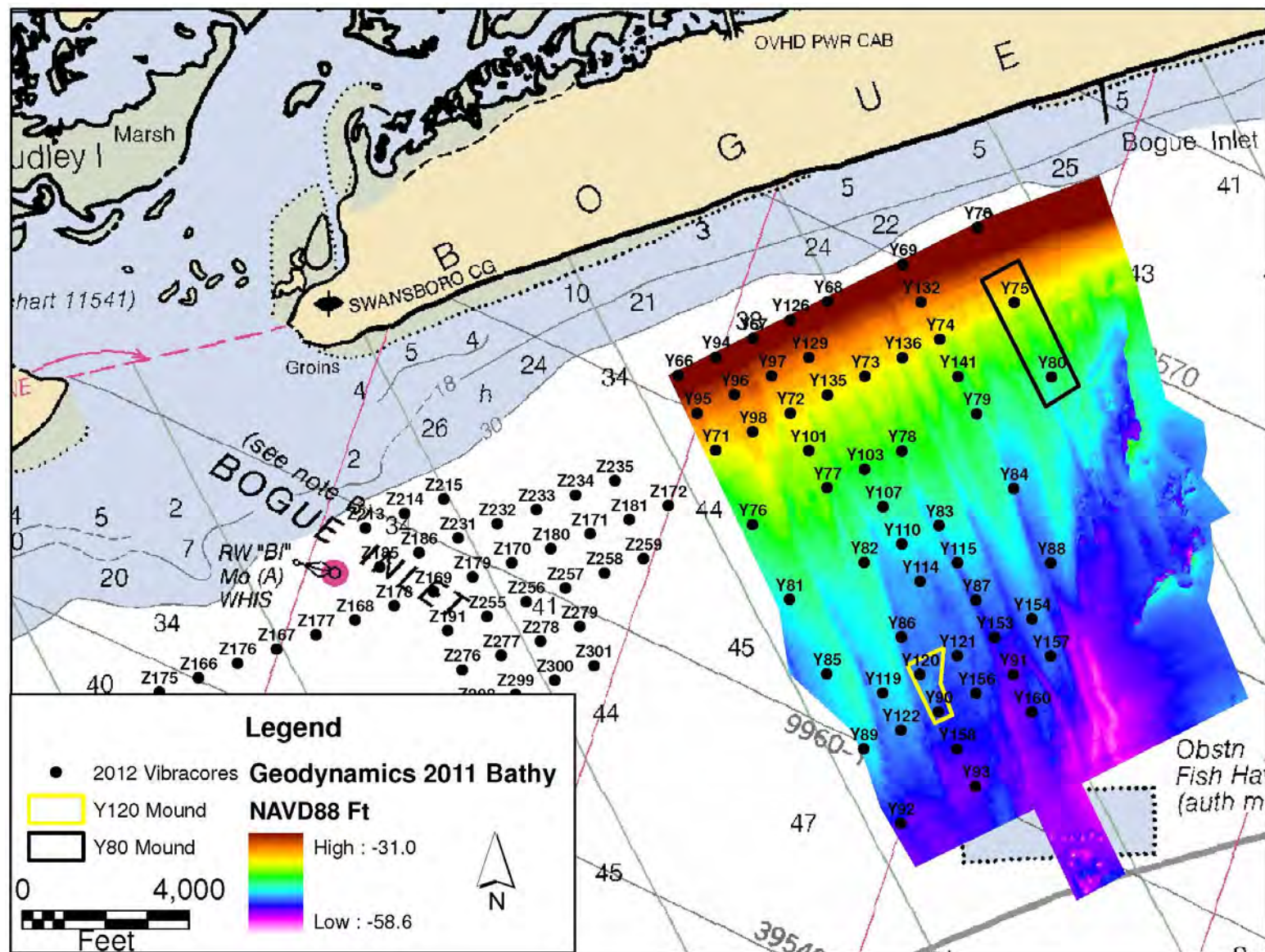


Figure 4.8 – Area Y Vibracores and Potential Borrow Areas

characteristics fall within the parameters set forth by the Rule, although it is significantly finer grained than the native composite (Table 4.11). The resulting Overfill Factor is 2.5 This indicates that this material would perform poorly as compared to native beach sand. The grain size distribution curve illustrates the finer nature of the borrow material throughout the grain sizes (Figure A3.11 in Appendix 3).

Characteristic	Required Borrow Site Parameters	Mound Y-80 / Y-75
Fines <#230	≤ 6%	2.37%
Sand (> #230 & <#10)	-	97.55%
Granular (>#10 & < #4)	≤ 6%	0.08%
Gravel (>#4)	≤ 6%	0.00%
Calcium Carbonate	≤ 35%	1.85%

Table 4.11 – Mound Y-80 / Y-75 Composite Characteristics and Rule Parameters

4.4.2 Vibracores Y-120 / Y-90

The other potential borrow area in Area Y surrounds vibracores Y-120 and Y-90 (Figure 4.8). Core Y-90 penetrates a small ridge and Y-120 is just adjacent to the ridge. Using an assumed area of influence that incorporates this ridge to a cut elevation of -62 feet NAVD88, based on the Geodynamics 2011 survey data, a volume of 379,675 cy is calculated. As with the previous potential borrow area delineated in Area Y, the area of influence for this potential borrow area is uncertain because adjacent vibracores do not contain this upper layer of sand.

The material in this mound has a mean grain size of 0.40 mm with about 2% fines; the material is significantly coarser than the native beach. The composite exceeds the gravel parameter set forth by the Rule with nearly 8% gravel by weight (Table 4.12). However, the material contains only trace calcium carbonate, and an inspection of the samples shows that the gravel-sized material is smooth river rock, rather than shell, which is not desirable in placement on the beach. The grain size distribution curve differs from the native in both the coarse and fine ends of the curve, where the Y-120/Y-90 material contains significantly more coarse material and some more fine material (Figure A3.12 in Appendix 3). The sediment is also dark in color. The Overfill Factor was calculated to be 1.30. However, this area should be considered a low priority borrow area that would need to be further defined if it is ever proposed for use, which is not recommended as the material is not compatible with the native beach.

Characteristic	Required Borrow Site Parameters	Mound Y-120 / Y-90
Fines <#230	≤ 6%	2.04%
Sand (> #230 & <#10)	-	86.60%
Granular (>#10 & < #4)	≤ 6%	3.43%
Gravel (>#4)	≤ 6%	7.93%
Calcium Carbonate	≤ 35%	1.50%

Table 4.12 – Mound Y-120 / Y-90 Composite Characteristics and Rule Parameters

4.5 Area Z

Forty-three vibracores were taken within Area Z, directly southeast of Bogue Inlet in an attempt to locate the relict White Oak River channel (Figure 4.9). The only sand that appeared to be beach quality in this area was underneath several feet of fine grained material with between 10-80% silt. The exception is vibracore Z-174, which contains about seven feet of clean light gray sand below 0.4 feet of silty sand. However, the two USACE vibracores from 2002 that were taken adjacent to this core showed poor material in the upper layer. As a result, the spatial extent of this resource is not defined and additional sampling in this area would be required if this resource is to be developed. The one composite sample from this upper layer is very poorly sorted and has a mean grain size of 0.35 mm, which is coarser than the native, likely due to the relatively high gravel content. This sample contains gravel-sized shell in excess of the 6% threshold (Table 4.13).

Characteristic	Required Borrow Site Parameters	Core Z - 174
Fines <#230	≤ 6%	1.34%
Sand (> #230 & <#10)	-	84.57%
Granular (>#10 & < #4)	≤ 6%	2.28%
Gravel (>#4)	≤ 6%	11.81%
Calcium Carbonate	≤ 35%	11.10%

Table 4.13 – Core Z-174 Composite Characteristics and Rule Parameters

4.6 Renewable Potential Borrow Areas

Renewable potential borrow areas are regularly dredged, naturally replenish, and offer repeated use as a sand source for beach nourishment. These areas have been previously identified and evaluated for compatibility with the native beach. These areas are described below.

4.6.1 Bogue Inlet Channel

Five vibracores were taken within the previously authorized channel relocation template from the 2005 Bogue Inlet relocation project (Figure 4.10). Based upon the vibracores and 2009 Geodynamics bathymetry, the previously excavated channel has infilled with fine grained, poorly sorted quartz sand with less than 1% fines or gravel and about 15% calcium carbonate in the form of shell hash. The samples taken from these cores have a composite mean grain size of 0.33 mm, which is slightly coarser than the native beach (0.30mm), indicating that the channel has in-filled with beach-compatible sand, which likely came from the surrounding beaches. This is supported by the low Overfill Factor of 1.15. This material falls within the parameters set forth by the Rule (Table 4.14) and has a similar grain size distribution to the native beach (Figure A3.13 in Appendix 3).

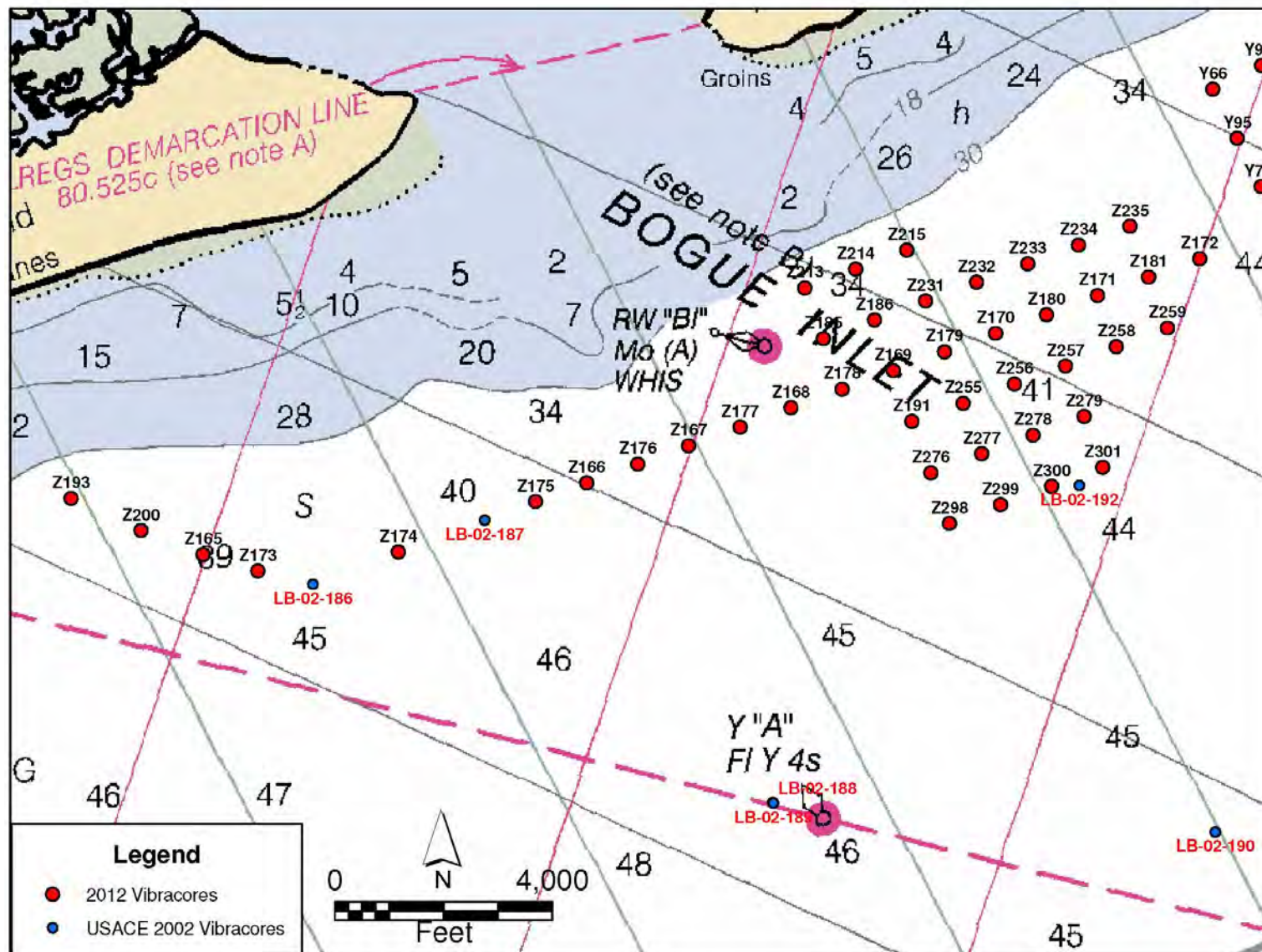


Figure 4.9 – Area Z Vibracores

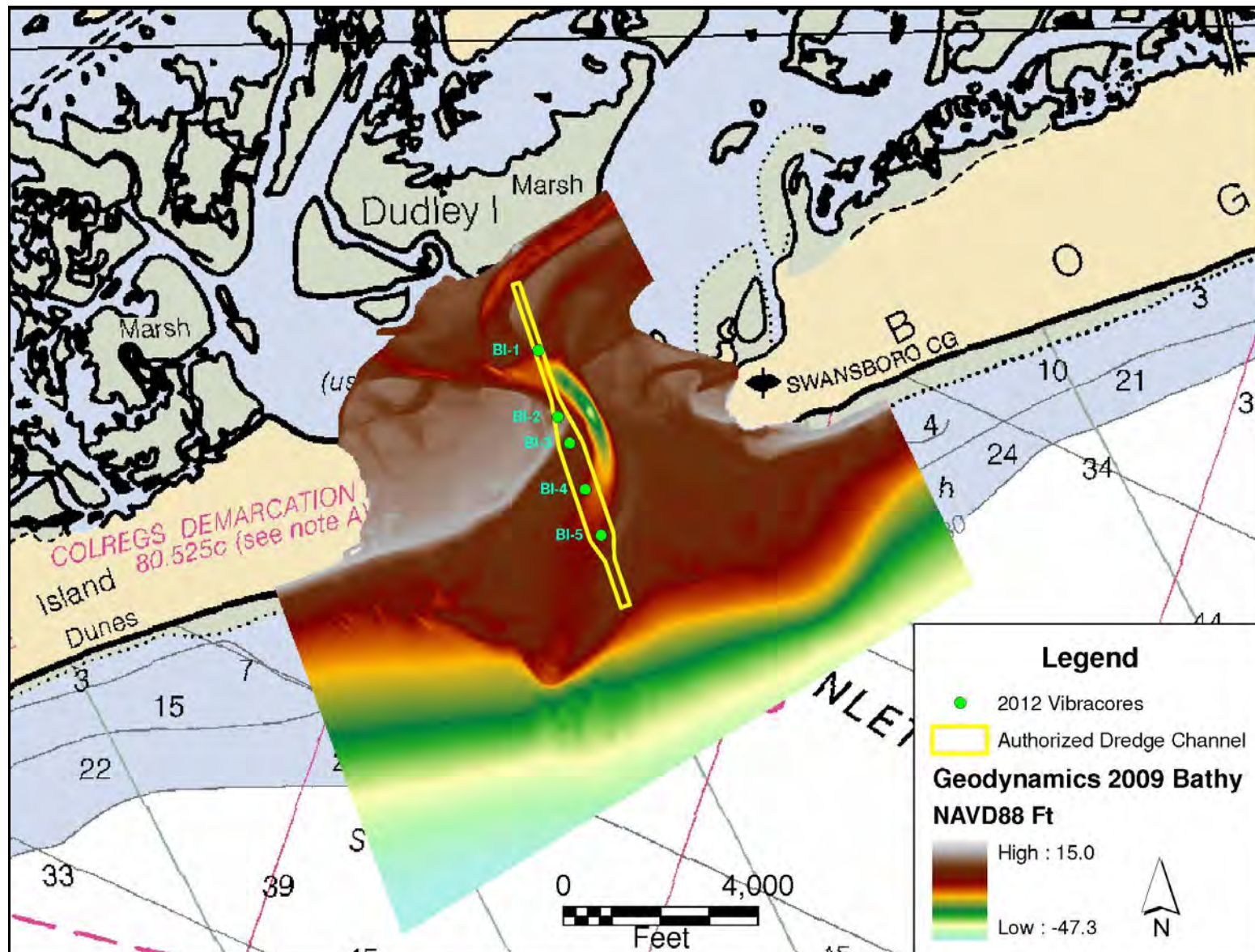


Figure 4.10 – Bogue Inlet Vibracores and Authorized Channel Location

Characteristic	Required Borrow Site Parameters	Bogue Inlet Channel
Fines <#230	≤ 6%	0.15%
Sand (> #230 & <#10)	-	96.61%
Granular (>#10 & < #4)	≤ 6%	2.40%
Gravel (>#4)	≤ 6%	0.84%
Calcium Carbonate	≤ 35%	14.96%

Table 4.14 – Bogue Inlet Channel Composite Characteristics and Rule Parameters

If the channel is dredged to the template associated with the previously authorized dredge depth of -18 feet NAVD88, it may produce between 850,000 cy to 1 Mcy of beach quality material as it did in 2005. This indicates that the channel may shoal up to about 100,000 cy per year. The 2012 vibracores only extended to a maximum of about 6 feet below the channel bottom or to around -12 feet NAVD88. However, it may be assumed that the previously excavated channel in-filled with only modern beach-compatible sand as the spit on the Bear Island shoulder migrates eastward into the inlet channel. The vibracores previously obtained within the inlet channel prior to the 2005 channel relocation also did not penetrate the full proposed dredge depth, while the excavated material proved to be beach-compatible sand.

4.6.2 Morehead City Outer Harbor

Outer portions of the Morehead City Harbor that are dredged regularly have proven to provide beach quality sand, while the inner portions of the Harbor generally produce sand with higher silt contents (USACE, 2009). The Outer Harbor consists of the Cutoff and Range A out to Station 110+00 (Figure 4.11). The Rule states that material dredged in association with a federal navigation project need only contain less than 10% silt in order to be deemed compatible with the native beach. The USACE tested 23 post-placement samples following the 2004 nourishment, which used this material, and found that it contained <1% fines, 6.4% gravel and 15.7% carbonate material (Olsen, 2006; USACE, 2010) (Table 4.15). Olsen and Associates estimated that the maintenance dredging of this portion of the channel will produce about 950,000 cy of sand per event (2006). The USACE Morehead City Harbor draft Dredged Material Management Plan (DMMP) estimates that the Outer Harbor is shoaling at a rate of 1.2 Mcy per year (2012). Depending on the final DMMP, there may be between 228,000-635,000 cy of sand available for beach placement annually. For the purposes of calculating available quantities of beach quality sand, a mid-range amount of 400,000 cy/yr is assumed to be available from this source.

Characteristic	Required Borrow Site Parameters	Morehead City Outer Harbor
Fines <#230	≤ 6%	<1%
Sand (> #230 & <#10)	-	Not Reported
Granular (>#10 & < #4)	≤ 6%	Not Reported
Gravel (>#4)	≤ 6%	6.40%
Calcium Carbonate	≤ 35%	15.70%

Table 4.15 – Morehead City Outer Harbor Composite Characteristics and Rule Parameters

4.6.3 Bogue Inlet – Atlantic Intracoastal Waterway Crossing

In addition to the sediment available from relocation of the main Bogue Inlet channel discussed in section 4.6.1 above, there is additional periodic dredging in the Atlantic Intracoastal Waterway (AIWW) Crossing (Figure 4.12). This channel is dredged every two to three years via pipeline dredge. Each dredging event can produce about 65,000 cy of sand that has traditionally been placed on “The Point” on western Emerald Isle (www.protectthebeach.com). These channel sediments were sampled by the USACE in 2002; results revealed that the sediment generally contained less than 2% fines or gravel, which is compatible with the Rule stipulation that material from a federally maintained navigation channel contain less than 10% fines by weight to be considered compatible with the native beach. A review of the sediment data from the analyses performed by Caitlin for the USACE shows the general character of the sediment that shoals in the AIWW Crossing, given in Table 4.16, below.

Characteristic	Required Borrow Site Parameters	Bogue Inlet AIWW Crossing
Fines <#230	≤ 6%	<2%
Sand (> #230 & <#10)	-	>94%
Granular (>#10 & < #4)	≤ 6%	<2%
Gravel (>#4)	≤ 6%	<2%
Calcium Carbonate	≤ 35%	<15%

Table 4.16 – Bogue Inlet AIWW Crossing Composite Characteristics and Rule Parameters

5.0 Conclusion

In summary, the potential borrow areas examined in this investigation were ranked based on the amount of data available and the compatibility of the material with the native beach composite as outlined by the Rule, as well as the Overfill Factor (Table 5.1). Potential borrow areas are given an A, B or C designation to reflect their desirability and reliability as a borrow area. Potential borrow areas designated by “A” are recommended for use as a sand source for nourishment of Carteret County beaches. Potential Borrow areas designated by “B” require additional vibracores to reliably define the stratigraphy or demonstrate compatibility of the sediment with the native beach consistent with the Rule. Potential Borrow areas designated by “C” are not recommended for use as a sand source for nourishment of Carteret County beaches due to insufficient data or poor compatibility of the sediment.

An estimated 19,821,325 cy of beach compatible material is given an “A” ranking because there is a significant amount of data available to define the stratigraphy, and the data show that the borrow area material is consistent with the Rule and solidly compatible with the native beach. About 1,348,975 cy of material was given the “B” ranking based on a lack of data and/or a higher Overfill Factor. If additional sampling verifies that the thickest portion of the mound is consistent with the sediment on the flanks, much of this volume can be moved into the “A” ranking. Finally, approximately 2,248,000 cy of material was given a “C” ranking because of a lack of data on these mounds, or because of poor compatibility; this material is not recommended for use as a sand source for beach nourishment.

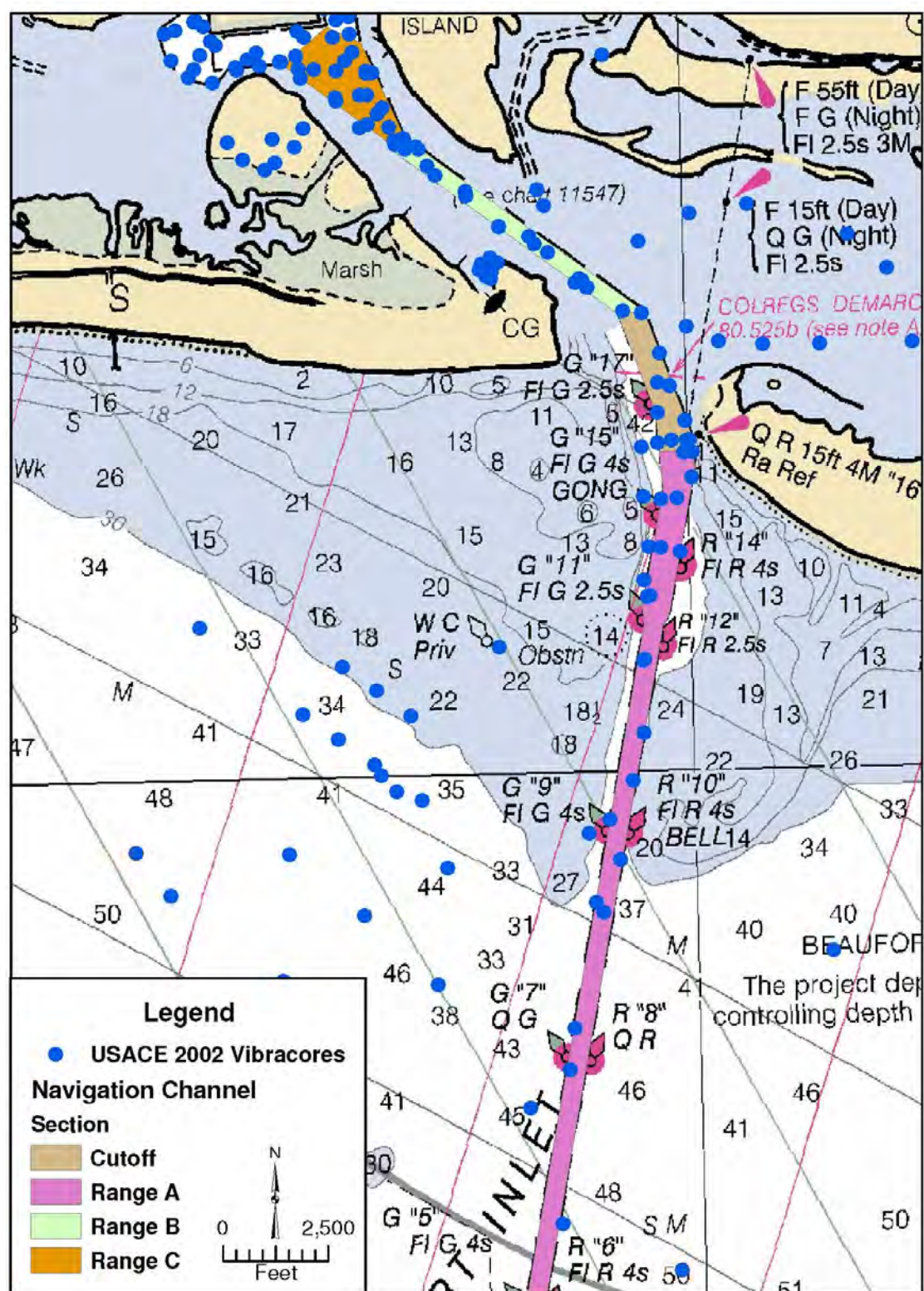


Figure 4.11 – Morehead City Channel Vibracore and Section Locations

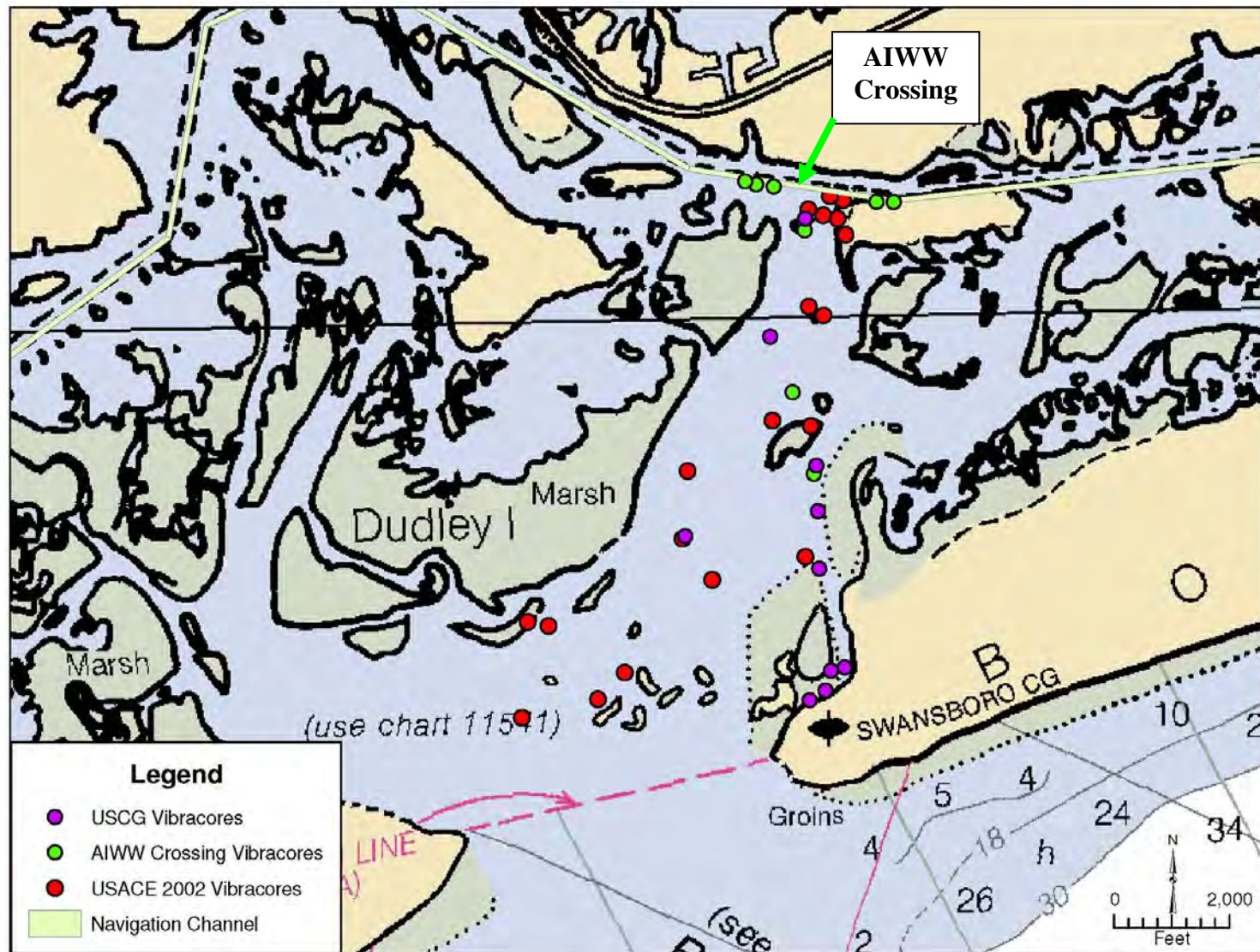


Figure 4.12 – Bogue Inlet AIWW Crossing

Area	Section	Navigation	Volume	Mean Grain Size (mm)	Fines (%)	CaCO ₃ (%)	Overfill Factor	Rank
Native Beach	CSE 2001 Composite	-	-	0.3	<1%	≤20%	-	-
Old ODMDS	Old ODMDS 1	no	13,138,307	0.3	0.53	13.6	1.25	A
	Old ODMDS 2	no	1,098,108	0.32	0.2	13.6%	1.25	A
Current ODMDS	Current ODMDS 1	no	4,233,612	0.3	0.52	13.3%	1.25	A
	O-192 Mound	no	785,270	0.36	0.13	19.6%	1.25	A
	O-14/O-47 Mound	no	566,028	0.38	0.23	19.8%	1.2	A
	O-15 Mound	no	355,920	0.24	0.07	10.1%	1.6	B
	O-35 Mound	no	499,491	0.3	0.31	15.2%	1.3	B
	O-46 Mound	no	493,564	0.4	0.37	18.2%	1.25	B
	O-48 Mound	no	468,740	0.2	5.91	7.8%	2.25	C
	Remaining Mounds	no	~320,000	-	-	-	-	C
Area Y	Y-80 Mound	no	1,079,853	0.23	2.37	1.5%	2.50	C
	Y-120 Mound	no	379,675	0.4	2.04	1.5%	1.30	C

Table 5.1 – Characteristics, Ranking and Volume of Non-Renewable Potential Borrow Areas

In addition to the non-renewable borrow areas ranked above, renewable borrow areas may provide approximately 15,322,992 cy over 30 years or 25,538,320 over 50 years (see Table 5.2). When added to the “A” ranked non-renewable material outlined above, there may be a total of 35,144,317 cy available over 30 years, which meets the 30 year estimated need of 15.7-26.9 Mcy. The combined non-renewable and renewable borrow areas may provide 45,359,645 cy available over 50 years, which meets the estimated 50 year need of 26-44.8 Mcy.

Area	Section	Volume	Dredging Frequency	30 yr Total volume	50 yr Total volume
MHC Outer Harbor	Cutoff+Range A to STA 110	400,000 cy (assumed)	1 years	12,000,000	20,000,000
Bogue Inlet	Inlet Relocation	847,664 cy	10 years	2,542,992	4,238,320
	AIWW Crossing	65,000 cy	2.5 years	780,000	1,300,000
Totals:				15,322,992	25,538,320

Table 5.2 – Volume of Renewable Potential Borrow Areas

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Appendix 1

**CD-ROM Containing
Alpine Ocean Seismic Survey, Inc.
Geotechnical Report**

Final Report

Bogue Banks Master Beach Renourishment Plan

Prepared for:



**Moffatt & Nichol
1616 East Millbrook Road, Suite 160
Raleigh, NC 27609**



**Carteret County Shore Protection Office
P.O. Box 4297
Emerald Isle, NC 28594**

Submitted by:



**Alpine Ocean Seismic Survey, Inc.
155 Hudson Avenue
Norwood, NJ 07648**

May 2012



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1.0 Introduction

Alpine Ocean Seismic Survey, Inc (Alpine), under contract to Moffatt & Nichol and Carteret County, conducted vibracore sampling offshore of Bogue Banks, North Carolina. The majority of the work was conducted using an Alpine model 270 pneumatic vibracore configured to collect 20 foot long cores. The R/V Shearwater was used for deployment of the vibracore system. Five cores inside Bogue Inlet were subsequently collected using an Alpine Mini-Vibracore system configured to collect 10 foot long cores, as deployed off a local spud barge.

The purpose of the project was to collect sediment samples for use in characterization of four areas as potential borrow sites for periodic renourishment of Bogue Banks beaches.

1.1 Areas of Interest

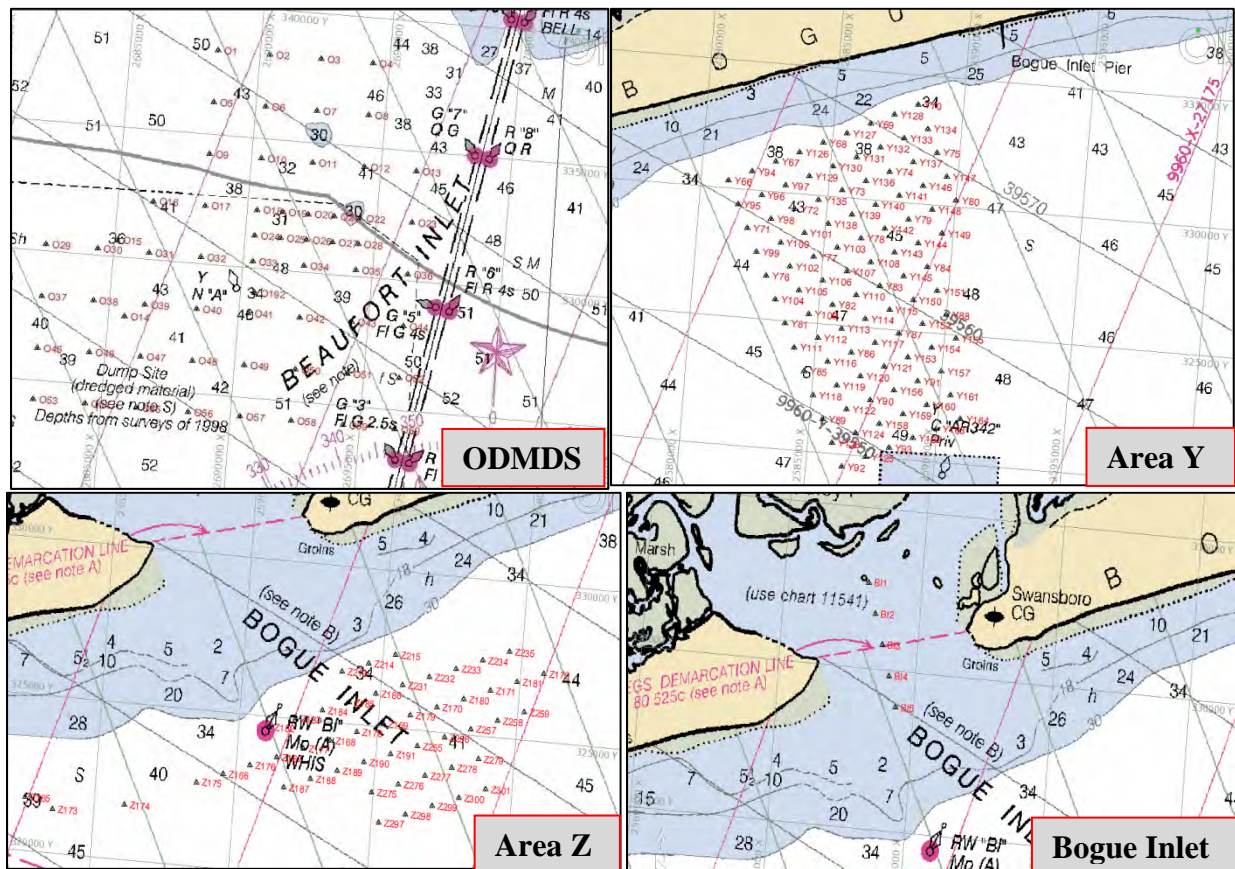


Figure 1. Areas of Interest.

1.2 Summary of Operations

12/9/2011 0615: R/V Shearwater underway to ODMDS site
0650: Conduct safety meeting
0742: Begin coring at ODMDS site
1724: Anchored offshore for night

12/10/2011 0712: Pull anchor and head to next ODMDS site
0720: Arrive on site, continue coring
1731: Anchored offshore for night

12/11/2011 0650: Pull anchor and head to next ODMDS site
0715: Arrive on site, continue coring
1700: Anchored offshore for night

12/12/2011 0730: Pull anchor and head to next ODMDS site
1400: Collect final ODMDS core, underway to dock
1546: Arrive at Portside Marina

12/13/2011 0700: Change vibracore heads, wait on delivery of new core pipes

12/14/2011 0600: Underway to Area Y
1030: Begin coring at Area Y
1100: Clients board R/V Shearwater to observe operations
1230: Clients leave R/V Shearwater
1620: Anchored offshore for night

12/15/2011 0630: Pull Anchor and head to next Area Y site
0715: Arrive on site, continue coring
1650: Anchored offshore for night

12/16/2011 0630: Pull Anchor and head to next Area Y site
0700: Arrive on site, continue coring
0945: Transiting to Area Z site
1000: Arrive on site, begin coring at Area Z site
1700: Anchored offshore for night

12/17/2011 0645: Pull anchor and head to next Area Z site
0725: Arrive on site, continue coring
1700: Anchored offshore for night

12/18/2011 0620: Pull anchor and head to next Area Z site
0645: Arrive on site, continue coring
0900: Return to Area Y for "optional" cores
0920: Begin coring at Area Y
1728: Anchored offshore for night

12/19/2011 0615: Pull Anchor and head to next Area Y "option" site

0725: Arrive on site, continue coring
1350: Client confirms enough cores collected, underway to dock
1700: Arrive at Portside Marina

12/20/2011 0900: Unloading cores, demobilization
1130: Shipping truck arrives, loading cores into truck
1600: Finished demobilization

Additional sampling in Shallow water inside Bogue Inlet

4/10/2012 0700: Meet boat and mobilize Mini-Vibracore & navigation gear
0950: Underway to first core site
1145: Commence coring at northern most site (BI-1)
1615: Finish collecting five cores- underway to dock
1800: At dock; demob equipment from boat

2.0 Equipment and Personnel

2.1 Key Personnel

Project Manager/Geologist
Navigator/Geologist
Vibracore Technician

Chuck Dill
Stephanie Miller
Ovidio Hernandez, Steve Gentry,
Michael Telesco

2.2 Survey Vessels

2.2.1 R/V Shearwater

The primary vessel for the survey was the R/V Shearwater (Figure 2), which is 110 feet long by 39 feet wide. It has ample deck space with a strong winch and hydraulic crane for vibracoring. The R/V Shearwater is powered by two individually controlled hydraulic drives which rotate 360 degrees and have separate thrust control which allows the vessel to maneuver accurately and hold position within 20 to 30 feet of proposed core sites without anchoring.



Figure 2. R/V Shearwater

2.2.2 Tug and Spud Barge for Bogue Inlet Sampling

Alpine contracted with a local barge operator to supply a platform for use in collecting the five cores located in shallow water inside Bogue Inlet. The equipment used consisted of a 20x48 foot barge equipped with two spuds to hold it on site. The barge was propelled by a tug boat with two diesel engines, and that tug was attached to the stern of the barge. The Vibracore was deployed from the barge by using a crane. The DGPS system was set up in the tugboat and the offset to the front of the barge was included in the navigation software.

This barge and tug worked well in the shallow waters of the inlet, as the tug boat draft was less than 30 inches.

2.3 Navigation Data Acquisition and Logging System

The POS-MV GPS system was utilized with a separate antenna for reception of US Coast Guard differential corrections (New Bern, NC). The POS-MV was interfaced to a computer equipped with Hypack navigation software providing WGS-84 geographic position. The positioning information was converted into North Carolina (NAD 83) state plane coordinate positions in real time by Hypack. An offset was then applied to provide the position of the deployment of the Vibracore off the support vessel being used. The proposed core locations were entered into the navigation software for initial positioning of the Vibracore on the core location. The final position of each core was also provided to CoreLog by Hypack and that data was stored in the computer. This same system was used during both the primary offshore survey and the inshore sampling at Bogue Inlet.

2.4 Bathymetry

During the primary survey digital depths from the Odom echosounder were fed into Hypack and draft corrected in real time providing spot soundings at each core location. The data were later tide corrected to MLLW using the Beaufort, NC tide gauge (station ID 8656483) and were then offset to NAVD88 using the tidal datums at Atlantic Beach Triple S Pier (removed in 2000).

During the inshore shallow water survey, depths were obtained by use of a weighted measuring tape deployed near the bow of the barge adjacent to each core site. These depths were then corrected using the Beaufort tide gage data and including the time offset for Bogue Inlet, with the resultant depth offset to NAVD-88 as described above.

2.5 Vibracore

A self-contained freestanding Alpine model 270 pneumatic vibracore configured to take cores up to 20 feet in length was utilized for the offshore portions of the project. The vibracore consists of: an air-driven vibratory hammer assembly with an 8 inch diameter piston; an aluminum H-beam which acts as the vertical guide for the vibrator; a set of four steel support pads and legs which hold the beam upright on the sea bottom; a steel coring pipe; a cutting edge; a core retainer; a clear lexan core liner; and a penetrometer which records time and depth of penetration of the core pipe in to the sea floor. An air hose array provides passage of compressed air from the compressor on deck to drive the Vibracore.

For the inshore sampling in Bogue Inlet, the Alpine Mini-Vibracore was used. This system consists of an air driven vibratory hammer with a five inch diameter piston which is used to drive an aluminum core pipe into the sediments. The core pipe, which is 3.5 inches OD, uses a stainless steel cutting edge to hold the core liner and retainer in place during the coring operation. The core pipe was 10 feet in length.

2.6 Field Methods

The vessel was maneuvered to within 10 feet of a given core location based upon the position of the vibracore deployment location to the proposed core position in Hypack. Once the vessel was in a stable position, the vibracore was placed on the seafloor, water depth and position were recorded, and the core was conducted. If refusal was hit prior to achieving the desired core depth, the jetting method was used for a second run.

Once the vibracore reached the desired core depth or refusal as shown in CoreLog, the air power was turned off and the vibracore was returned to and secured on the side of the vessel. The sample was then removed, measured, marked, cut into 5 foot sections and sealed. A description of the core was taken at every 5 feet and a seafloor sample was collected and bagged for analysis by the client.

Once back at Alpine, the samples were split in half, photographed and described. A composite sample was collected from each significant sediment unit and sent to Coastal

Technology, Inc. in Melbourne, Florida for grain size analysis and carbonate content analysis.

3.0 Vibracore Data Presentation

Appendix 1 presents a summary of final core locations for all samples along with corrected water depth, penetration and recovered core length. Penetration graphs for each core are presented in Appendix 2 with the header of the graphs indicating the core number (runs only shown if required recovery was reached), date and time, location (NCSPCS 83), length of penetration and recovery and the raw and corrected (NAVD88) water depth. The USACE format geological logs for each core are provided in Appendix 3 with core photographs provided in Appendix 4. Grain size analysis and carbonate analysis data are provided in Appendix 5.



Bogue Banks
Master Beach Renourishment Plan



APPENDIX 1

TABLE OF CORE SITES

Core Name	Date	Easting	Northing	Unit	Penetration	Recovery	W.D. Corr.
O1	12/11/2011	2688366	338253.5	Feet	18.66 ft	18.3 ft	53.59 ft
O2	12/11/2011	2690366	338257	Feet	18.80 ft	19.6 ft	52.40 ft
O3	12/11/2011	2692365	338252.1	Feet	18.61 ft	16.60 ft	48.13 ft
O4	12/11/2011	2694365	338253	Feet	18.92 ft	16.75 ft	50.21 ft
O5	12/11/2011	2688364	336249.4	Feet	17.78 ft	18.60 ft	47.63 ft
O6	12/11/2011	2690365	336252.7	Feet	19.11 ft	19.00 ft	42.60 ft
O7	12/11/2011	2692366	336256.4	Feet	15.73 ft	13.60 ft	38.84 ft
O8	12/11/2011	2694364	336253	Feet	19.16 ft	19.00 ft	52.12 ft
O9	12/12/2011	2688363	334253.5	Feet	19.82 ft	18.50 ft	49.87 ft
O10	12/12/2011	2690364	334251.1	Feet	20.02 ft	15.00 ft	38.03 ft
O10	12/12/2011	2690367	334250	Feet	8.85 ft	6.20 ft	38.24 ft
O11	12/12/2011	2692363	334252.6	Feet	15.25 ft	17.00 ft	37.59 ft
O12	12/12/2011	2694365	334250.7	Feet	19.06 ft	18.00 ft	46.61 ft
O13	12/12/2011	2696360	334251	Feet	18.75 ft	14.10 ft	47.29 ft
O13	12/12/2011	2696362	334251.3	Feet	18.93 ft	0.00 ft	46.72 ft
O14	12/12/2011	2685622	327738.9	Feet	17.50 ft	11.92 ft	42.65 ft
O15	12/12/2011	2685079	330634.9	Feet	20.01 ft	12.25 ft	41.32 ft
O16	12/12/2011	2686364	332253.3	Feet	19.13 ft	18.20 ft	48.52 ft
O17	12/12/2011	2688366	332247.9	Feet	18.50 ft	17.8 ft	49.65 ft
O18	12/12/2011	2690367	332252.7	Feet	20.02 ft	17.80 ft	44.07 ft
O19	12/11/2011	2691363	332243.7	Feet	19.25 ft	15.00 ft	36.09 ft
O19	12/11/2011	2691366	332250.3	Feet	10.25 ft	8.50 ft	36.08 ft
O20	12/11/2011	2692365	332250.4	Feet	15.74 ft	13.83 ft	36.43 ft
O21	12/11/2011	2693364	332249.3	Feet	17.61 ft	15.92 ft	37.05 ft
O22	12/10/2011	2694364	332253.7	Feet	19.14 ft	14.00 ft	32.74 ft
O22	12/10/2011	2694364	332252.8	Feet	8.63 ft	6.83 ft	36.80 ft
O23	12/10/2011	2696365	332253	Feet	19.73 ft	17.17 ft	47.80 ft
O24	12/12/2011	2690362	331252.2	Feet	18.48 ft	13.75 ft	49.27 ft
O25	12/11/2011	2691367	331253.5	Feet	19.99 ft	11.50 ft	41.97 ft
O25	12/11/2011	2691364	331253.1	Feet	10.14 ft	8.00 ft	41.97 ft
O26	12/11/2011	2692365	331247.3	Feet	20.04 ft	13.80 ft	45.70 ft
O27	12/11/2011	2693366	331253.5	Feet	19.42 ft	16.75 ft	43.63 ft
O28	12/10/2011	2694359	331246.1	Feet	19.17 ft	12.6 ft	42.72 ft
O29	12/10/2011	2682364	330251.9	Feet	18.94 ft	15.70 ft	51.90 ft
O30	12/10/2011	2684366	330251.1	Feet	18.51 ft	18.80 ft	51.03 ft
O31	12/10/2011	2686364	330253.4	Feet	19.27 ft	17.90 ft	53.64 ft
O32	12/10/2011	2688366	330251.3	Feet	18.67 ft	17.50 ft	51.12 ft
O33	12/10/2011	2690363	330252.2	Feet	16.33 ft	18.20 ft	63.18 ft
O34	12/10/2011	2692365	330251.8	Feet	18.65 ft	12.50 ft	50.17 ft
O35	12/10/2011	2694363	330254	Feet	19.18 ft	11.90 ft	49.35 ft



Bogue Banks
Master Beach Renourishment Plan



Core Name	Date	Easting	Northing	Unit	Penetration	Recovery	W.D. Corr.
O36	12/10/2011	2696365	330251.5	Feet	19.46 ft	15.63 ft	49.13 ft
O37	12/10/2011	2682364	328255.2	Feet	19.06 ft	14.90 ft	50.78 ft
O38	12/10/2011	2684368	328255.7	Feet	20.03 ft	13.80 ft	46.62 ft
O39	12/10/2011	2686365	328252.6	Feet	18.15 ft	17.75 ft	53.79 ft
O40	12/10/2011	2688362	328251.4	Feet	18.36 ft	18.80 ft	53.73 ft
O41	12/10/2011	2690364	328249.4	Feet	19.42 ft	16.25 ft	45.91 ft
O42	12/10/2011	2692366	328247	Feet	18.70 ft	13.80 ft	52.44 ft
O43	12/10/2011	2694364	328249.5	Feet	18.67 ft	14.40 ft	48.40 ft
O44	12/10/2011	2696367	328252.3	Feet	18.57 ft	14.30 ft	53.27 ft
O45	12/9/2011	2682365	326254.2	Feet	19.00 ft	19.00 ft	54.25 ft
O46	12/9/2011	2684367	326253	Feet	19.38 ft	15.25 ft	47.29 ft
O47	12/9/2011	2686366	326253.6	Feet	20.02 ft	18.00 ft	47.39 ft
O48	12/9/2011	2688363	326257.2	Feet	20.03 ft	0.00 ft	47.15 ft
O48	12/9/2011	2688363	326256.6	Feet	20.03 ft	8.83 ft	46.58 ft
O49	12/9/2011	2690351	326260.7	Feet	16.35 ft	16.50 ft	54.12 ft
O50	12/9/2011	2692364	326252.1	Feet	19.28 ft	19.80 ft	55.90 ft
O51	12/9/2011	2694364	326252.9	Feet	19.32 ft	17.33 ft	52.67 ft
O52	12/9/2011	2696365	326251.6	Feet	19.17 ft	18.33 ft	54.69 ft
O53	12/9/2011	2682357	324251	Feet	19.10 ft	17.50 ft	55.07 ft
O54	12/9/2011	2684362	324250.9	Feet	18.61 ft	19.00 ft	55.11 ft
O55	12/9/2011	2686362	324249	Feet	18.29 ft	19.20 ft	55.19 ft
O56	12/9/2011	2688369	324253	Feet	18.48 ft	16.75 ft	57.69 ft
O57	12/9/2011	2690363	324250.4	Feet	17.97 ft	18.00 ft	54.70 ft
O58	12/9/2011	2692364	324253.9	Feet	11.04 ft	9.70 ft	55.66 ft
O59	12/9/2011	2694361	324250.4	Feet	18.45 ft	18.20 ft	54.91 ft
O60	12/9/2011	2696356	324248.3	Feet	16.07 ft	13.10 ft	56.16 ft
O192	12/11/2011	2690549	329052.1	Feet	16.20 ft	17.30 ft	41.66 ft

Core Name	Date	Easting	Northing	Unit	Penetration	Recovery	W.D. Corr.
Y66	12/15/2011	2581068	330291	Feet	11.64 ft	10.20 ft	40.26 ft
Y67	12/15/2011	2582861	331179.8	Feet	16.37 ft	15.00 ft	39.90 ft
Y68	12/16/2011	2584653	332068.2	Feet	17.22 ft	17.50 ft	40.55 ft
Y69	12/16/2011	2586446	332954.7	Feet	17.39 ft	17.90 ft	40.36 ft
Y70	12/14/2011	2588236	333843.2	Feet	19.51 ft	19.20 ft	35.91 ft
Y71	12/15/2011	2581959	328498.1	Feet	12.53 ft	15.5 ft	45.70 ft
Y72	12/15/2011	2583749	329384.7	Feet	11.83 ft	13.50 ft	46.30 ft
Y73	12/16/2011	2585541	330274.7	Feet	16.21 ft	16.25 ft	46.20 ft
Y74	12/16/2011	2587334	331159.7	Feet	17.20 ft	19.10 ft	48.83 ft
Y75	12/14/2011	2589123	332046.5	Feet	16.91 ft	19.20 ft	47.79 ft
Y76	12/15/2011	2582843	326707.4	Feet	16.33 ft	15.10 ft	49.58 ft
Y77	12/15/2011	2584636	327594.7	Feet	15.08 ft	20.10 ft	47.78 ft
Y78	12/16/2011	2586423	328481	Feet	14.16 ft	16.90 ft	48.52 ft
Y79	12/14/2011	2588220	329370	Feet	13.89 ft	19.50 ft	48.67 ft
Y80	12/14/2011	2590015	330255.7	Feet	15.94 ft	19.40 ft	48.47 ft
Y81	12/15/2011	2583730	324915.7	Feet	16.06 ft	19.40 ft	50.65 ft
Y82	12/15/2011	2585524	325799.9	Feet	11.64 ft	14.60 ft	48.88 ft
Y83	12/16/2011	2587317	326689.7	Feet	13.05 ft	19.80 ft	51.46 ft
Y84	12/14/2011	2589108	327575.4	Feet	14.42 ft	19.70 ft	51.30 ft
Y85	12/15/2011	2584622	323122.1	Feet	15.01 ft	18.20 ft	51.37 ft
Y86	12/15/2011	2586413	324010.1	Feet	13.18 ft	18.10 ft	51.04 ft
Y87	12/16/2011	2588205	324899.2	Feet	13.06 ft	18.10 ft	52.49 ft
Y88	12/14/2011	2589997	325785.6	Feet	8.35 ft	12.50 ft	51.40 ft
Y89	12/15/2011	2585512	321327.7	Feet	11.96 ft	16.10 ft	51.85 ft
Y90	12/15/2011	2587301	322214.3	Feet	14.06 ft	19.30 ft	53.17 ft
Y91	12/15/2011	2589099	323108.1	Feet	14.03 ft	20.00 ft	52.48 ft
Y92	12/15/2011	2586399	319538.9	Feet	16.02 ft	20.00 ft	54.21 ft
Y93	12/15/2011	2588189	320426.9	Feet	11.76 ft	15.70 ft	53.52 ft
Y94	12/18/2011	2581965	330730.1	Feet	16.26 ft	16.90 ft	40.71 ft
Y95	12/18/2011	2581514	329387.4	Feet	17.07 ft	17.17 ft	43.75 ft
Y96	12/18/2011	2582408	329835.8	Feet	12.16 ft	13.00 ft	43.73 ft
Y97	12/18/2011	2583303	330281.6	Feet	15.97 ft	17.90 ft	49.07 ft
Y98	12/18/2011	2582849	328940.6	Feet	16.09 ft	19.10 ft	45.34 ft
Y101	12/18/2011	2584195	328487.1	Feet	16.04 ft	18.20 ft	49.89 ft
Y103	12/19/2011	2585533	328038.1	Feet	16.28 ft	20.00 ft	48.63 ft
Y107	12/19/2011	2585977	327138.4	Feet	10.10 ft	15.00 ft	51.06 ft
Y110	12/19/2011	2586423	326244.5	Feet	14.25 ft	18.50 ft	51.24 ft
Y114	12/19/2011	2586864	325349.2	Feet	10.26 ft	14.00 ft	52.10 ft
Y115	12/19/2011	2587761	325794.7	Feet	14.22 ft	18.30 ft	52.25 ft
Y119	12/19/2011	2585965	322670.2	Feet	14.20 ft	18.30 ft	51.85 ft



Bogue Banks
Master Beach Renourishment Plan



Core Name	Date	Easting	Northing	Unit	Penetration	Recovery	W.D. Corr.
Y120	12/18/2011	2586858	323115.1	Feet	16.19 ft	18.00 ft	51.76 ft
Y121	12/19/2011	2587756	323559.5	Feet	10.78 ft	13.10 ft	51.44 ft
Y122	12/18/2011	2586406	321774.2	Feet	15.76 ft	18.50 ft	51.55 ft
Y126	12/18/2011	2583757	331622.8	Feet	16.20 ft	18.2 ft	41.12 ft
Y129	12/18/2011	2584199	330723.8	Feet	16.18 ft	10.50 ft	44.67 ft
Y132	12/19/2011	2586888	332058.4	Feet	16.16 ft	17.50 ft	44.69 ft
Y135	12/18/2011	2584643	329827	Feet	16.02 ft	17.00 ft	47.22 ft
Y136	12/19/2011	2586438	330719.8	Feet	15.97 ft	18.00 ft	47.59 ft
Y141	12/19/2011	2587775	330265.1	Feet	11.92 ft	12.70 ft	48.36 ft
Y153	12/19/2011	2588650	324001.2	Feet	14.18 ft	17.00 ft	51.85 ft
Y154	12/19/2011	2589546	324444.9	Feet	14.17 ft	16.50 ft	51.33 ft
Y156	12/18/2011	2588204	322660.9	Feet	14.78 ft	17.50 ft	52.05 ft
Y157	12/18/2011	2589989	323550.8	Feet	10.96 ft	13.20 ft	52.80 ft
Y158	12/18/2011	2587745	321321.6	Feet	15.02 ft	18.50 ft	52.85 ft
Y160	12/18/2011	2589536	322210.1	Feet	15.15 ft	17.00 ft	52.31 ft



Bogue Banks
Master Beach Renourishment Plan



Core Name	Date	Easting	Northing	Unit	Penetration	Recovery	W.D. Corr.
Z165	12/16/2011	2562509	321709.8	Feet	15.07 ft	14.17 ft	42.57 ft
Z166	12/16/2011	2569560	323032.7	Feet	15.08 ft	17.80 ft	44.01 ft
Z167	12/16/2011	2571435	323719.2	Feet	16.42 ft	15.58 ft	42.66 ft
Z168	12/16/2011	2573317	324420.6	Feet	14.65 ft	16.00 ft	44.92 ft
Z169	12/16/2011	2575196	325102.7	Feet	15.13 ft	17.20 ft	45.59 ft
Z170	12/16/2011	2577076	325791.6	Feet	16.01 ft	17.50 ft	44.38 ft
Z171	12/16/2011	2578952	326487.8	Feet	16.00 ft	17.70 ft	45.42 ft
Z172	12/16/2011	2580828	327167.9	Feet	16.56 ft	19.00 ft	49.32 ft
Z173	12/16/2011	2563518	321406.6	Feet	16.58 ft	17.50 ft	45.85 ft
Z174	12/16/2011	2566101	321757.3	Feet	16.24 ft	18.30 ft	45.09 ft
Z175	12/16/2011	2568624	322687.4	Feet	15.37 ft	13.83 ft	44.07 ft
Z176	12/16/2011	2570500	323378.8	Feet	13.74 ft	18.00 ft	42.21 ft
Z177	12/16/2011	2572380	324063.6	Feet	16.16 ft	20.00 ft	42.97 ft
Z178	12/16/2011	2574257	324762.4	Feet	16.07 ft	20.00 ft	43.53 ft
Z179	12/16/2011	2576137	325450.3	Feet	10.53 ft	10.08 ft	43.69 ft
Z180	12/17/2011	2578013	326133.3	Feet	9.90 ft	9.50 ft	45.50 ft
Z181	12/17/2011	2579891	326828.3	Feet	16.63 ft	16.80 ft	45.91 ft
Z185	12/17/2011	2573912	325692	Feet	16.24 ft	19.33 ft	41.12 ft
Z186	12/17/2011	2574849	326037.8	Feet	14.62 ft	15.42 ft	41.44 ft
Z191	12/17/2011	2575538	324167.1	Feet	12.73 ft	15.33 ft	47.56 ft
Z193	12/16/2011	2560083	322745.3	Feet	17.38 ft	17.00 ft	35.73 ft
Z200	12/16/2011	2561367	322152.4	Feet	17.94 ft	17.25 ft	39.34 ft
Z213	12/17/2011	2573569	326629	Feet	14.98 ft	13.50 ft	34.13 ft
Z214	12/17/2011	2574505	326974.5	Feet	16.89 ft	16.80 ft	36.53 ft
Z215	12/17/2011	2575444	327325.2	Feet	17.64 ft	17.17 ft	32.13 ft
Z231	12/17/2011	2575789	326387.5	Feet	12.49 ft	10.33 ft	42.46 ft
Z232	12/17/2011	2576728	326732.5	Feet	14.12 ft	15.17 ft	43.64 ft
Z233	12/17/2011	2577666	327071.9	Feet	17.04 ft	17.92 ft	41.37 ft
Z234	12/17/2011	2578603	327418.9	Feet	16.16 ft	14.58 ft	42. 71 ft
Z235	12/17/2011	2579546	327766.4	Feet	16.06 ft	18.17 ft	44.80 ft
Z255	12/17/2011	2576481	324501.4	Feet	13.40 ft	15.83 ft	49.19 ft
Z256	12/17/2011	2577422	324854.6	Feet	16.01 ft	17.30 ft	46.26 ft
Z257	12/17/2011	2578360	325187.1	Feet	17.03 ft	19.10 ft	46.82 ft
Z258	12/17/2011	2579295	325544.5	Feet	15.01 ft	18.42 ft	46.84 ft
Z259	12/17/2011	2580234	325889.1	Feet	16.04 ft	18.33 ft	47.50 ft
Z276	12/18/2011	2575886	323220.7	Feet	13.97 ft	18.33 ft	47.01 ft
Z277	12/17/2011	2576823	323571	Feet	18.14 ft	13.60 ft	48.78 ft
Z277	12/17/2011	2576824	323569	Feet	7.04 ft	7.00 ft	48.00 ft
Z278	12/17/2011	2577765	323912.6	Feet	15.52 ft	20.00 ft	48.03 ft
Z279	12/17/2011	2578703	324259.8	Feet	16.04 ft	14.92 ft	46.97 ft



Bogue Banks
Master Beach Renourishment Plan



Core Name	Date	Easting	Northing	Unit	Penetration	Recovery	W.D. Corr
Z180	12/17/2011	2578013	326133.3	Feet	9.90 ft	9.50 ft	45.50 ft
Z181	12/17/2011	2579891	326828.3	Feet	16.63 ft	16.80 ft	45.91 ft
Z185	12/17/2011	2573912	325692	Feet	16.24 ft	19.33 ft	41.12 ft
Z186	12/17/2011	2574849	326037.8	Feet	14.62 ft	15.42 ft	41.44 ft
Z191	12/17/2011	2575538	324167.1	Feet	12.73 ft	15.33 ft	47.56 ft
Z193	12/16/2011	2560083	322745.3	Feet	17.38 ft	17.00 ft	35.73 ft
Z200	12/16/2011	2561367	322152.4	Feet	17.94 ft	17.25 ft	39.34 ft
Z213	12/17/2011	2573569	326629	Feet	14.98 ft	13.50 ft	34.13 ft
Z214	12/17/2011	2574505	326974.5	Feet	16.89 ft	16.80 ft	36.53 ft
Z215	12/17/2011	2575444	327325.2	Feet	17.64 ft	17.17 ft	32.13 ft
Z231	12/17/2011	2575789	326387.5	Feet	12.49 ft	10.33 ft	42.46 ft
Z232	12/17/2011	2576728	326732.5	Feet	14.12 ft	15.17 ft	43.64 ft
Z233	12/17/2011	2577666	327071.9	Feet	17.04 ft	17.92 ft	41.37 ft
Z234	12/17/2011	2578603	327418.9	Feet	16.16 ft	14.58 ft	42.71 ft
Z235	12/17/2011	2579546	327766.4	Feet	16.06 ft	18.17 ft	44.80 ft
Z255	12/17/2011	2576481	324501.4	Feet	13.40 ft	15.83 ft	49.19 ft
Z256	12/17/2011	2577422	324854.6	Feet	16.01 ft	17.30 ft	46.26 ft
Z257	12/17/2011	2578360	325187.1	Feet	17.03 ft	19.10 ft	46.82 ft
Z258	12/17/2011	2579295	325544.5	Feet	15.01 ft	18.42 ft	46.84 ft
Z259	12/17/2011	2580234	325889.1	Feet	16.04 ft	18.33 ft	47.50 ft
Z276	12/18/2011	2575886	323220.7	Feet	13.97 ft	18.33 ft	47.01 ft
Z277	12/17/2011	2576823	323571	Feet	18.14 ft	13.60 ft	48.78 ft
Z277	12/17/2011	2576824	323569	Feet	7.04 ft	7.00 ft	48.00 ft
Z278	12/17/2011	2577765	323912.6	Feet	15.52 ft	20.00 ft	48.03 ft
Z279	12/17/2011	2578703	324259.8	Feet	16.04 ft	14.92 ft	46.97 ft
Z298	12/18/2011	2576231	322284.7	Feet	14.02 ft	16.50 ft	46.91 ft
Z299	12/18/2011	2577167	322630.3	Feet	14.27 ft	18.50 ft	49.41 ft
Z300	12/18/2011	2578107	322970.3	Feet	16.24 ft	16.92 ft	49.74 ft
Z301	12/18/2011	2579045	323320.2	Feet	16.60 ft	18.00 ft	47.84 ft



Bogue Banks
Master Beach Renourishment Plan



Core Name	Date	Easting	Northing	Unit	Penetration	Recovery	W.D. Corr.
BI-1	4/10/2012	2568064	332679	Feet	5.21 ft	5.20 ft	4.5 ft
BI-2	4/10/2012	2568478	331313	Feet	5.92 ft	5.20 ft	5.2 ft
BI-3	4/10/2012	2568710	330774	Feet	6.20 ft	5.67 ft	4.9 ft
BI-4	4/10/2012	2569033	329825	Feet	4.91 ft	5.20 ft	6.6 ft
BI-5	4/10/2012	2569357	328880	Feet	5.55 ft	5.00 ft	6.6 ft



Bogue Banks
Master Beach Renourishment Plan



APPENDIX 2

CORE PENETRATION GRAPHS

Penetration Graph for Core No. 01, Run 1

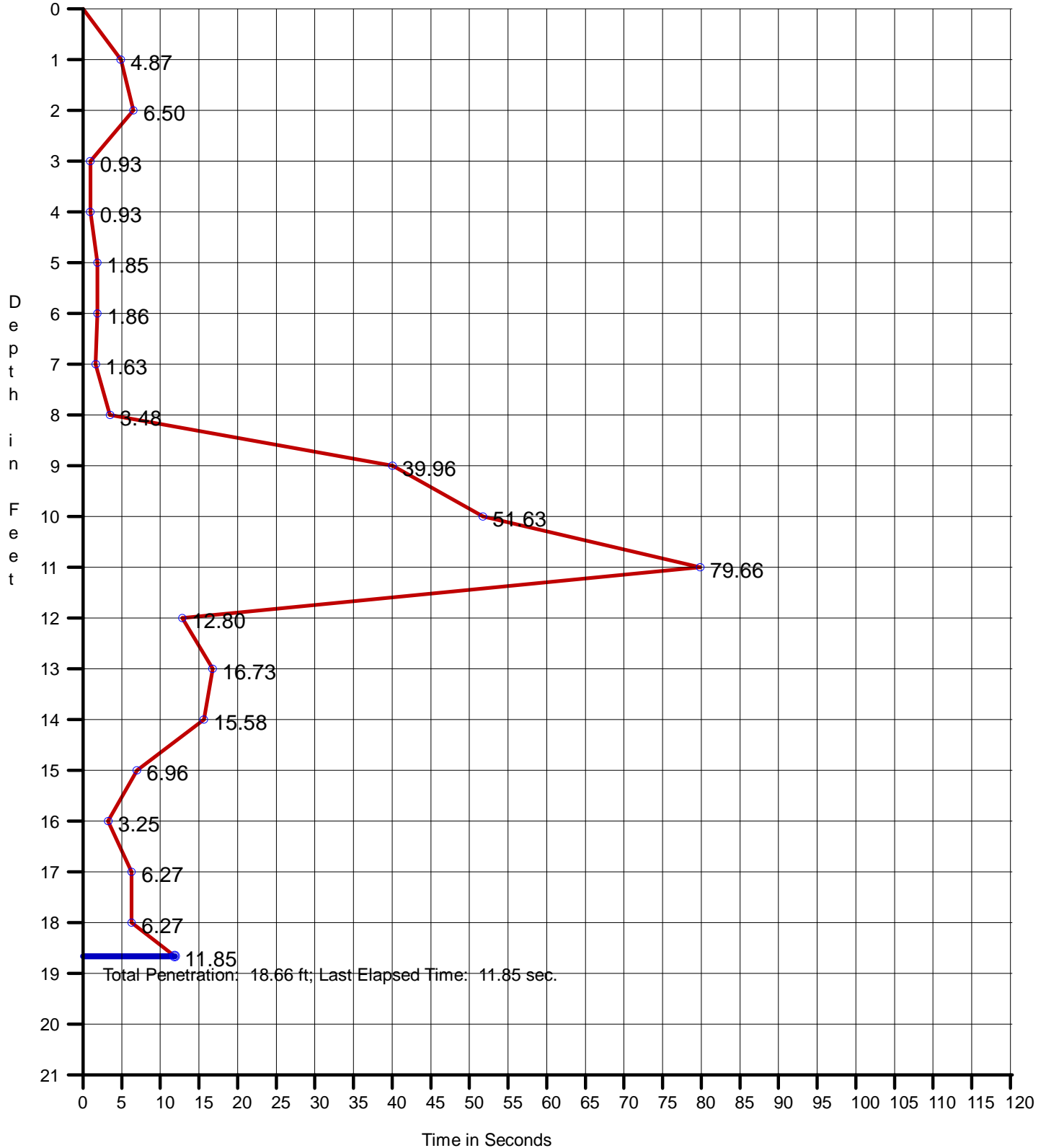
Date: 12/11/2011
Start Time: 2:37:06 PM
End Time: 2:41:39 PM

Penetration: 18.66 ft
Recovery: 18.3 ft
W. D. Corrected: 53.59 ft
W. D. Raw: 51.55 ft

Easting: 2688365.88
Northing: 338253.45
Coord. System: NCSPCS 83

Long: 76°42'38.6940"W
Lat: 034°39'27.3300"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 02, Run 1

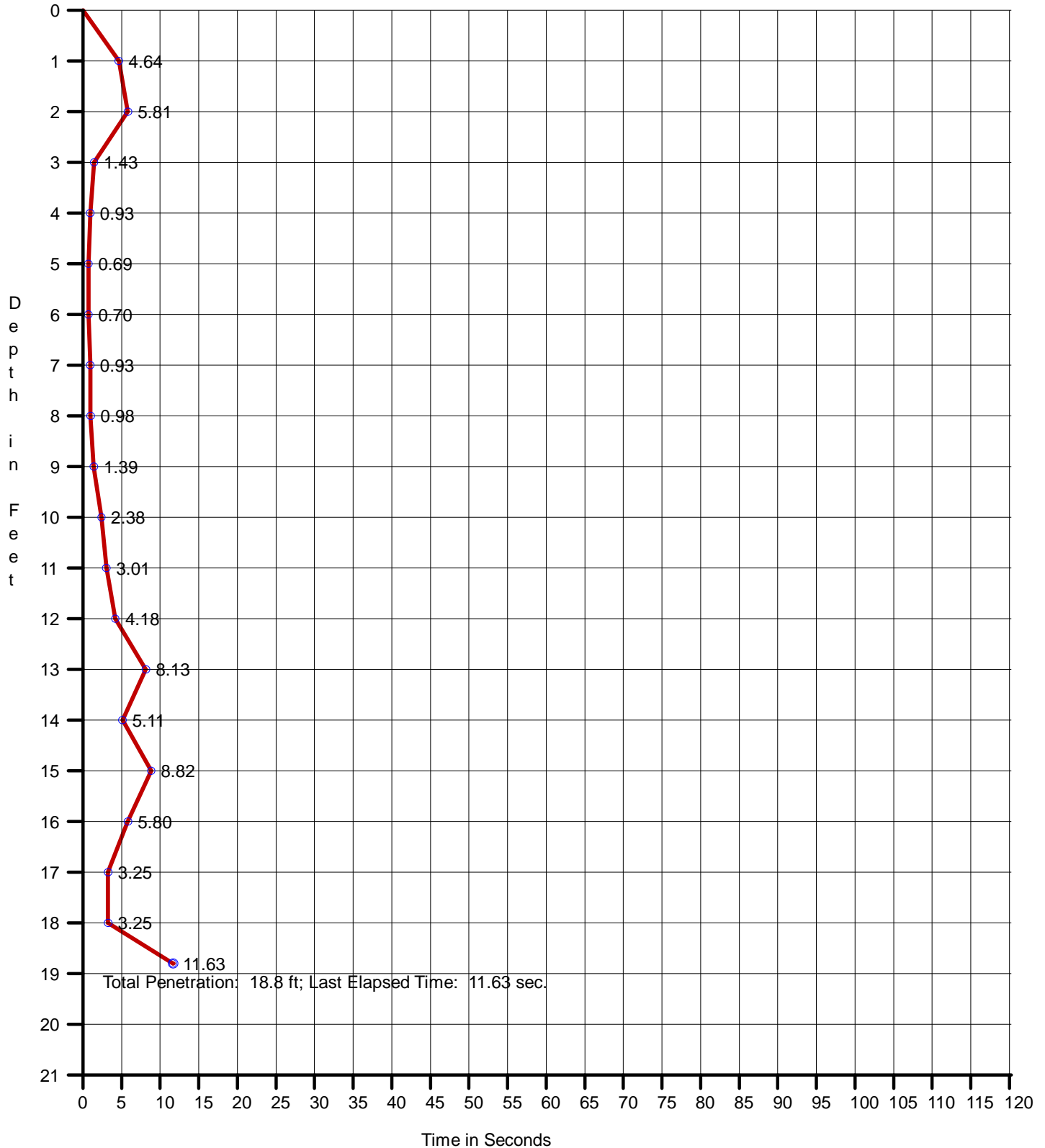
Date: 12/11/2011
Start Time: 2:01:15 PM
End Time: 2:02:28 PM

Penetration: 18.80 ft
Recovery: 19.6 ft
W. D. Corrected: 52.40 ft
W. D. Raw: 50.46 ft

Easting: 2690365.61
Northing: 338257.02
Coord. System: NCSPCS 83

Long: 76°42'14.7600"W
Lat: 034°39'26.9100"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 03, Run 1

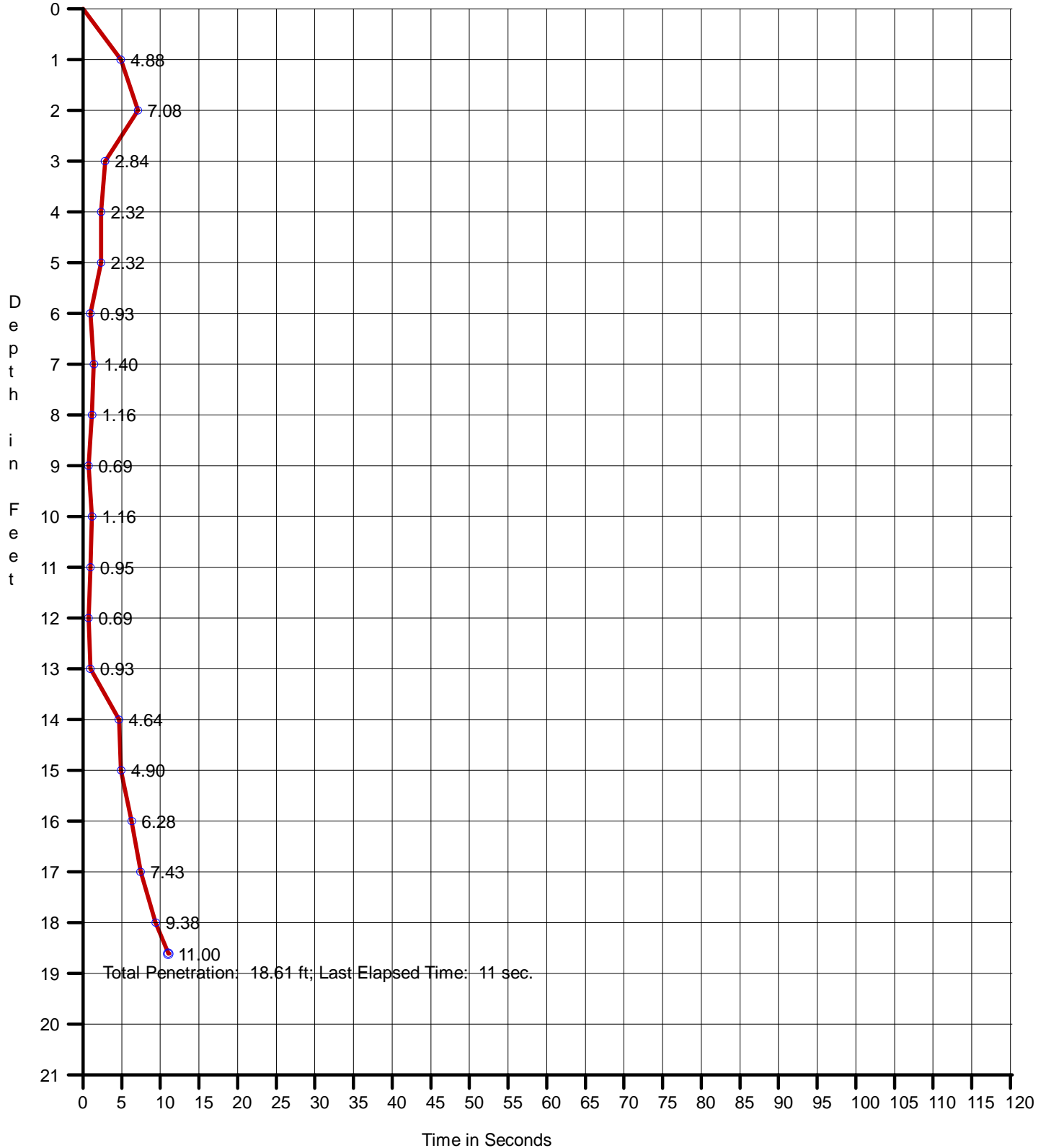
Date: 12/11/2011
Start Time: 1:34:41 PM
End Time: 1:35:52 PM

Penetration: 18.61 ft
Recovery: 16.60 ft
W. D. Corrected: 48.13 ft
W. D. Raw: 46.30 ft

Easting: 2692365.35
Northing: 338252.14
Coord. System: NCSPCS 83

Long: 76°41'50.8260"W
Lat: 034°39'26.4000"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 04, Run 1

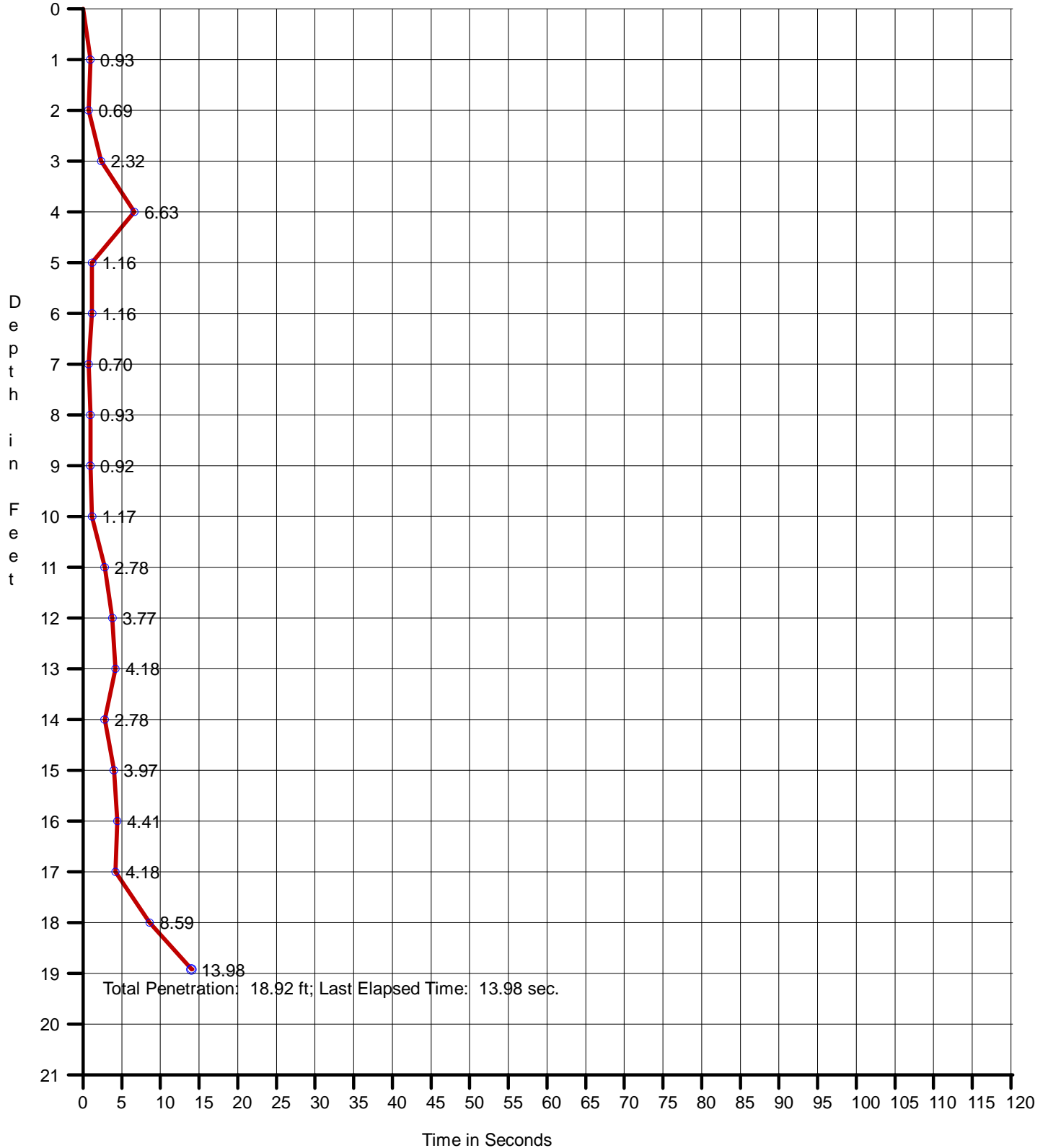
Date: 12/11/2011
Start Time: 1:12:17 PM
End Time: 1:13:22 PM

Penetration: 18.92 ft
Recovery: 16.75 ft
W. D. Corrected: 50.21 ft
W. D. Raw: 48.54 ft

Easting: 2694365.27
Northing: 338252.98
Coord. System: NCSPCS 83

Long: 76°41'26.8920"W
Lat: 034°39'25.9500"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 05, Run 1

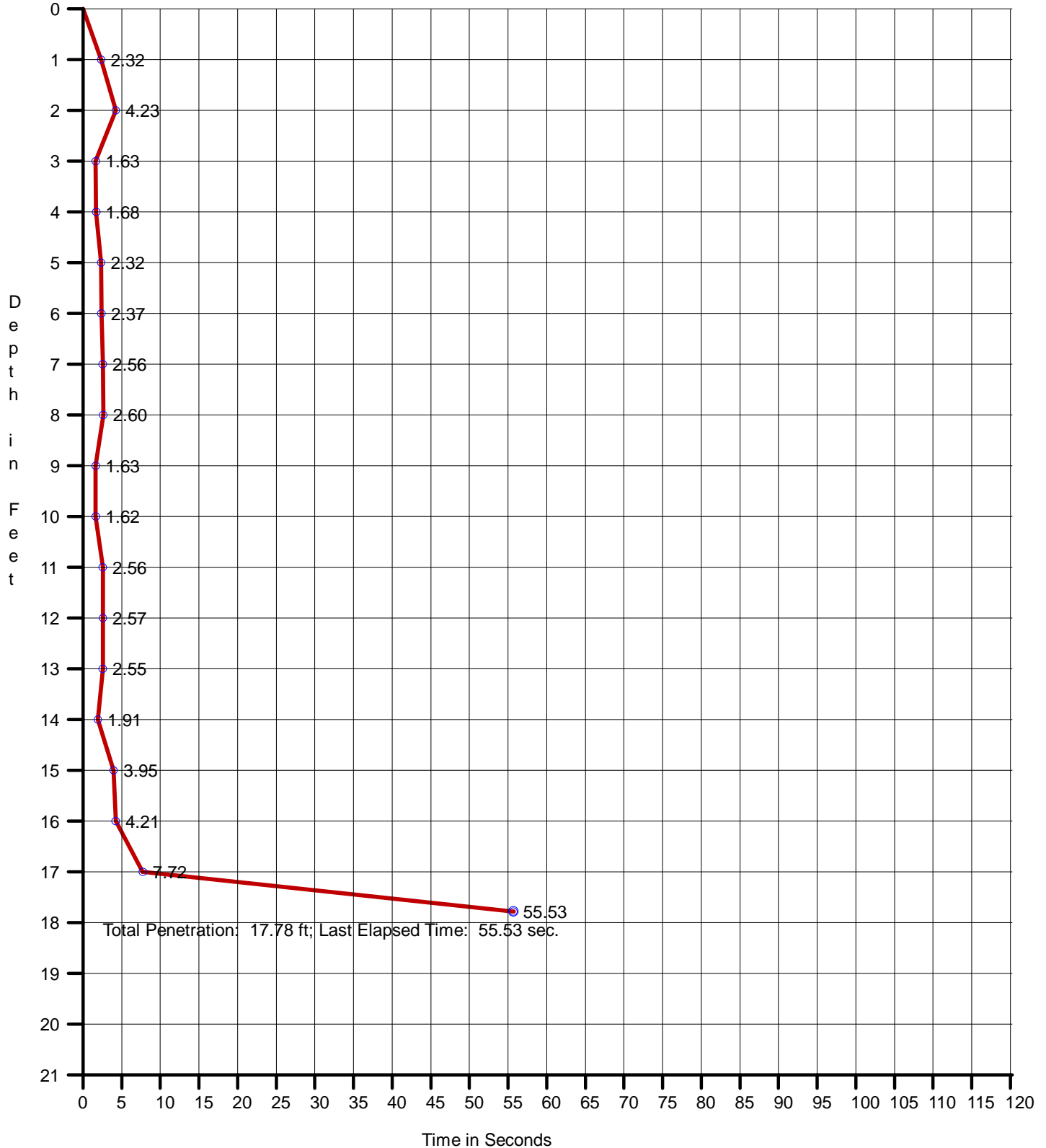
Date: 12/11/2011
Start Time: 3:10:13 PM
End Time: 3:12:01 PM

Penetration: 17.78 ft
Recovery: 18.60 ft
W. D. Corrected: 47.63 ft
W. D. Raw: 45.60 ft

Easting: 2688363.92
Northing: 336249.42
Coord. System: NCSPCS 83

Long: 76°42'39.2700"W
Lat: 034°39'07.5120"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O6, Run 1

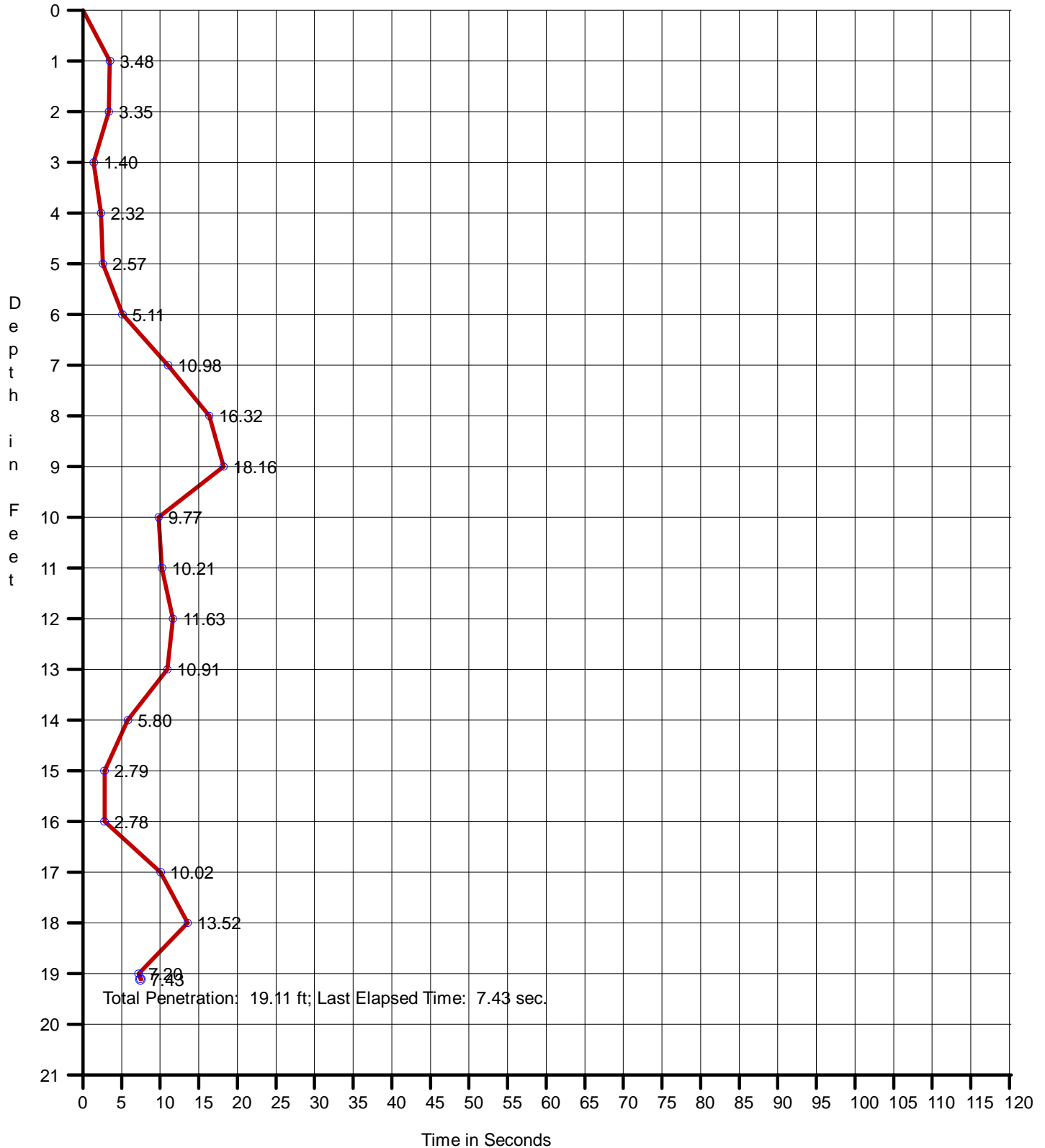
Date: 12/11/2011
Start Time: 3:37:23 PM
End Time: 3:40:02 PM

Penetration: 19.11 ft
Recovery: 19.00 ft
W. D. Corrected: 42.60 ft
W. D. Raw: 40.75 ft

Easting: 2690364.77
Northing: 336252.68
Coord. System: NCSPCS 83

Long: 76°42'15.3240"W
Lat: 034°39'07.0860"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 07, Run 1

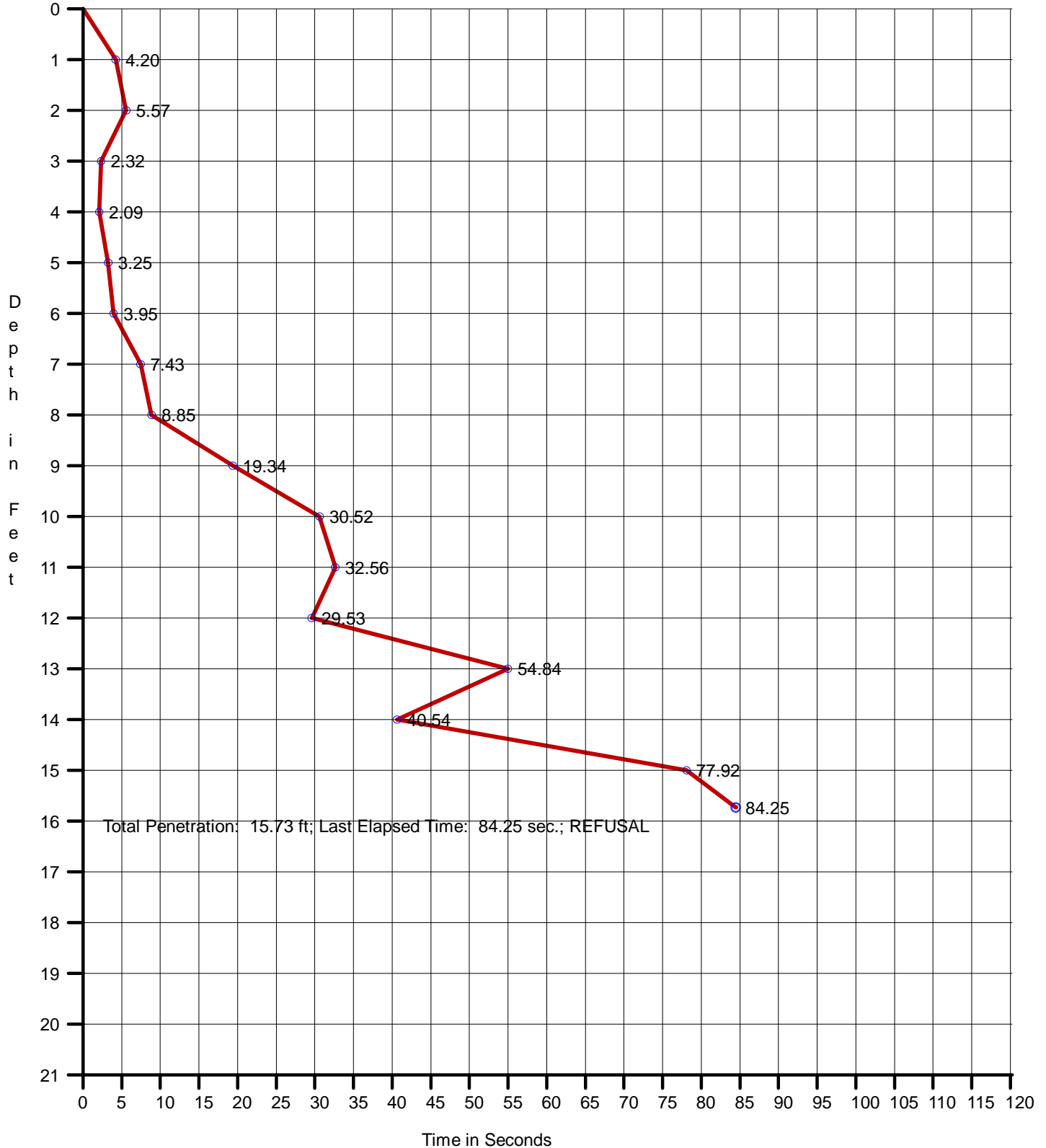
Date: 12/11/2011
Start Time: 4:02:23 PM
End Time: 4:09:11 PM

Penetration: 15.73 ft
Recovery: 13.60 ft
W. D. Corrected: 38.84 ft
W. D. Raw: 37.11 ft

Easting: 2692366.01
Northing: 336256.38
Coord. System: NCSPCS 83

Long: 76°41'51.3720"W
Lat: 034°39'06.6660"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O8, Run 1

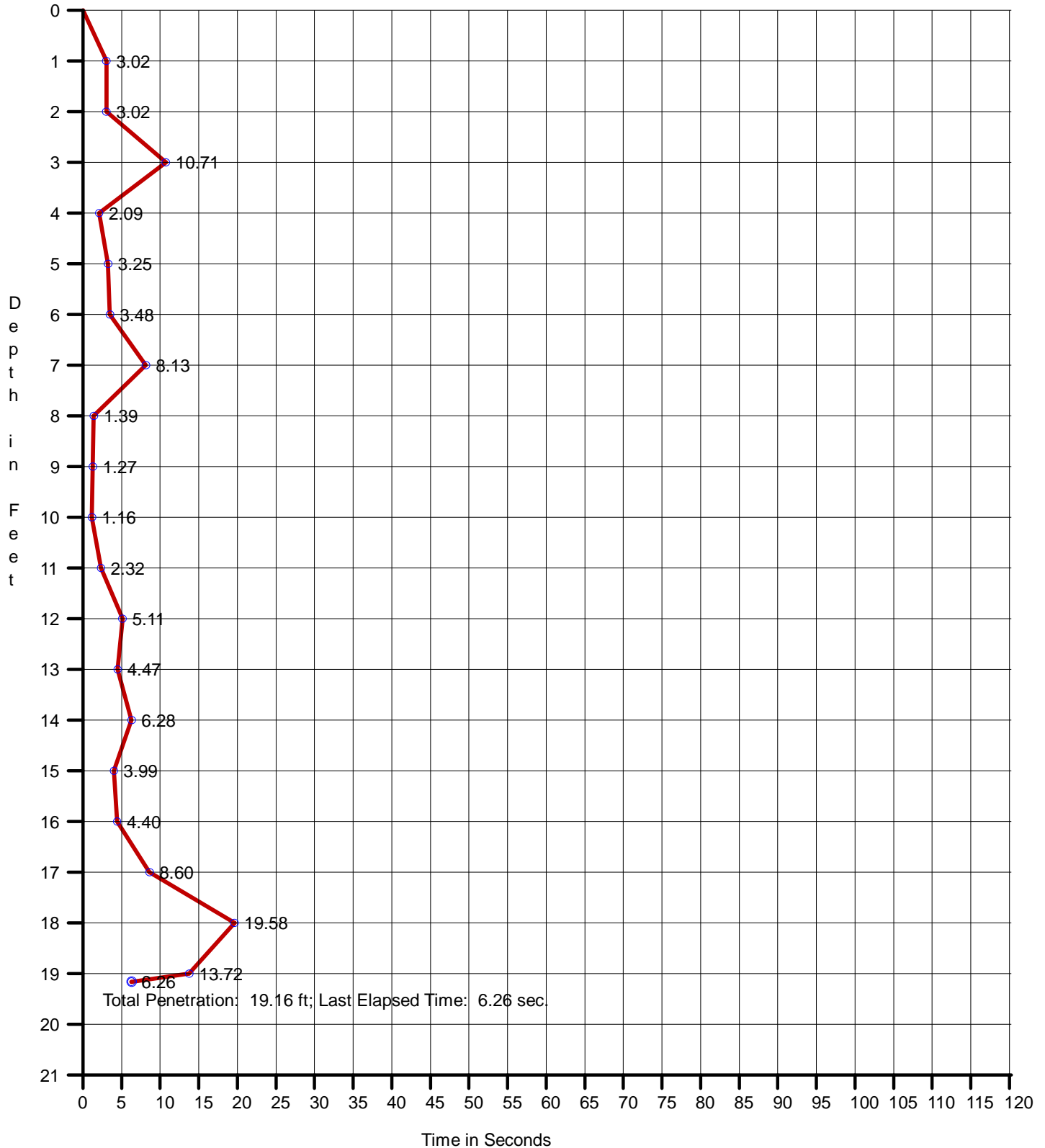
Date: 12/11/2011
Start Time: 4:32:24 PM
End Time: 4:35:22 PM

Penetration: 19.16 ft
Recovery: 19.00 ft
W. D. Corrected: 52.12 ft
W. D. Raw: 50.76 ft

Easting: 2694363.61
Northing: 336253.01
Coord. System: NCSPCS 83

Long: 76°41'27.4680"W
Lat: 034°39'06.1740"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 09, Run 1

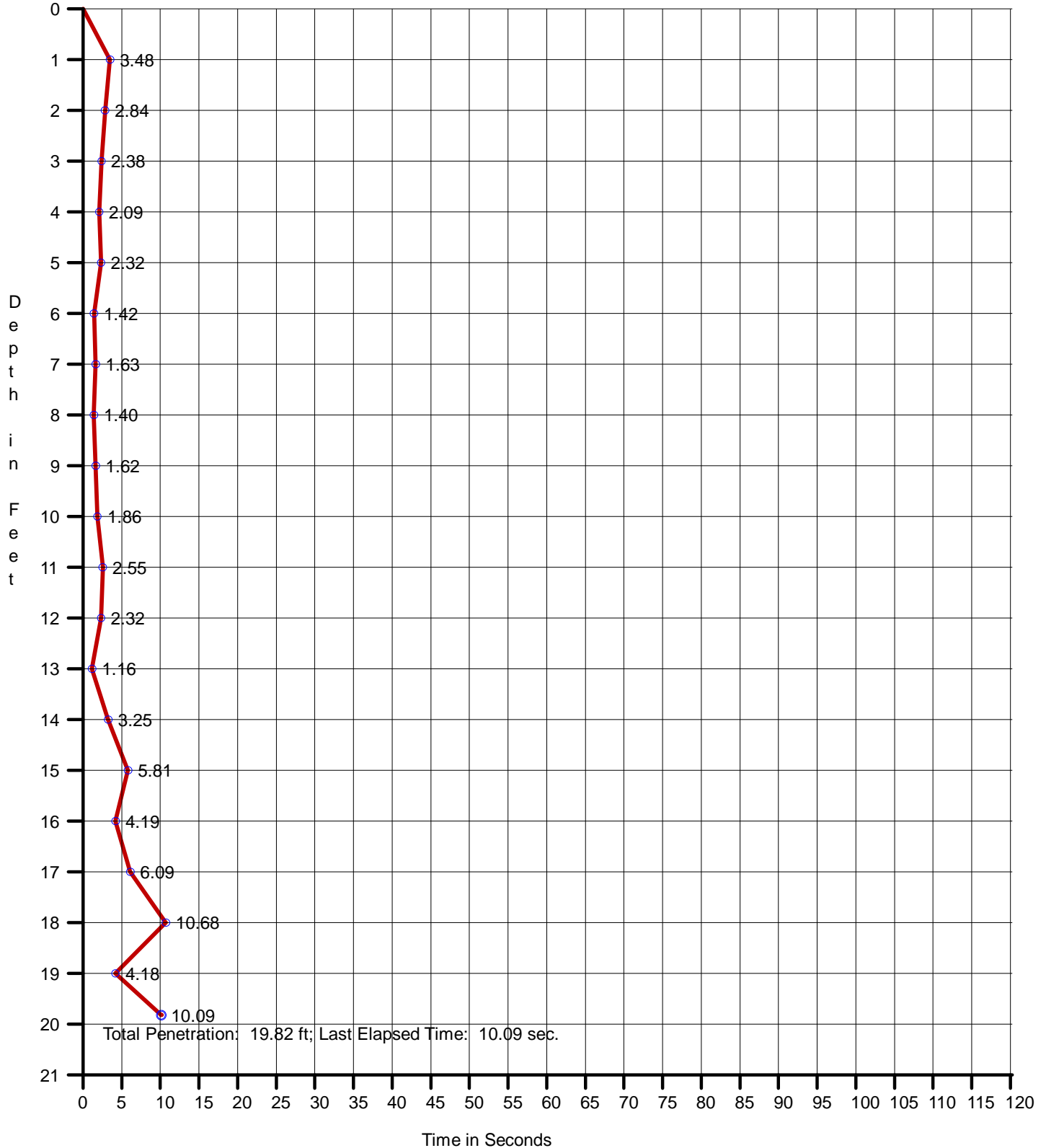
Date: 12/12/2011
Start Time: 10:29:38 AM
End Time: 10:30:50 AM

Penetration: 19.82 ft
Recovery: 18.50 ft
W. D. Corrected: 49.87 ft
W. D. Raw: 50.47 ft

Easting: 2688362.57
Northing: 334253.48
Coord. System: NCSPCS 83

Long: 76°42'39.8340"W
Lat: 034°38'47.7720"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O10, Run 1

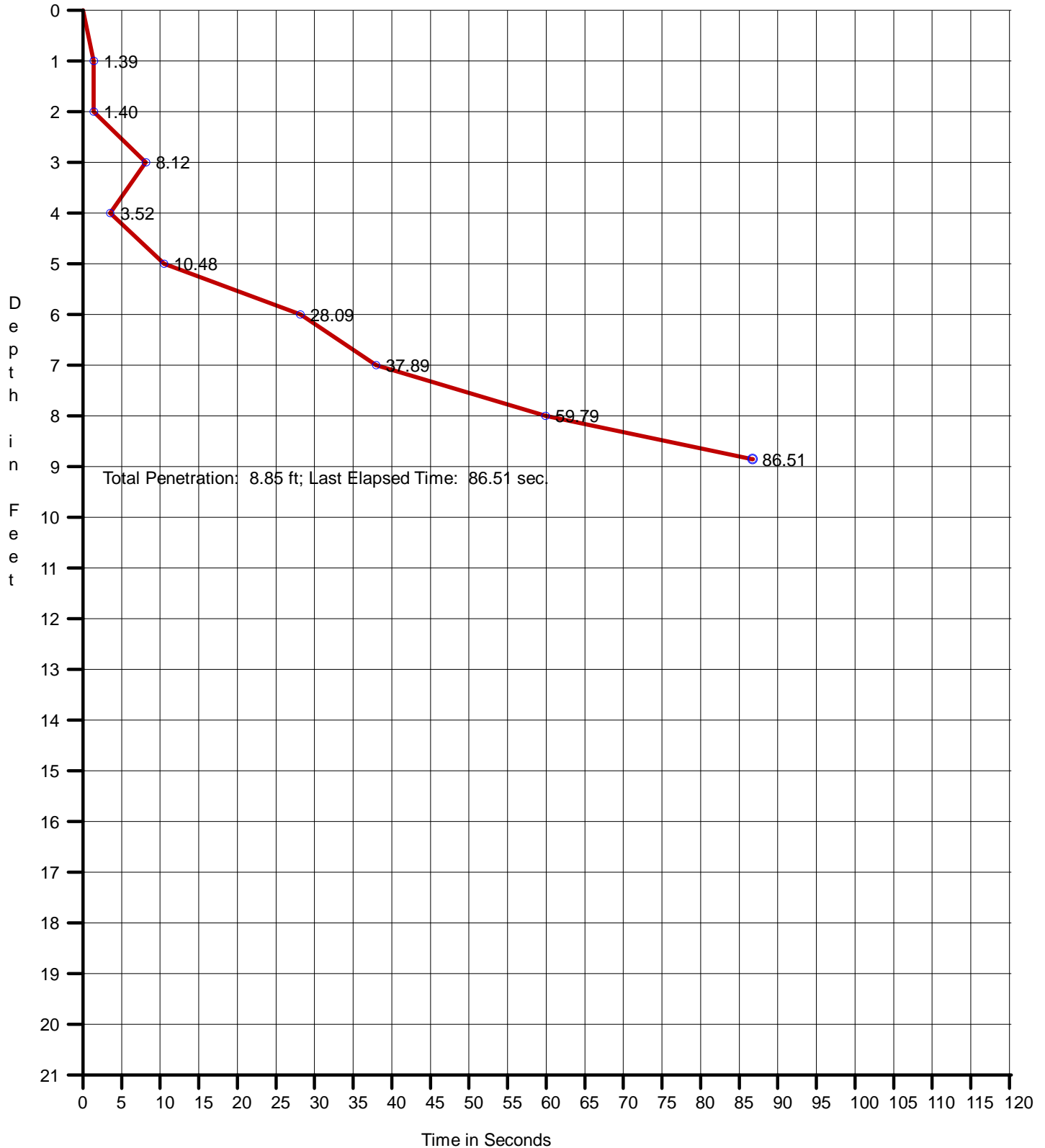
Date: 12/12/2011
Start Time: 9:23:14 AM
End Time: 9:27:11 AM

Penetration: 8.85 ft
Recovery: 6.20 ft
W. D. Corrected: 38.24 ft
W. D. Raw: 39.54 ft

Easting: 2690366.91
Northing: 334249.95
Coord. System: NCSPCS 83

Long: 76°42'15.8520"W
Lat: 034°38'47.2800"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O10, Run 2

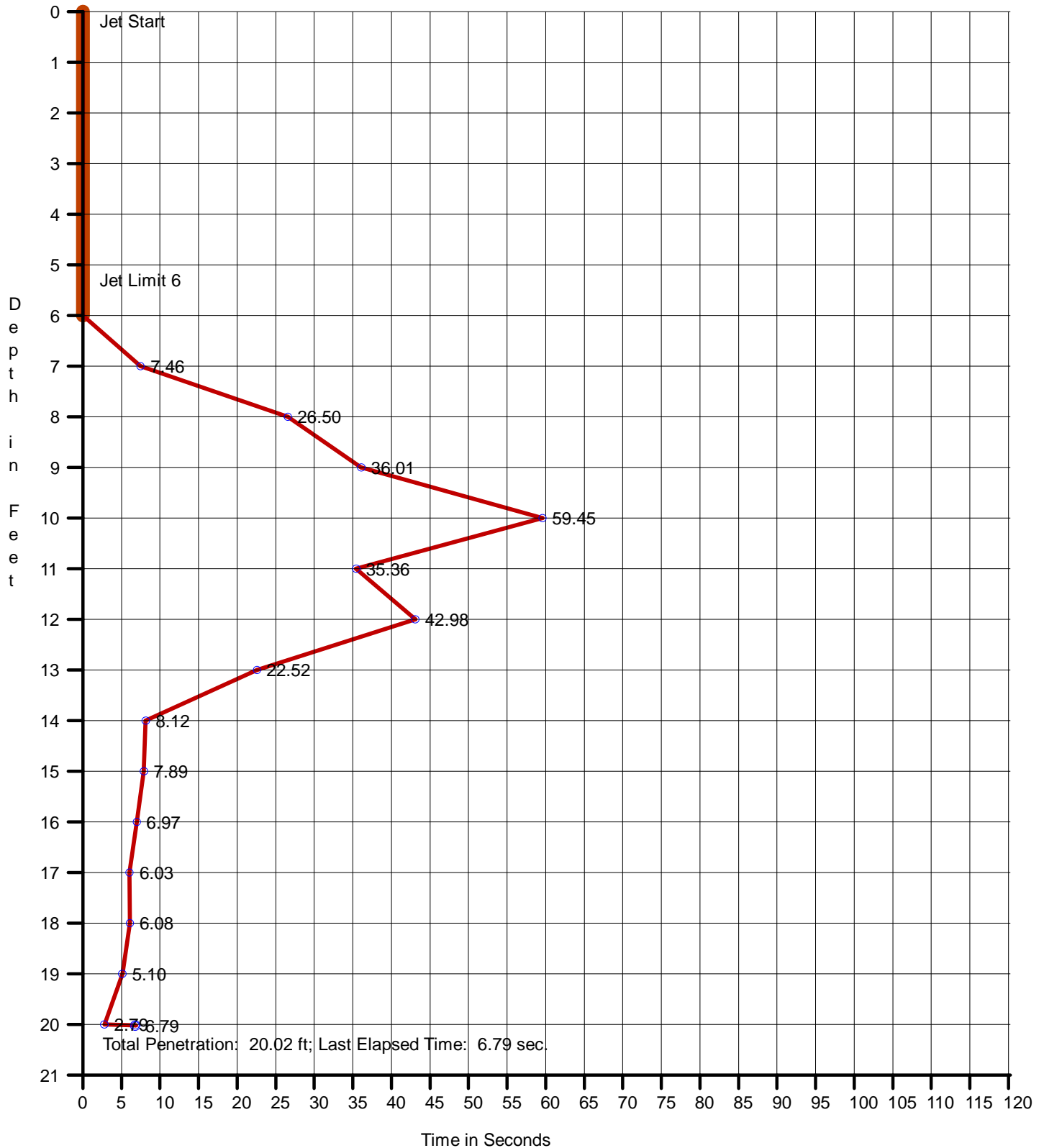
Date: 12/12/2011
Start Time: 10:00:52 AM
End Time: 10:06:36 AM

Penetration: 20.02 ft
Recovery: 15.00 ft
W. D. Corrected: 38.03 ft
W. D. Raw: 38.94 ft

Easting: 2690363.71
Northing: 334251.14
Coord. System: NCSPCS 83

Long: 76°42'15.8880"W
Lat: 034°38'47.2920"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 011, Run 1

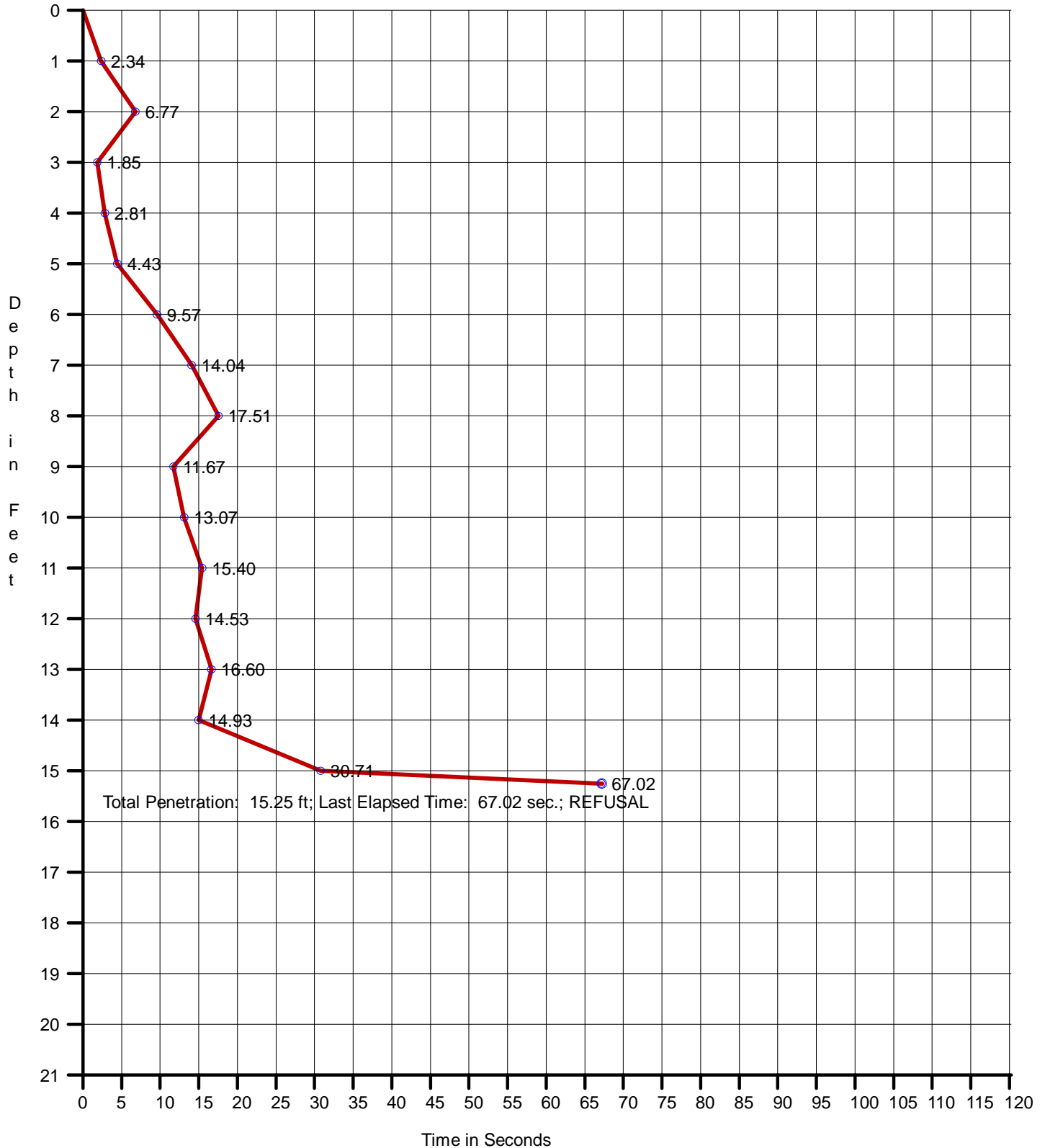
Date: 12/12/2011
Start Time: 9:01:35 AM
End Time: 9:05:39 AM

Penetration: 15.25 ft
Recovery: 17.00 ft
W. D. Corrected: 37.59 ft
W. D. Raw: 39.12 ft

Easting: 2692362.90
Northing: 334252.57
Coord. System: NCSPCS 83

Long: 76°41'51.9660"W
Lat: 034°38'46.8480"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 012, Run 1

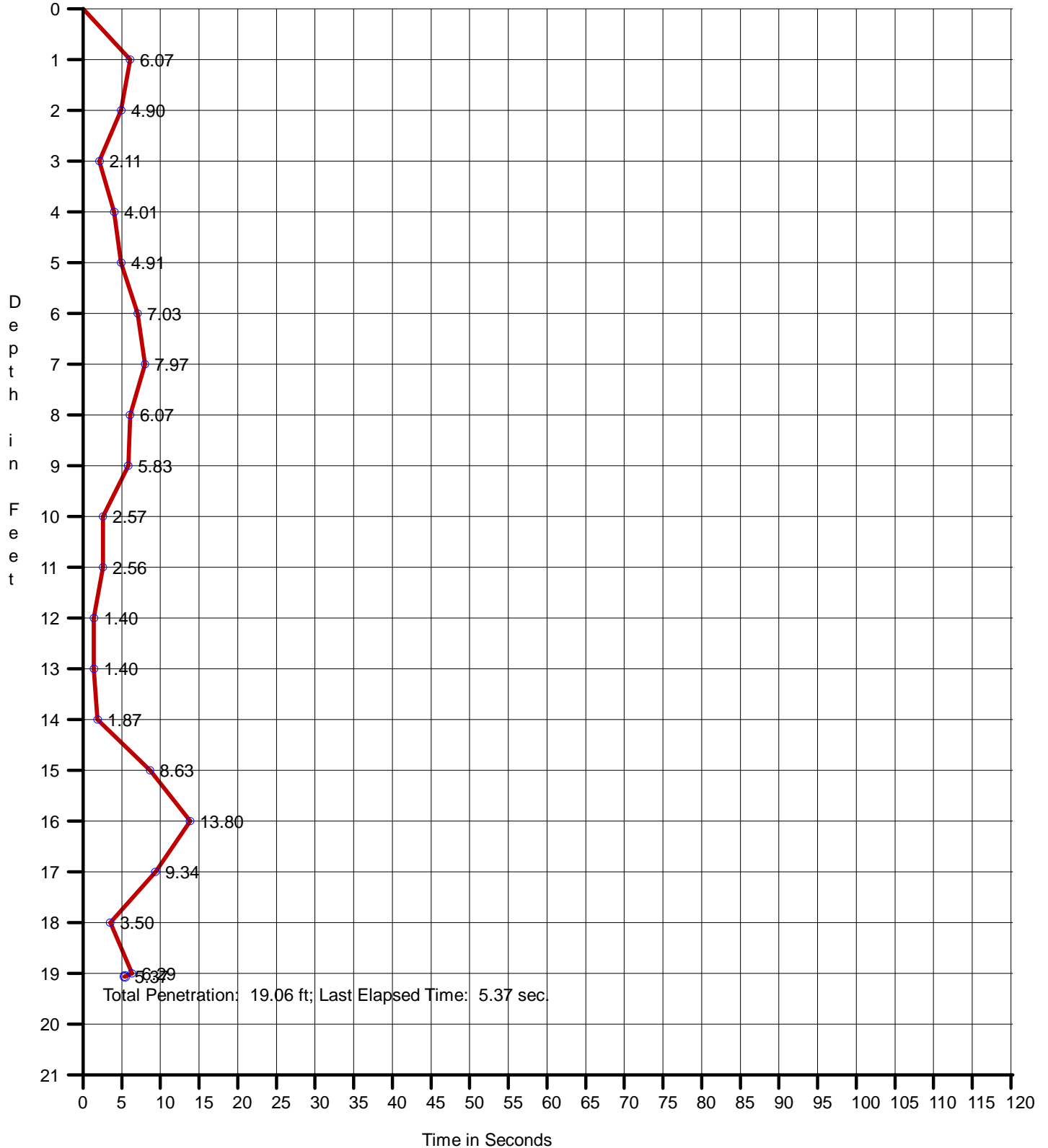
Date: 12/12/2011
Start Time: 8:39:18 AM
End Time: 8:41:04 AM

Penetration: 19.06 ft
Recovery: 18.00 ft
W. D. Corrected: 46.61 ft
W. D. Raw: 48.10 ft

Easting: 2694365.04
Northing: 334250.71
Coord. System: NCSPCS 83

Long: 76°41'28.0080"W
Lat: 034°38'46.3740"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O13, Run 2

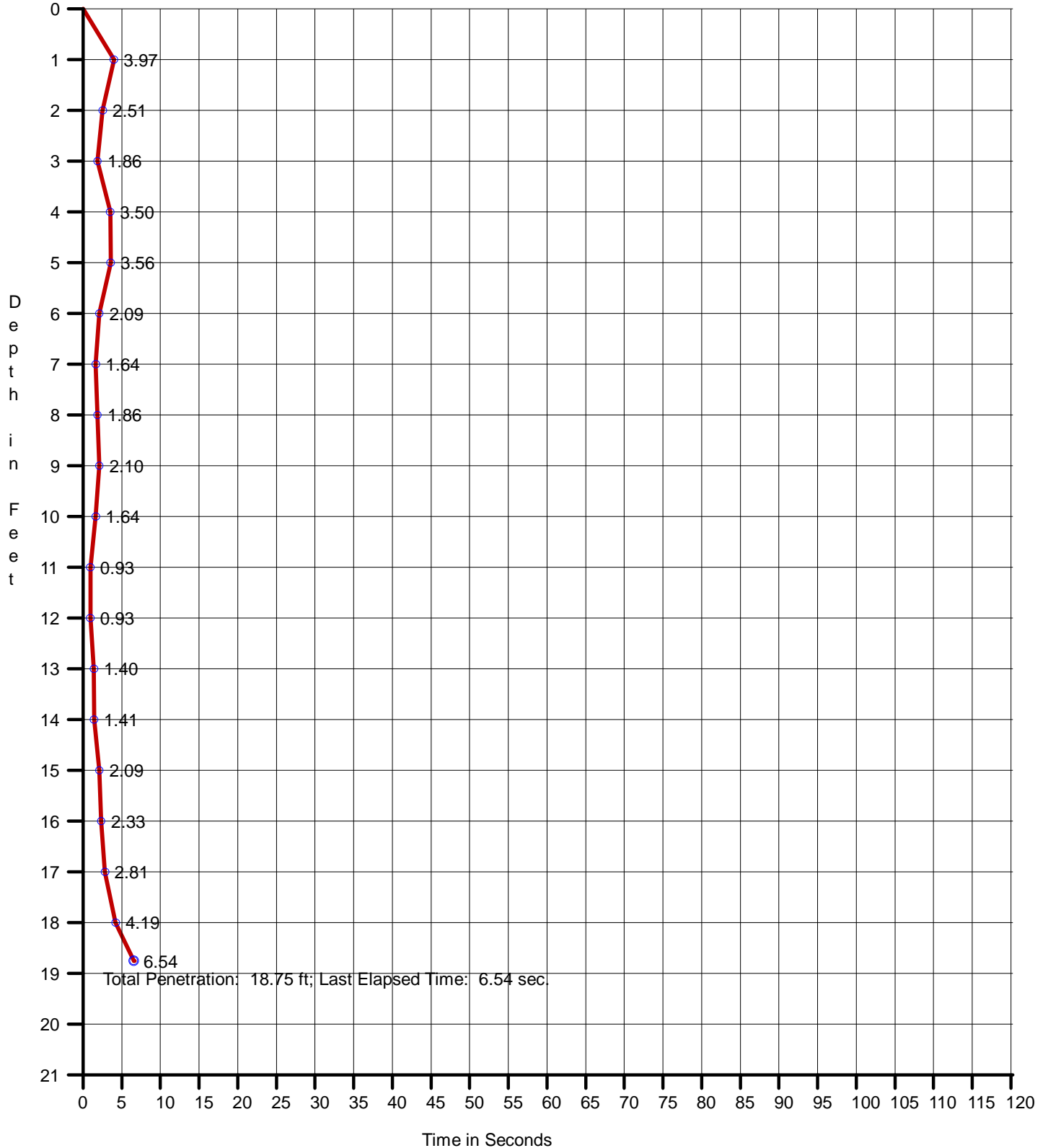
Date: 12/12/2011
Start Time: 8:18:01 AM
End Time: 8:18:58 AM

Penetration: 18.75 ft
Recovery: 14.10 ft
W. D. Corrected: 47.29 ft
W. D. Raw: 48.70 ft

Easting: 2696360.16
Northing: 334250.97
Coord. System: NCSPCS 83

Long: 76°41'04.1340"W
Lat: 034°38'45.9120"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 014, Run 1

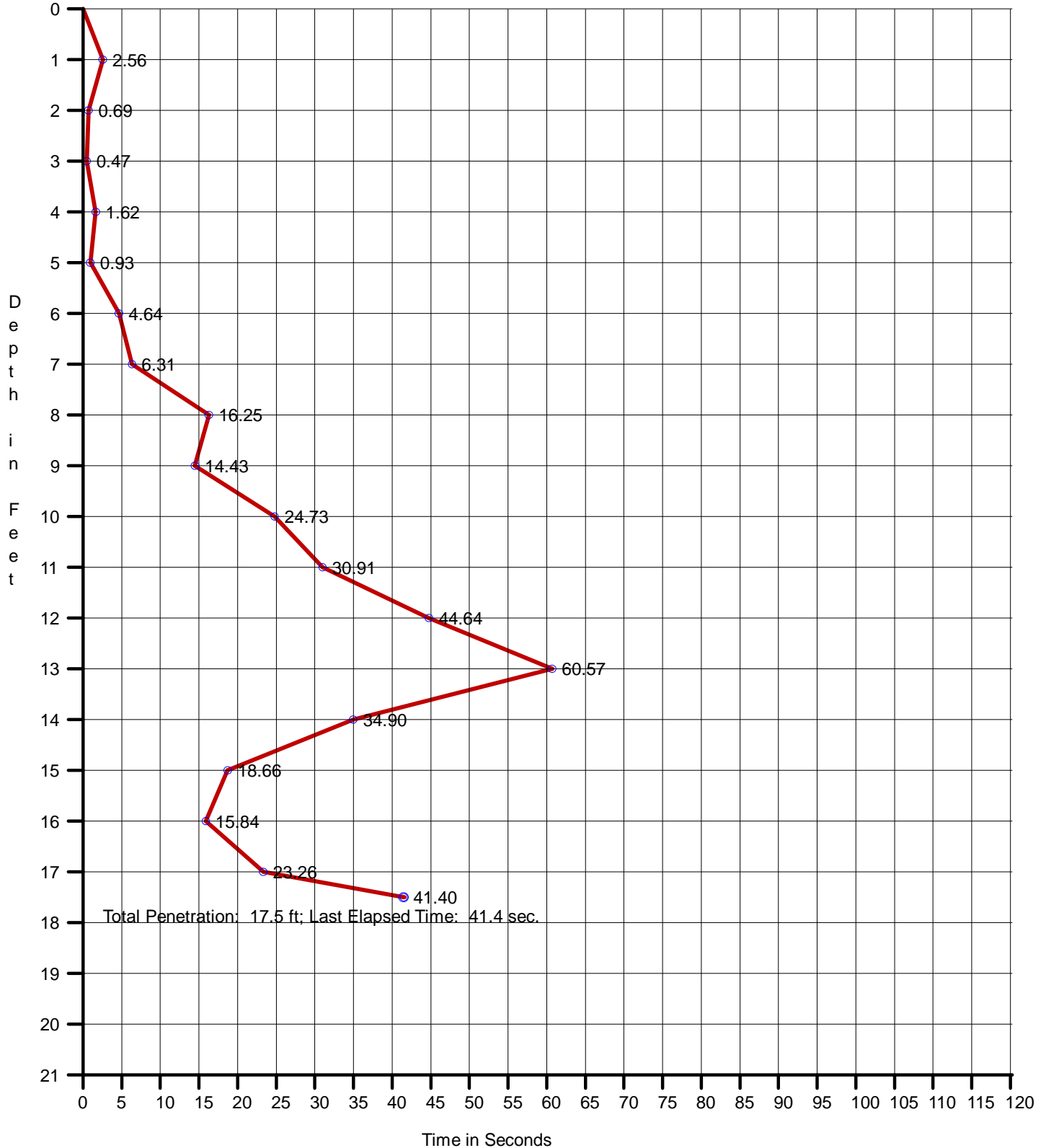
Date: 12/12/2011
Start Time: 1:32:18 PM
End Time: 1:38:01 PM

Penetration: 17.50 ft
Recovery: 11.92 ft
W. D. Corrected: 42.65 ft
W. D. Raw: 41.05 ft

Easting: 2685621.80
Northing: 327738.93
Coord. System: NCSPCS 83

Long: 76°43'14.4240"W
Lat: 034°37'43.9740"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 015, Run 1

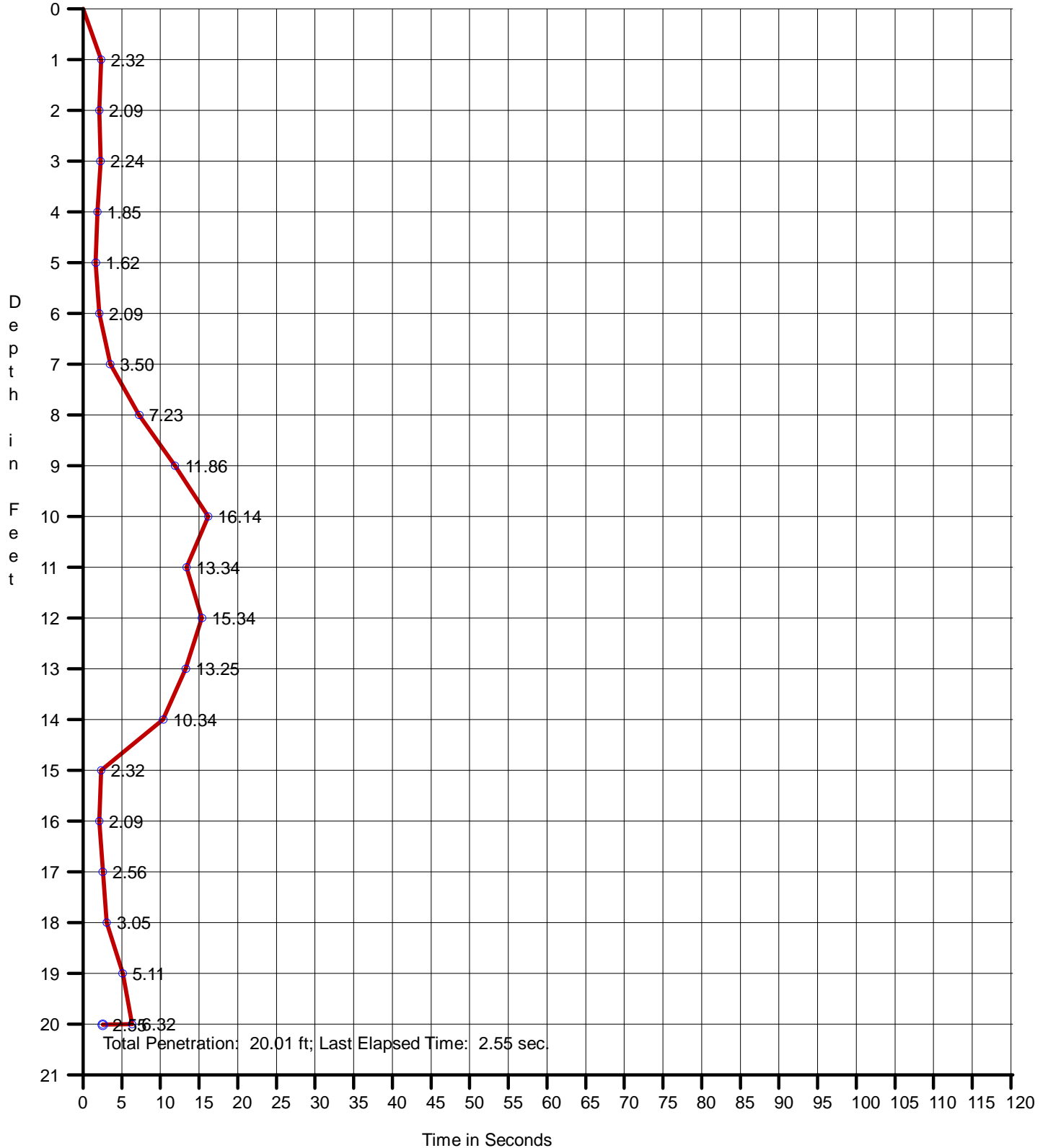
Date: 12/12/2011
Start Time: 1:10:29 PM
End Time: 1:12:36 PM

Penetration: 20.01 ft
Recovery: 12.25 ft
W. D. Corrected: 41.32 ft
W. D. Raw: 39.98 ft

Easting: 2685079.19
Northing: 330634.85
Coord. System: NCSPCS 83

Long: 76°43'20.1180"W
Lat: 034°38'12.7380"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O16, Run 1

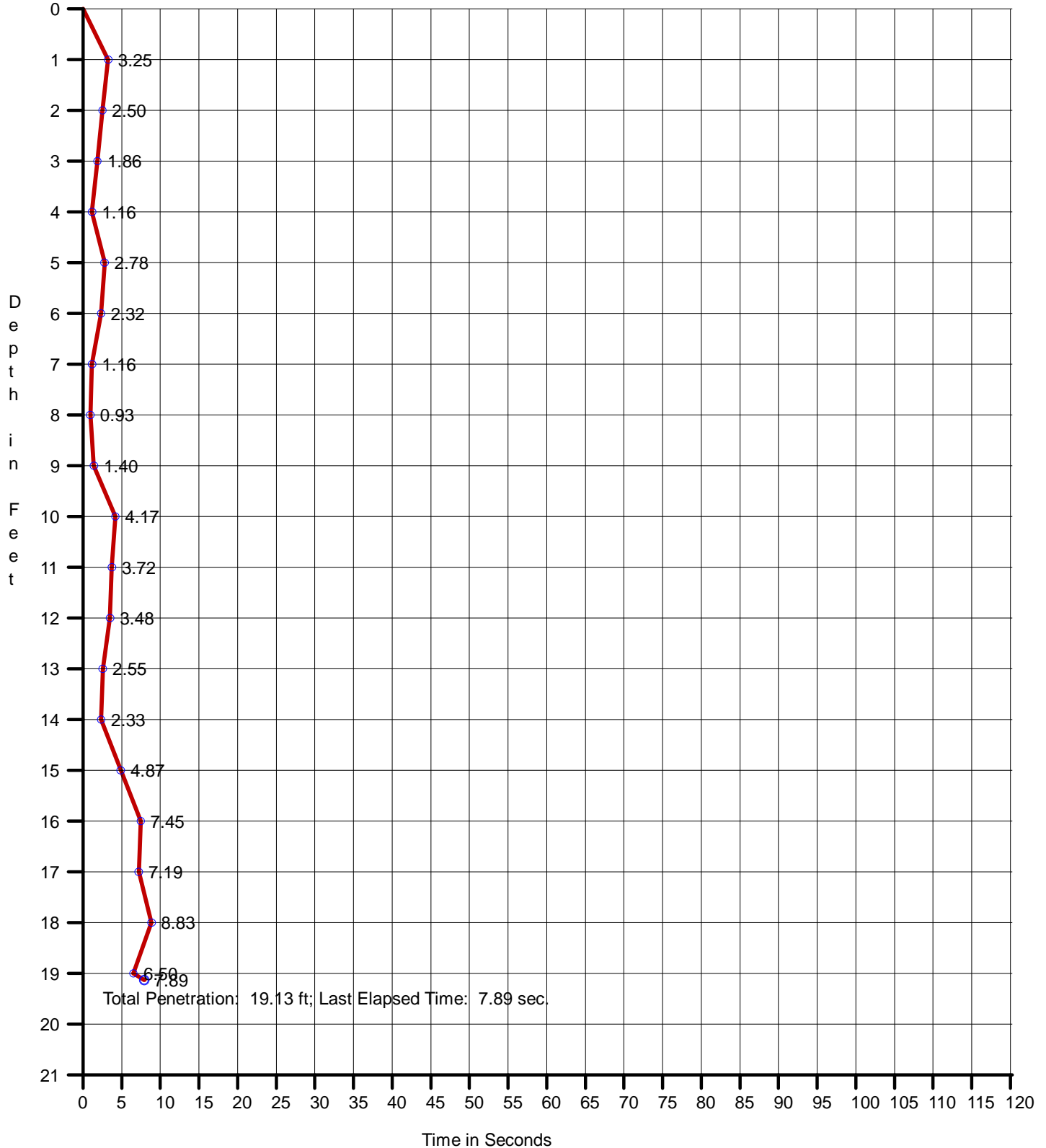
Date: 12/12/2011
Start Time: 10:52:35 AM
End Time: 10:56:26 AM

Penetration: 19.13 ft
Recovery: 18.20 ft
W. D. Corrected: 48.52 ft
W. D. Raw: 48.95 ft

Easting: 2686364.14
Northing: 332253.27
Coord. System: NCSPCS 83

Long: 76°43'04.3020"W
Lat: 034°38'28.4460"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 017, Run 1

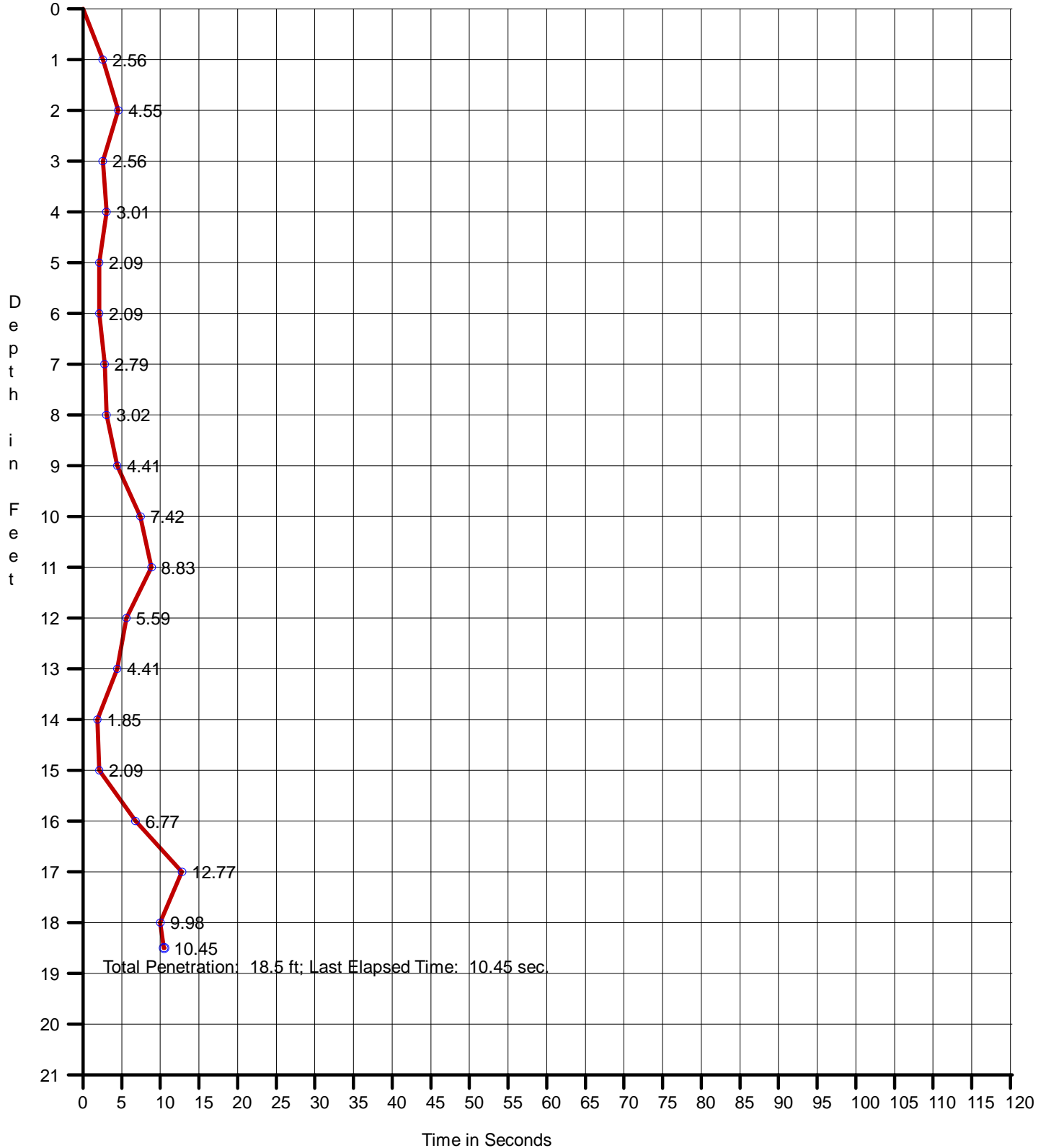
Date: 12/12/2011
Start Time: 11:16:03 AM
End Time: 11:17:40 AM

Penetration: 18.50 ft
Recovery: 17.8 ft
W. D. Corrected: 49.65 ft
W. D. Raw: 49.73 ft

Easting: 2688366.21
Northing: 332247.90
Coord. System: NCSPCS 83

Long: 76°42'40.3440"W
Lat: 034°38'27.9420"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O18, Run 1

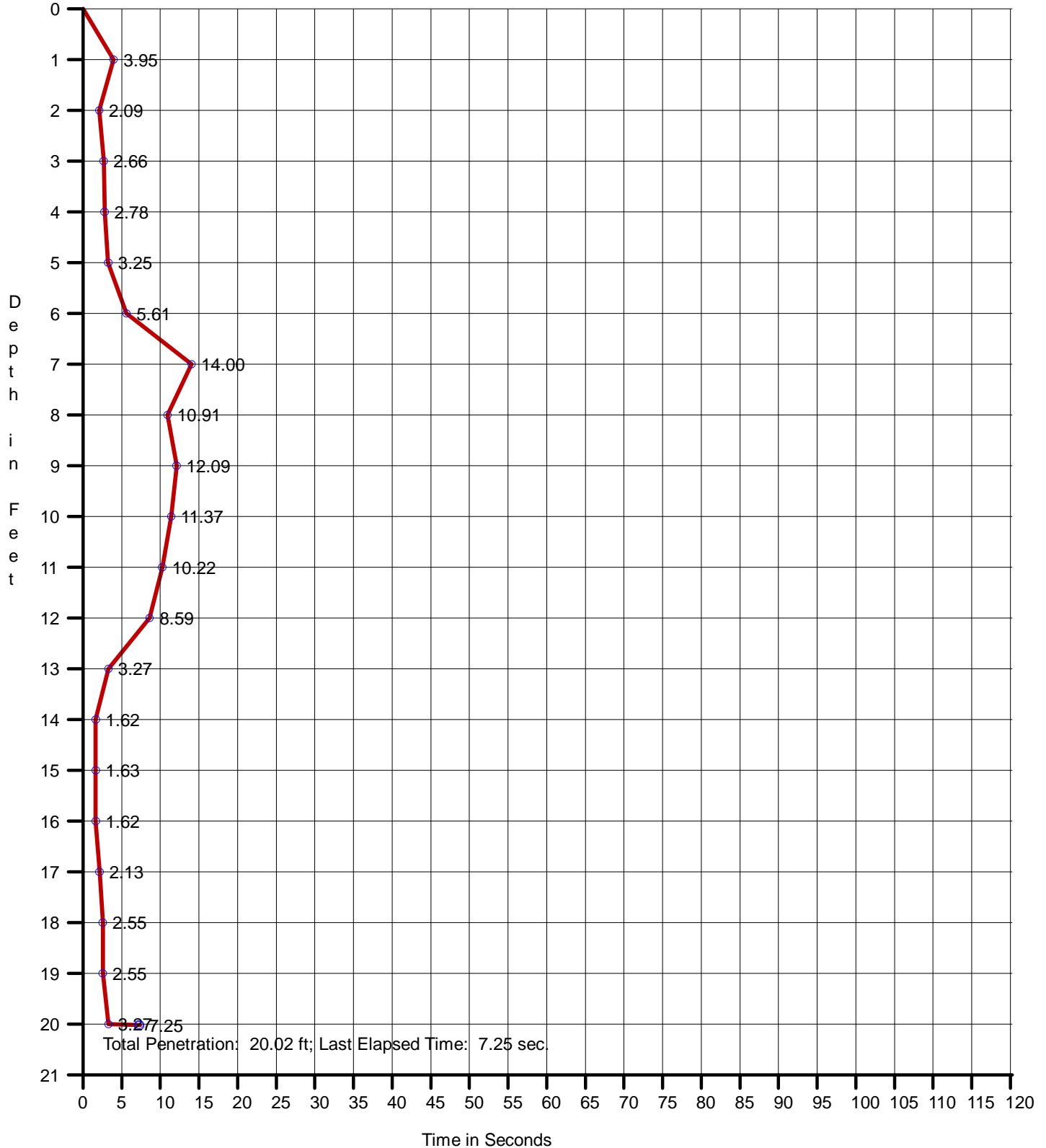
Date: 12/12/2011
Start Time: 11:49:17 AM
End Time: 11:51:10 AM

Penetration: 20.02 ft
Recovery: 17.80 ft
W. D. Corrected: 44.07 ft
W. D. Raw: 43.69 ft

Easting: 2690367.29
Northing: 332252.65
Coord. System: NCSPCS 83

Long: 76°42'16.3980"W
Lat: 034°38'27.5280"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 019, Run 1

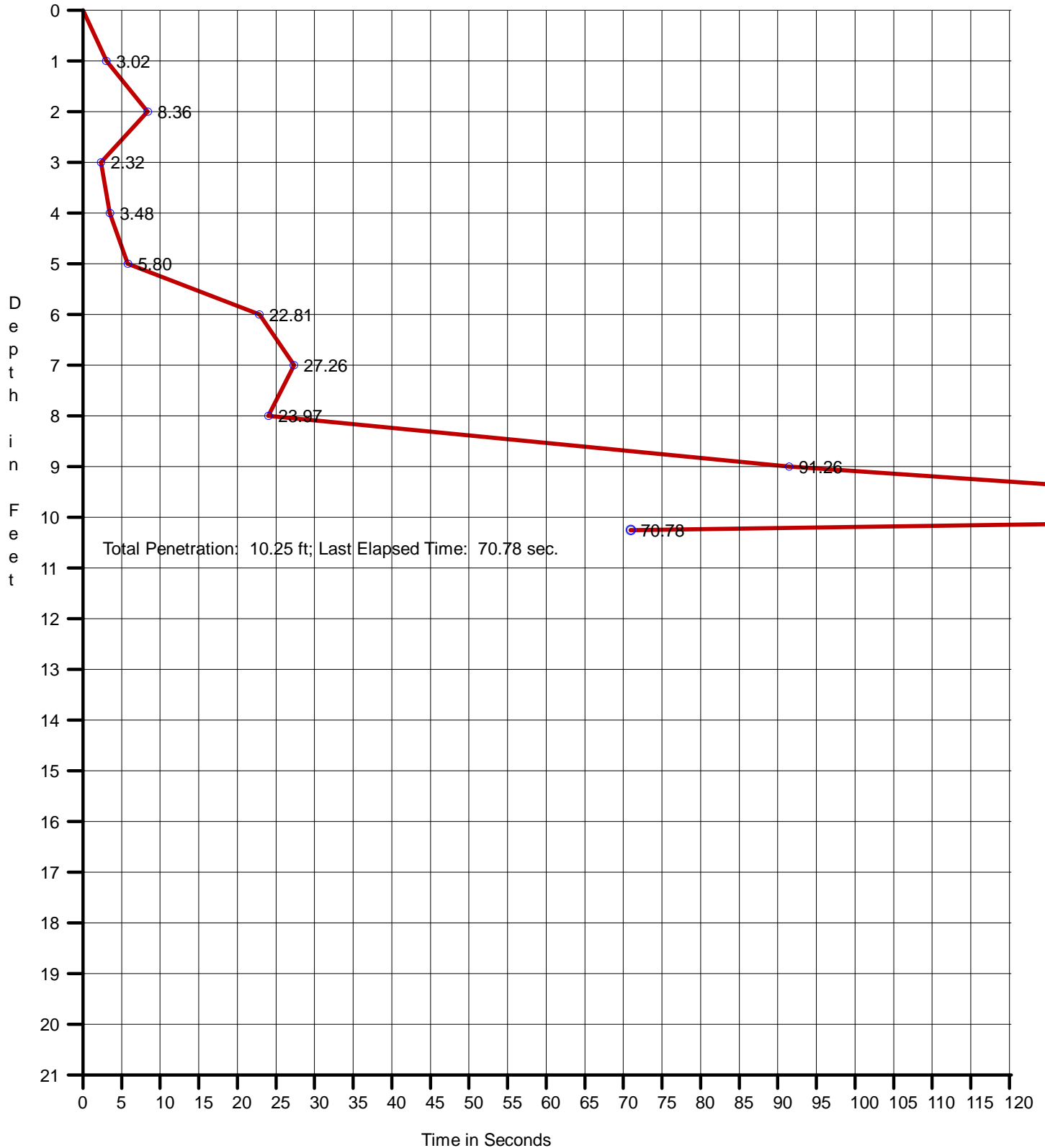
Date: 12/11/2011
Start Time: 9:31:30 AM
End Time: 9:38:56 AM

Penetration: 10.25 ft
Recovery: 8.50 ft
W. D. Corrected: 36.08 ft
W. D. Raw: 37.09 ft

Easting: 2691366.45
Northing: 332250.27
Coord. System: NCSPCS 83

Long: 76°42'04.4460"W
Lat: 034°38'27.2760"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 019, Run 2

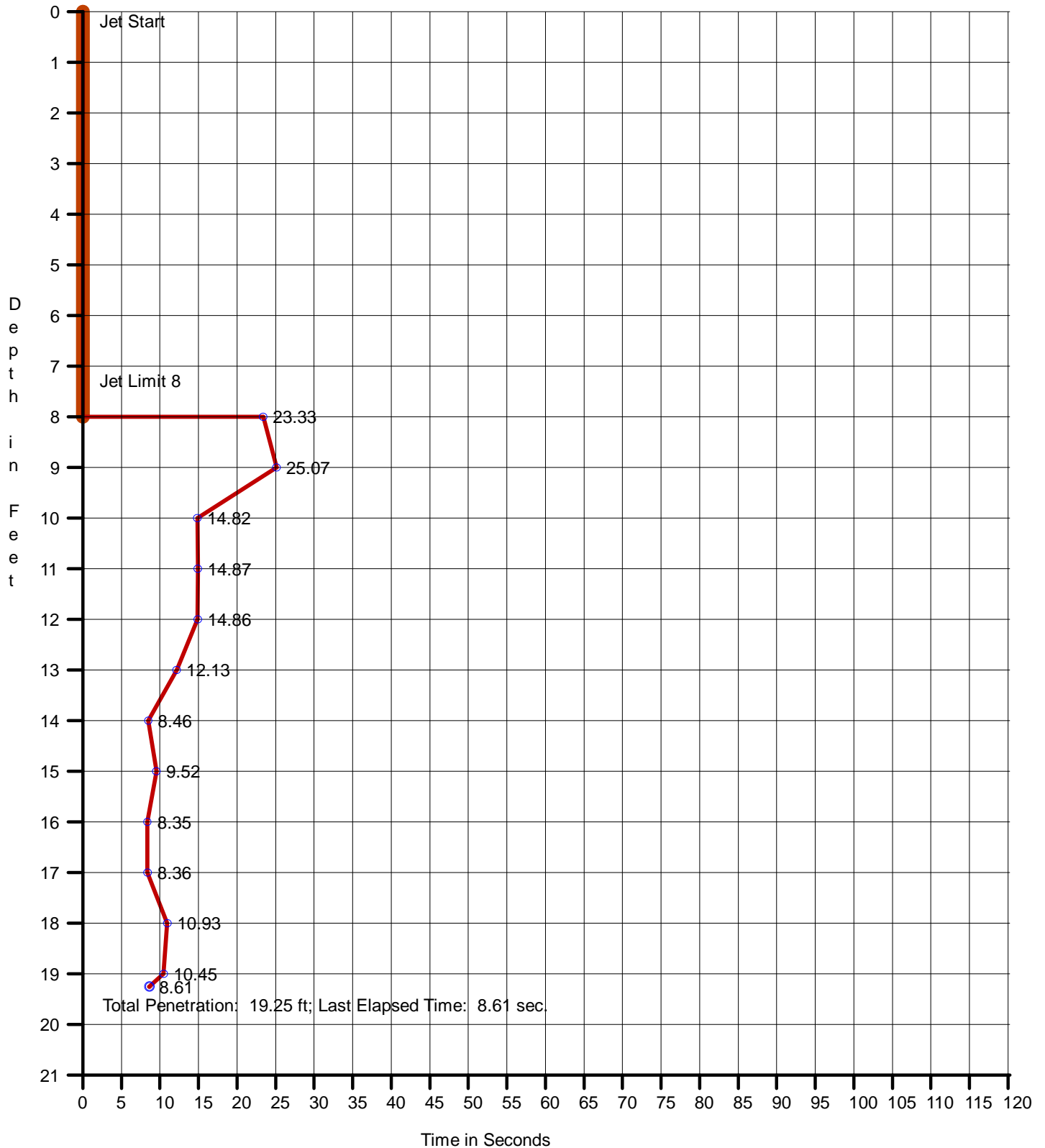
Date: 12/11/2011
Start Time: 10:01:35 AM
End Time: 10:05:52 AM

Penetration: 19.25 ft
Recovery: 15.00 ft
W. D. Corrected: 36.09 ft
W. D. Raw: 36.68 ft

Easting: 2691363.16
Northing: 332243.67
Coord. System: NCSPCS 83

Long: 76°42'04.4880"W
Lat: 034°38'27.2100"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O20, Run 1

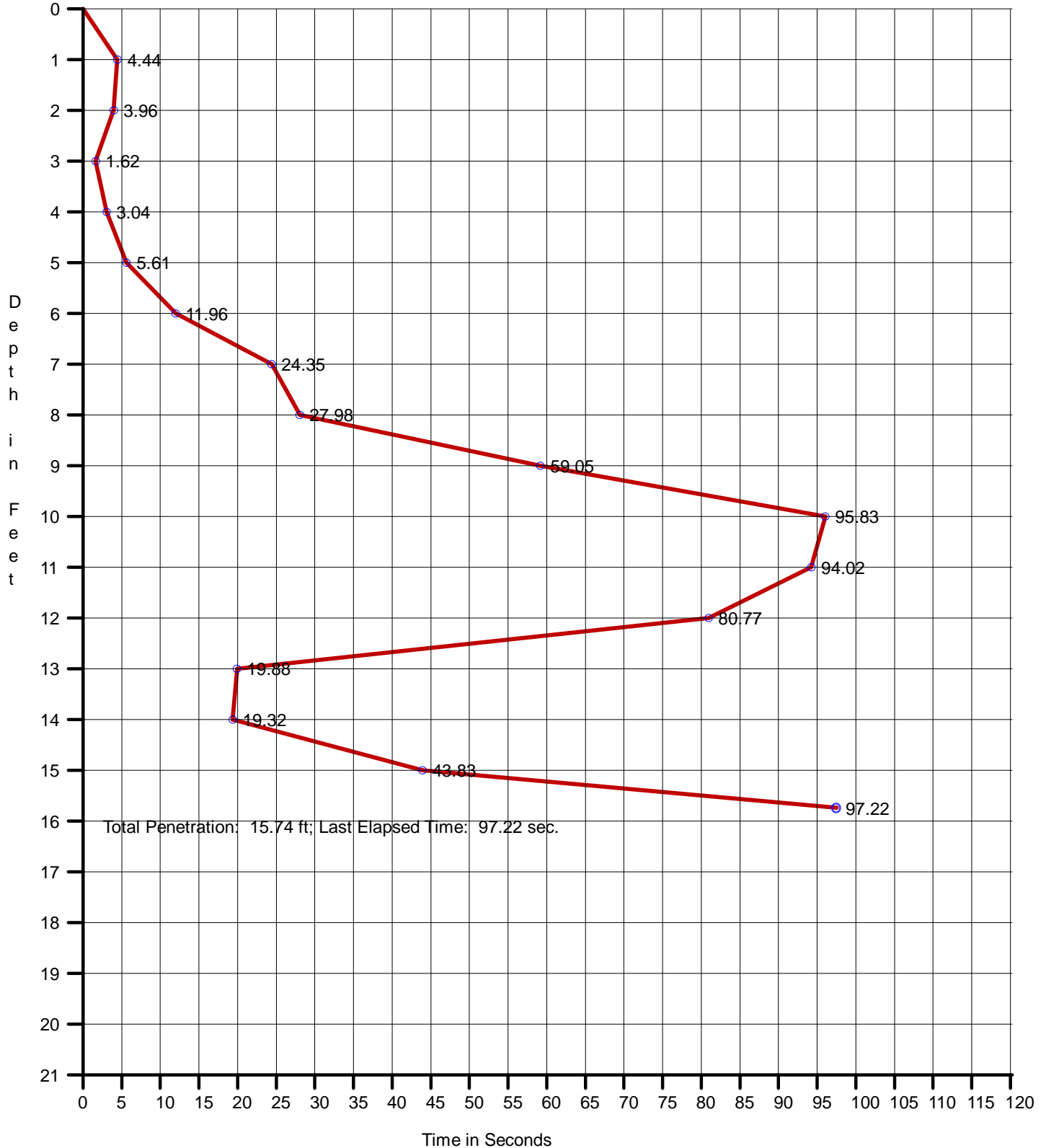
Date: 12/11/2011
Start Time: 8:58:15 AM
End Time: 9:08:11 AM

Penetration: 15.74 ft
Recovery: 13.83 ft
W. D. Corrected: 36.43 ft
W. D. Raw: 37.7 ft

Easting: 2692364.69
Northing: 332250.35
Coord. System: NCSPCS 83

Long: 76°41'52.5000"W
Lat: 034°38'27.0480"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 021, Run 1

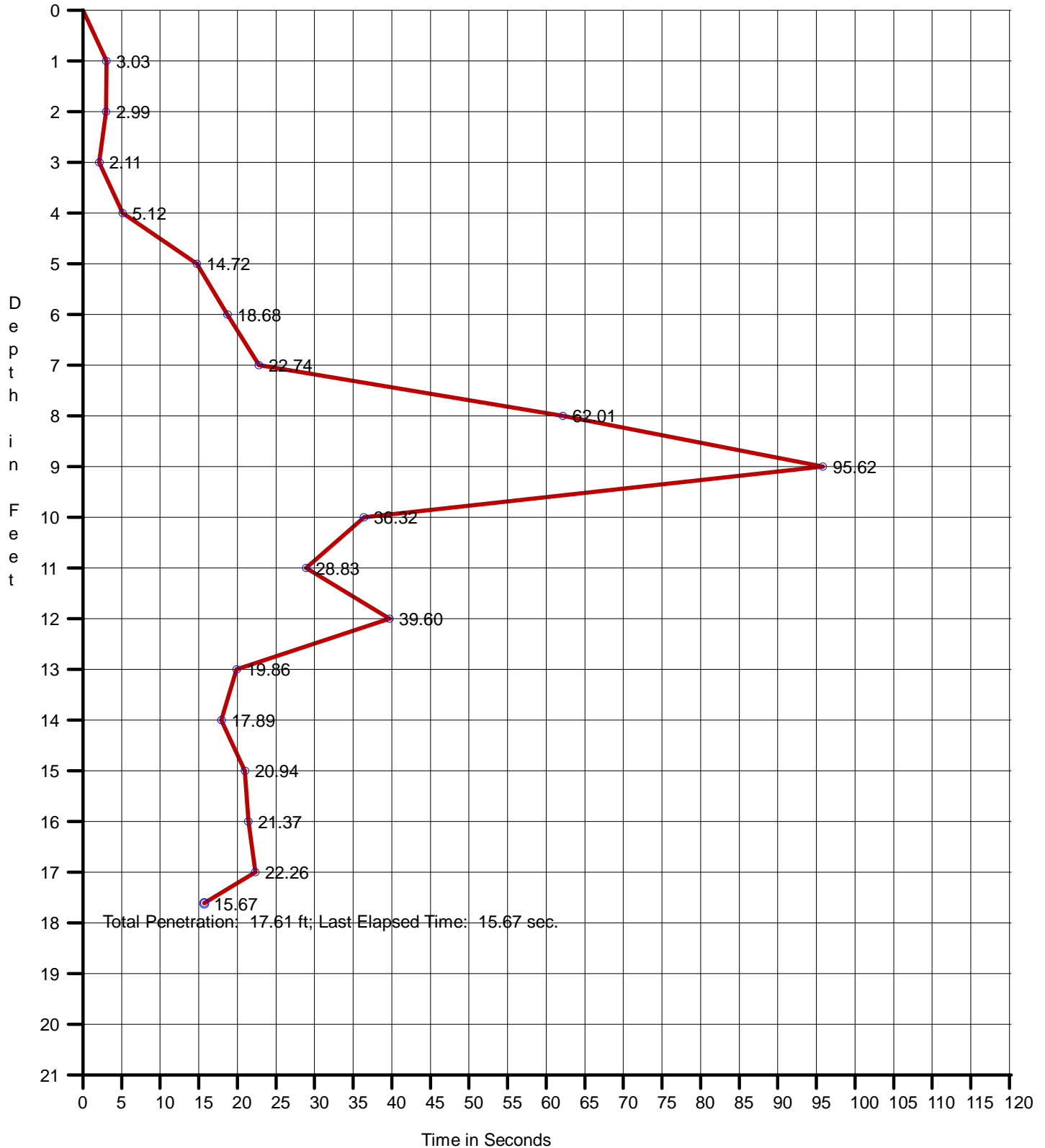
Date: 12/11/2011
Start Time: 7:19:11 AM
End Time: 7:26:47 AM

Penetration: 17.61 ft
Recovery: 15.92 ft
W. D. Corrected: 37.05 ft
W. D. Raw: 38.19 ft

Easting: 2693363.50
Northing: 332249.29
Coord. System: NCSPCS 83

Long: 76°41'40.5480"W
Lat: 034°38'26.8080"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 022, Run 1

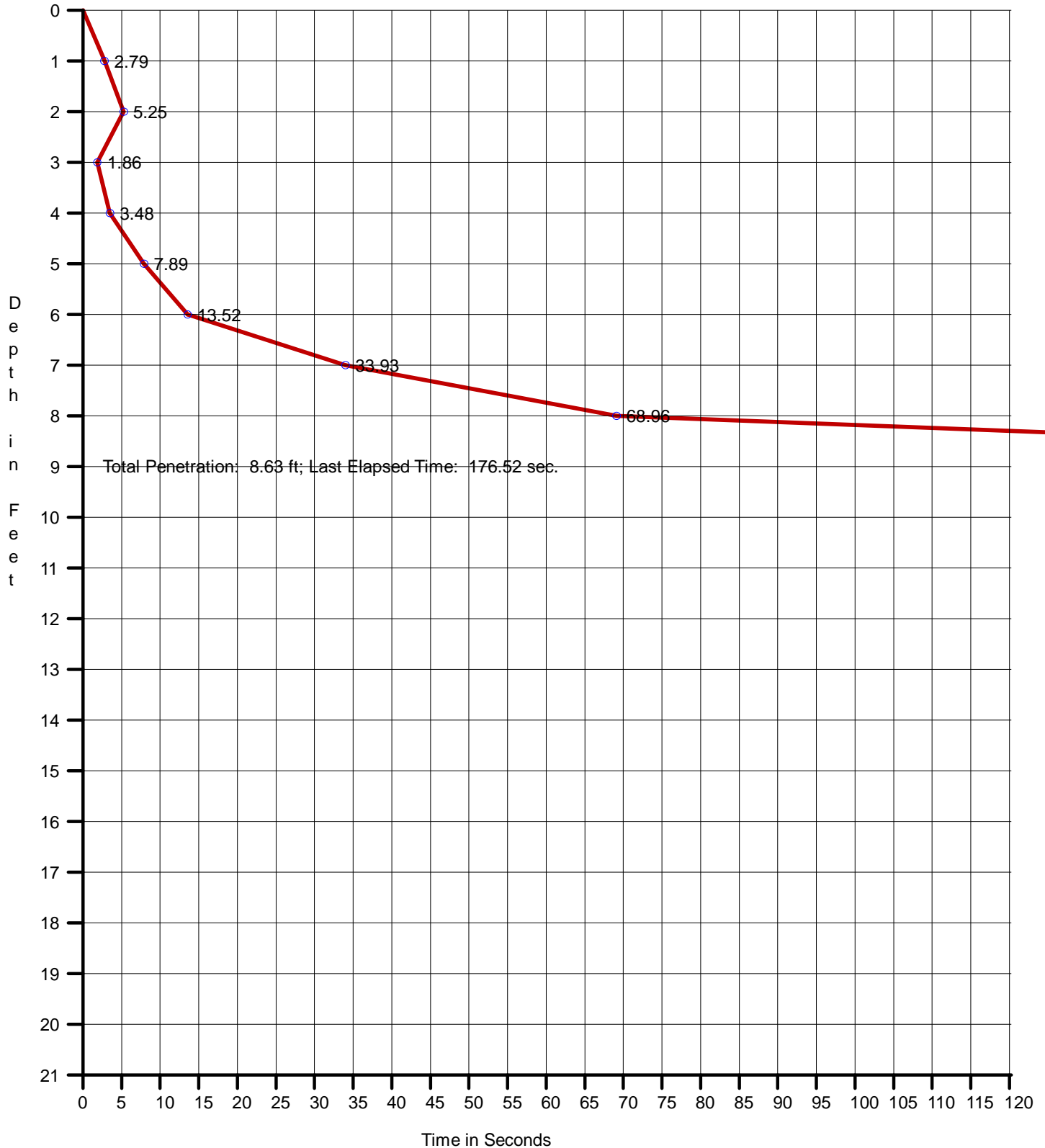
Date: 12/10/2011
Start Time: 4:29:30 PM
End Time: 4:34:47 PM

Penetration: 8.63 ft
Recovery: 6.83 ft
W. D. Corrected: 36.80 ft
W. D. Raw: 36.03 ft

Easting: 2694363.93
Northing: 332252.81
Coord. System: NCSPCS 83

Long: 76°41'28.5780"W
Lat: 034°38'26.6160"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 022, Run 2

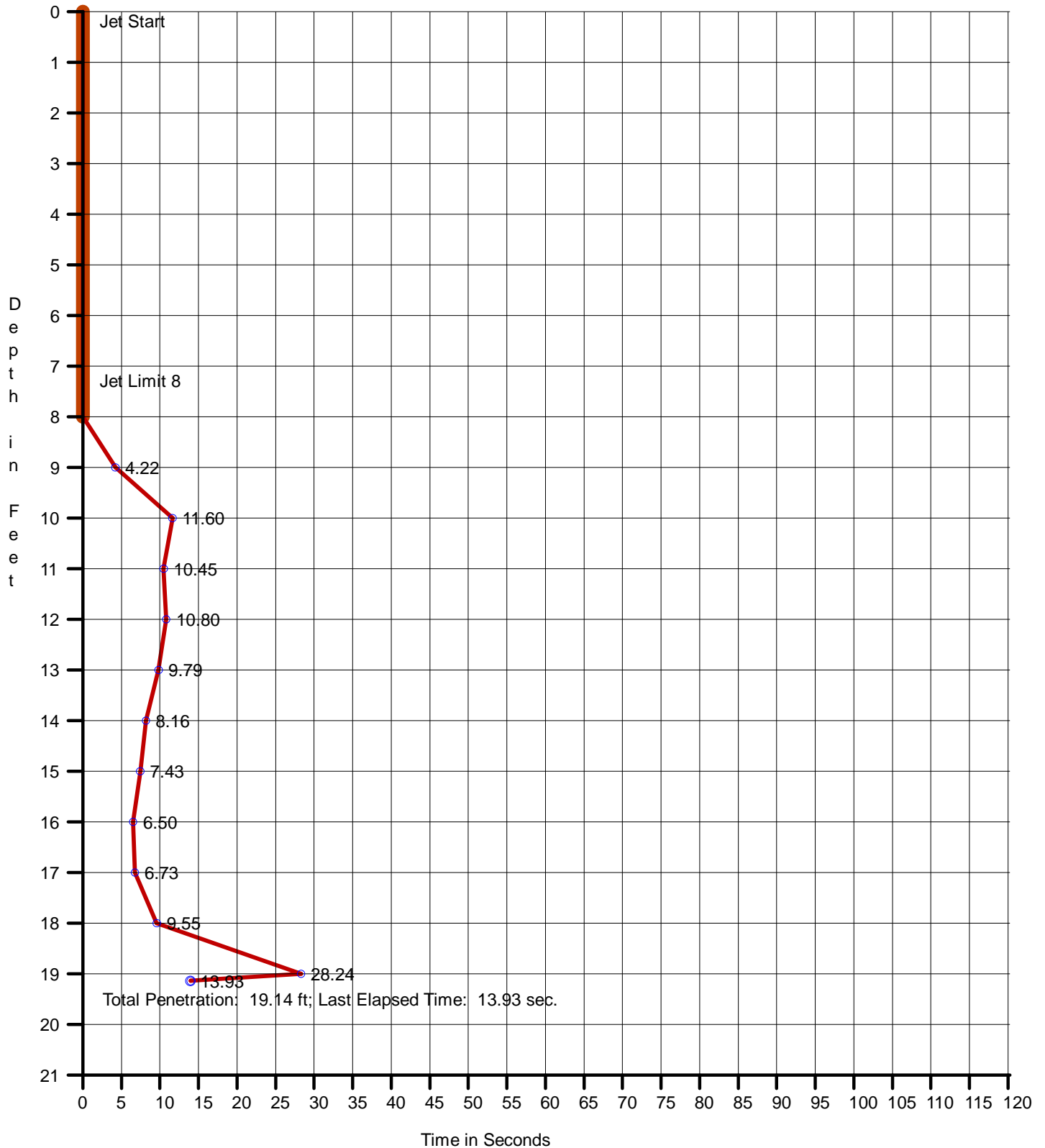
Date: 12/10/2011
Start Time: 4:51:54 PM
End Time: 4:56:06 PM

Penetration: 19.14 ft
Recovery: 14.00 ft
W. D. Corrected: 32.74 ft
W. D. Raw: 32.14 ft

Easting: 2694363.56
Northing: 332253.70
Coord. System: NCSPCS 83

Long: 76°41'28.5840"W
Lat: 034°38'26.6220"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 023, Run 1

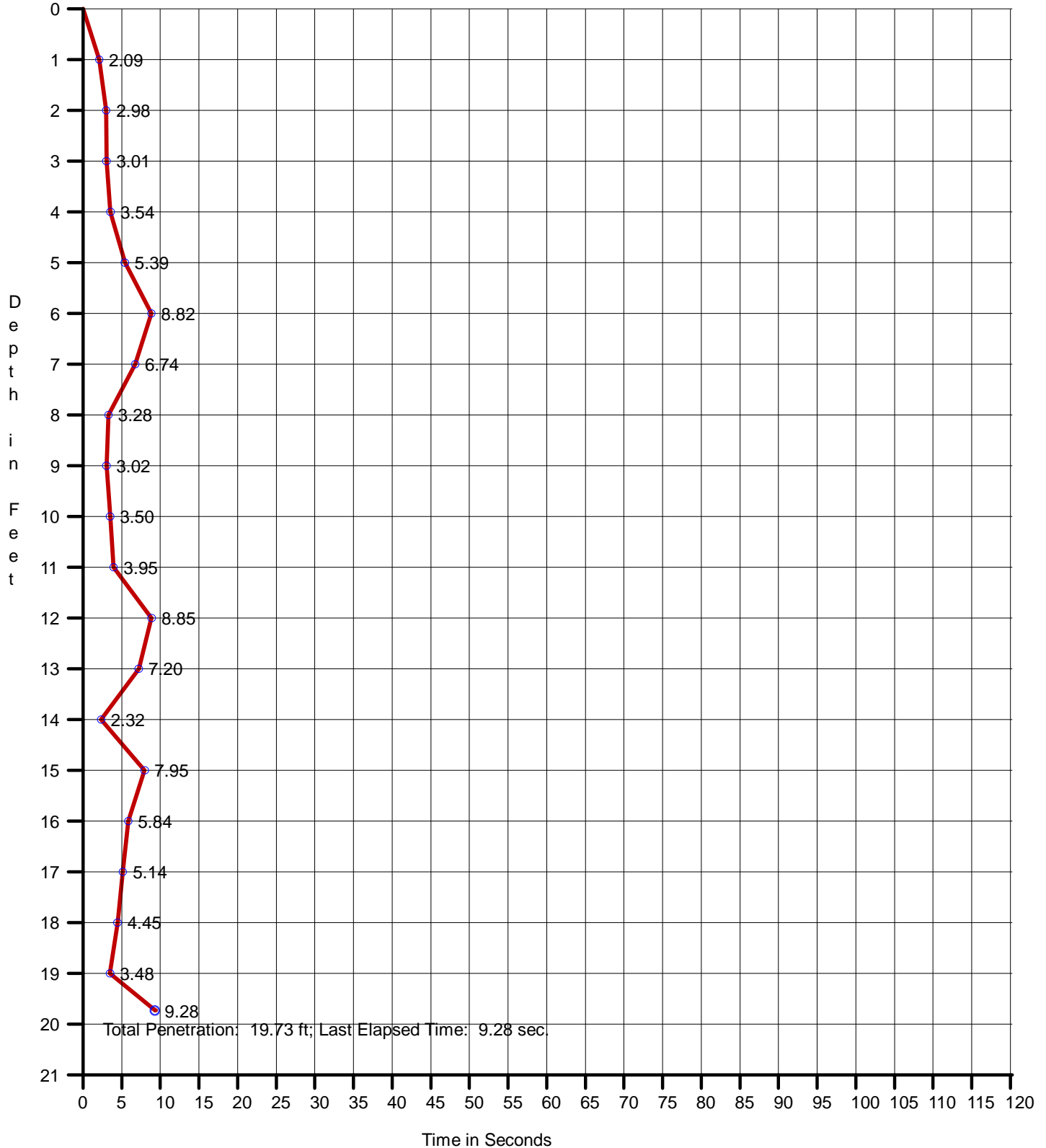
Date: 12/10/2011
Start Time: 3:36:38 PM
End Time: 3:38:23 PM

Penetration: 19.73 ft
Recovery: 17.17 ft
W. D. Corrected: 47.80 ft
W. D. Raw: 46.34 ft

Easting: 2696365.13
Northing: 332253.00
Coord. System: NCSPCS 83

Long: 76°41'04.6320"W
Lat: 034°38'26.1540"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 024, Run 1

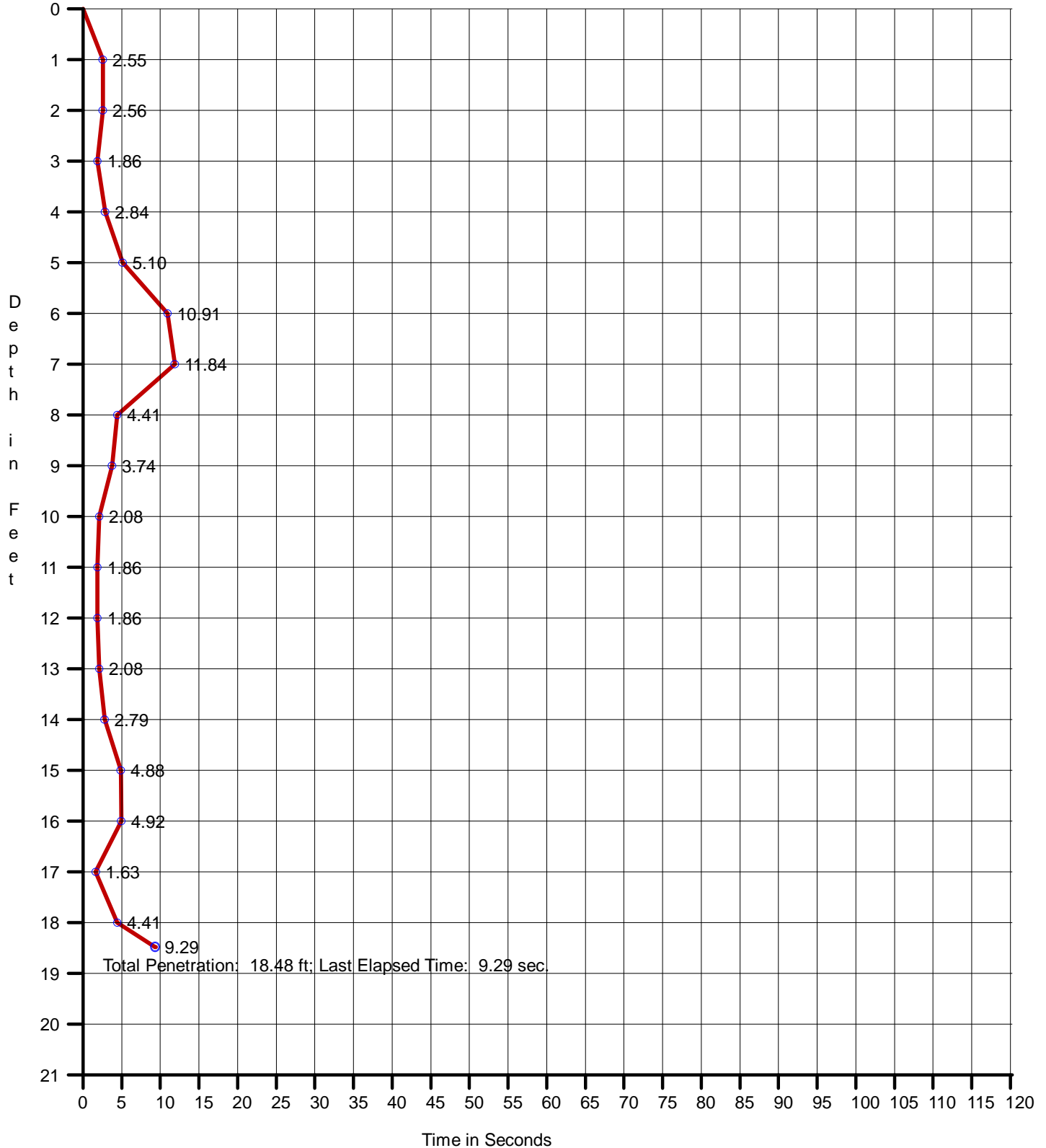
Date: 12/12/2011
Start Time: 12:11:23 PM
End Time: 12:12:45 PM

Penetration: 18.48 ft
Recovery: 13.75 ft
W. D. Corrected: 49.27 ft
W. D. Raw: 48.71 ft

Easting: 2690361.98
Northing: 331252.24
Coord. System: NCSPCS 83

Long: 76°42'16.7400"W
Lat: 034°38'17.6400"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 025, Run 1

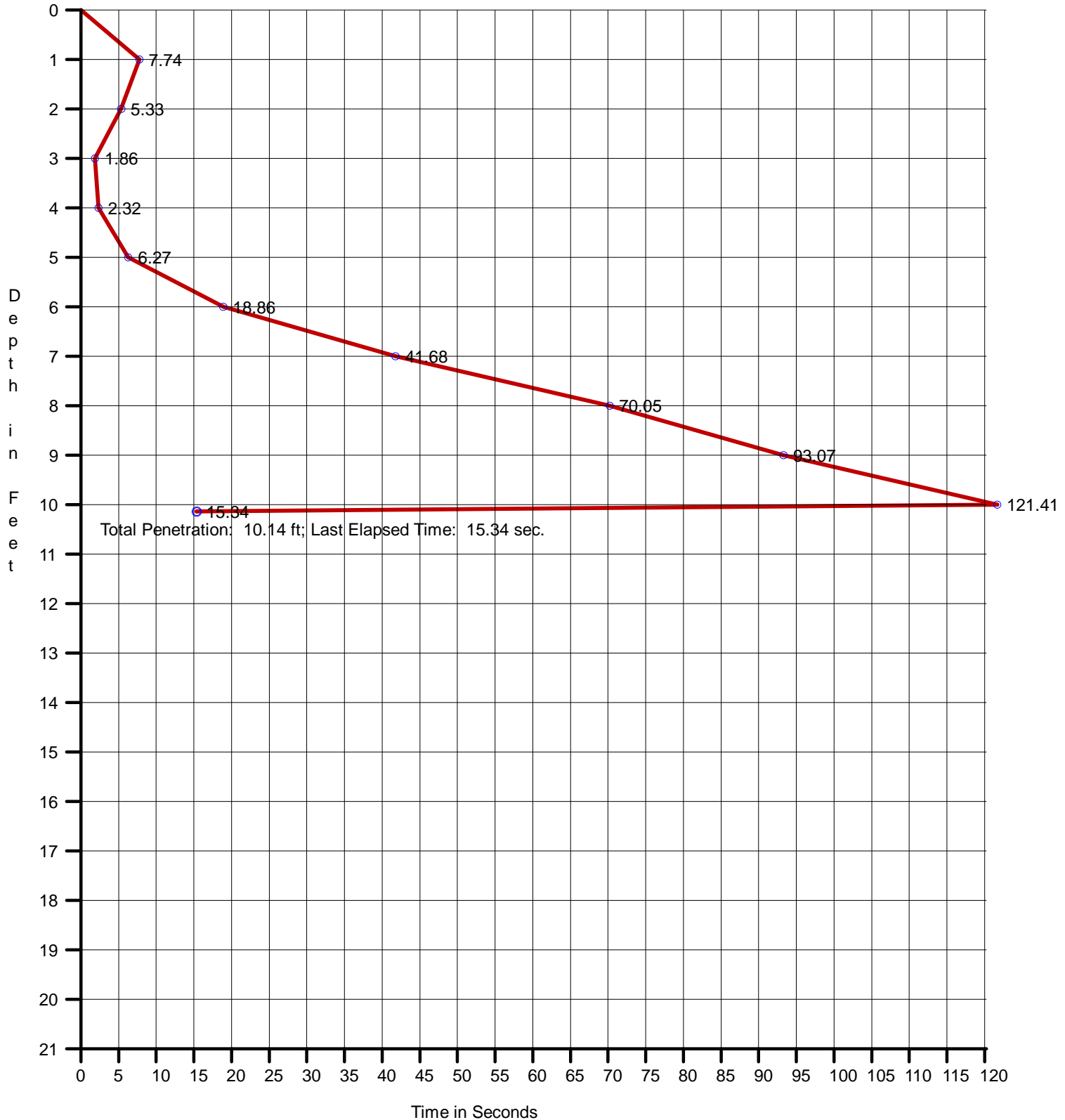
Date: 12/11/2011
Start Time: 10:31:03 AM
End Time: 10:37:27 AM

Penetration: 10.14 ft
Recovery: 8.00 ft
W. D. Corrected: 41.97 ft
W. D. Raw: 42.10 ft

Easting: 2691364.49
Northing: 331253.07
Coord. System: NCSPCS 83

Long: 76°42'04.7460"W
Lat: 034°38'17.4180"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 025, Run 2

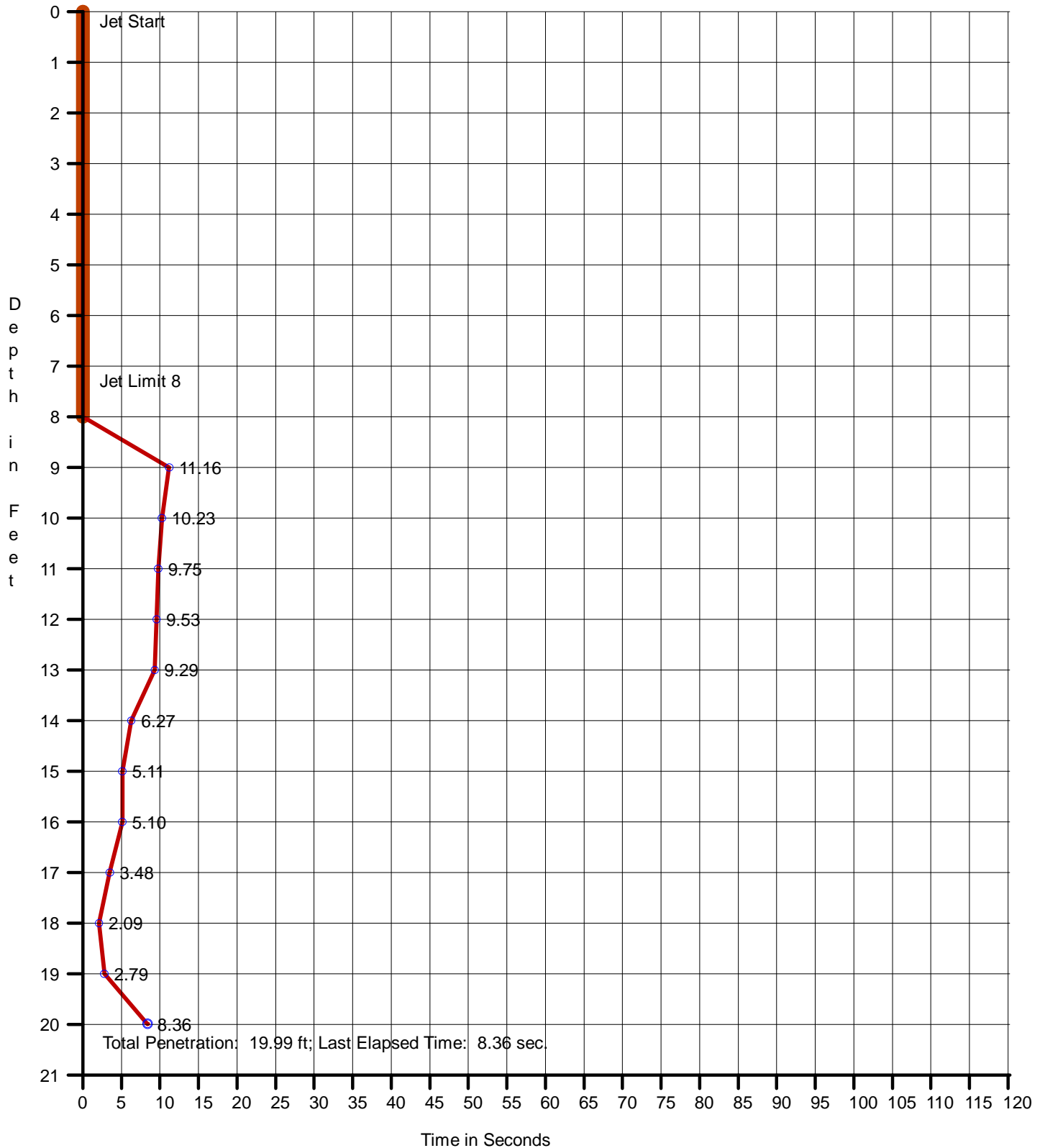
Date: 12/11/2011
Start Time: 10:55:21 AM
End Time: 10:59:00 AM

Penetration: 19.99 ft
Recovery: 11.50 ft
W. D. Corrected: 41.97 ft
W. D. Raw: 39.39 ft

Easting: 2691367.19
Northing: 331253.49
Coord. System: NCSPCS 83

Long: 76°42'04.7100"W
Lat: 034°38'17.4180"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O26, Run 1

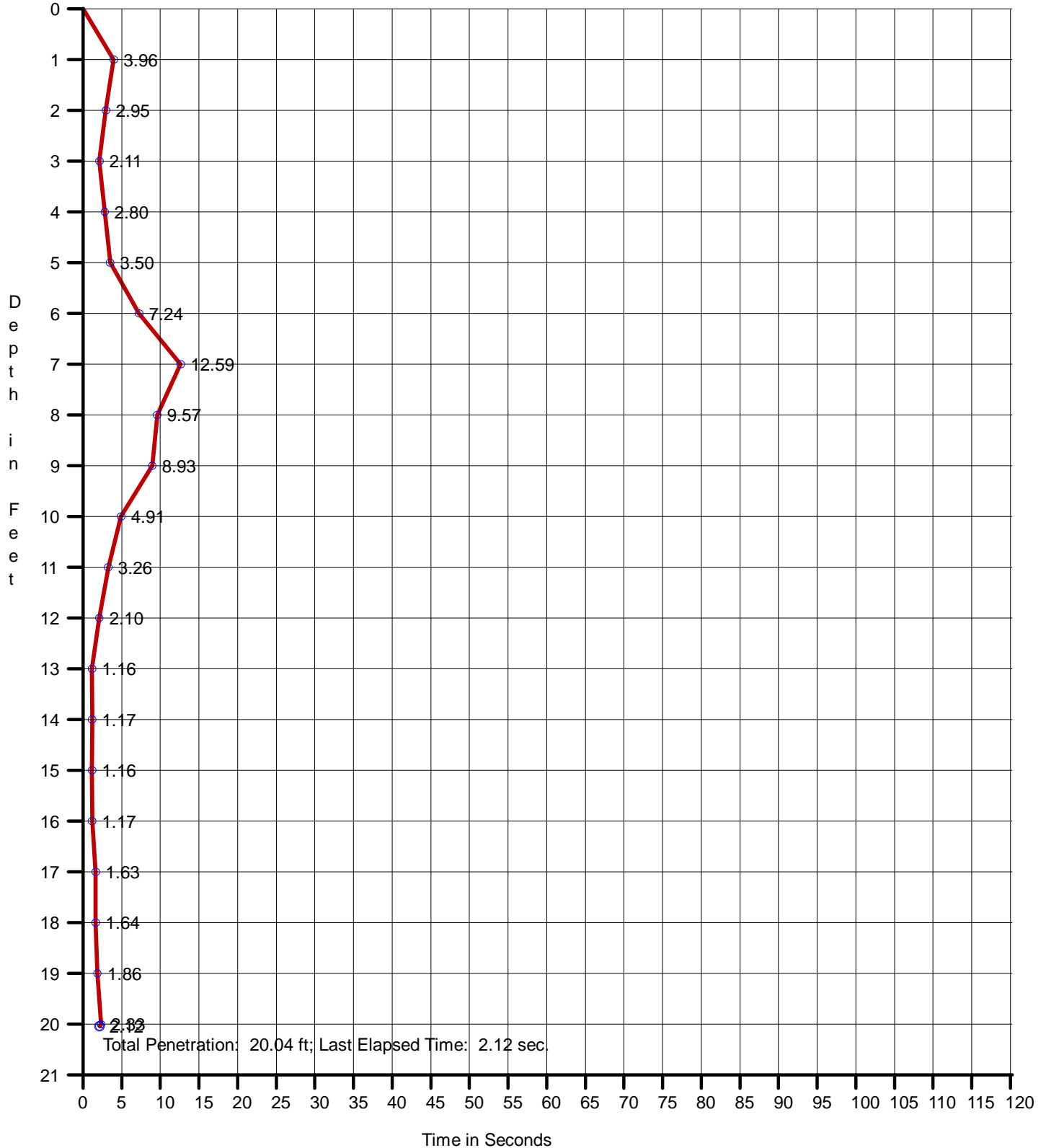
Date: 12/11/2011
Start Time: 8:31:53 AM
End Time: 8:33:17 AM

Penetration: 20.04 ft
Recovery: 13.80 ft
W. D. Corrected: 45.70 ft
W. D. Raw: 47.10 ft

Easting: 2692365.13
Northing: 331247.31
Coord. System: NCSPCS 83

Long: 76°41'52.7760"W
Lat: 034°38'17.1300"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 027, Run 1

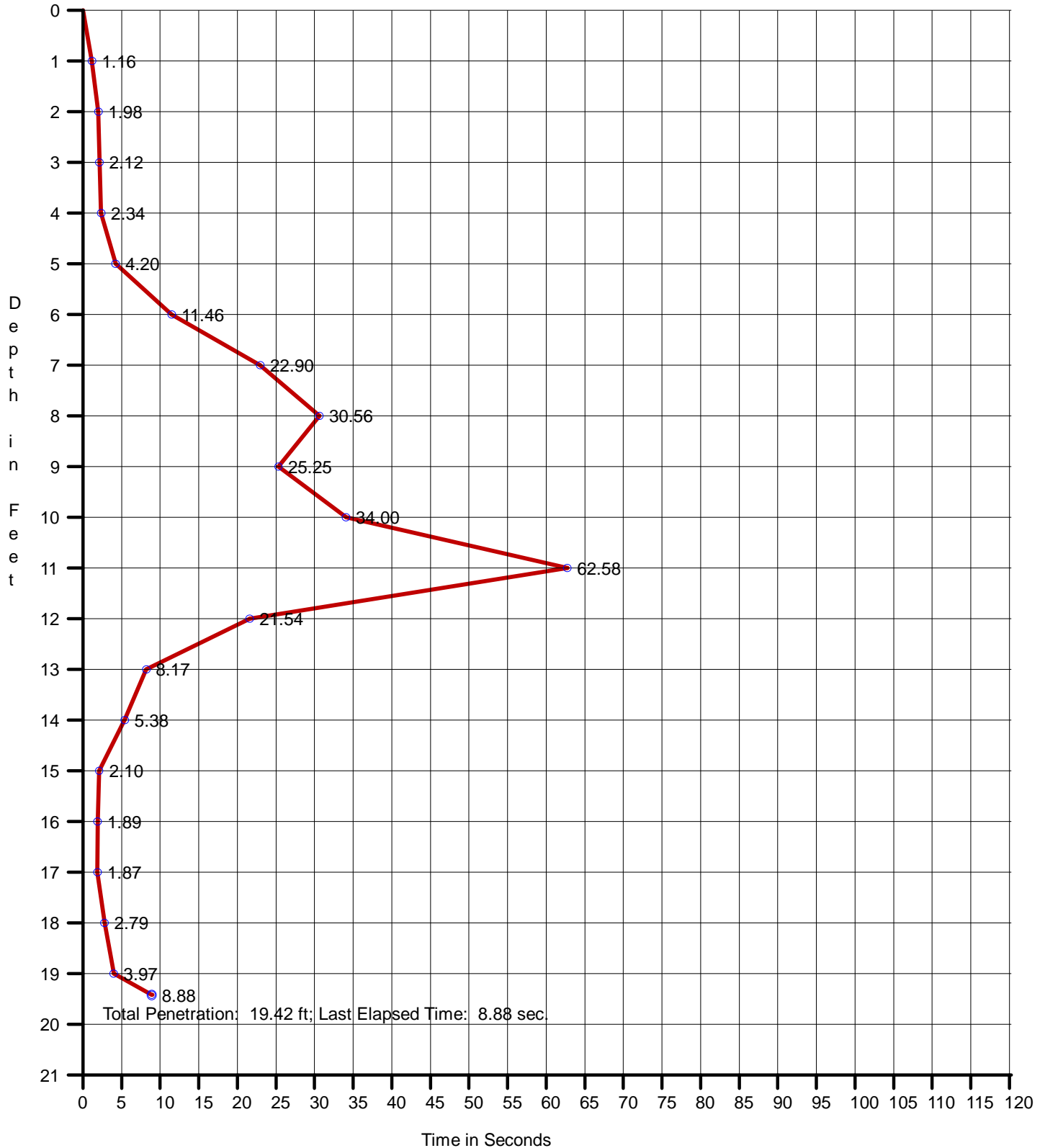
Date: 12/11/2011
Start Time: 8:04:51 AM
End Time: 8:09:14 AM

Penetration: 19.42 ft
Recovery: 16.75 ft
W. D. Corrected: 43.63 ft
W. D. Raw: 45.06 ft

Easting: 2693366.30
Northing: 331253.48
Coord. System: NCSPCS 83

Long: 76°41'40.7940"W
Lat: 034°38'16.9620"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 028, Run 1

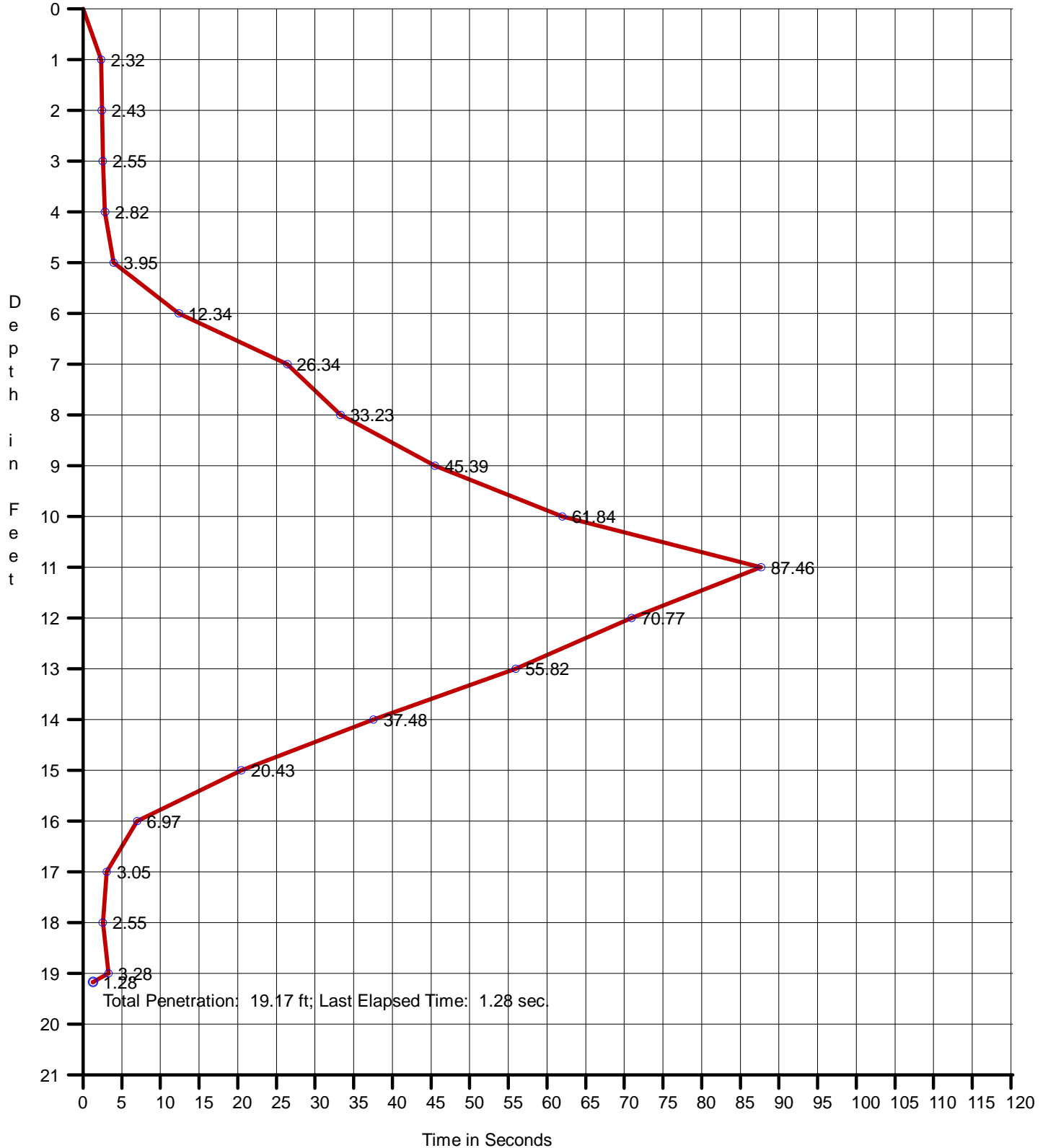
Date: 12/10/2011
Start Time: 3:58:57 PM
End Time: 4:08:00 PM

Penetration: 19.17 ft
Recovery: 12.6 ft
W. D. Corrected: 42.72 ft
W. D. Raw: 41.51 ft

Easting: 2694358.58
Northing: 331246.13
Coord. System: NCSPCS 83

Long: 76°41'28.9200" W
Lat: 034°38'16.6620"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O29, Run 1

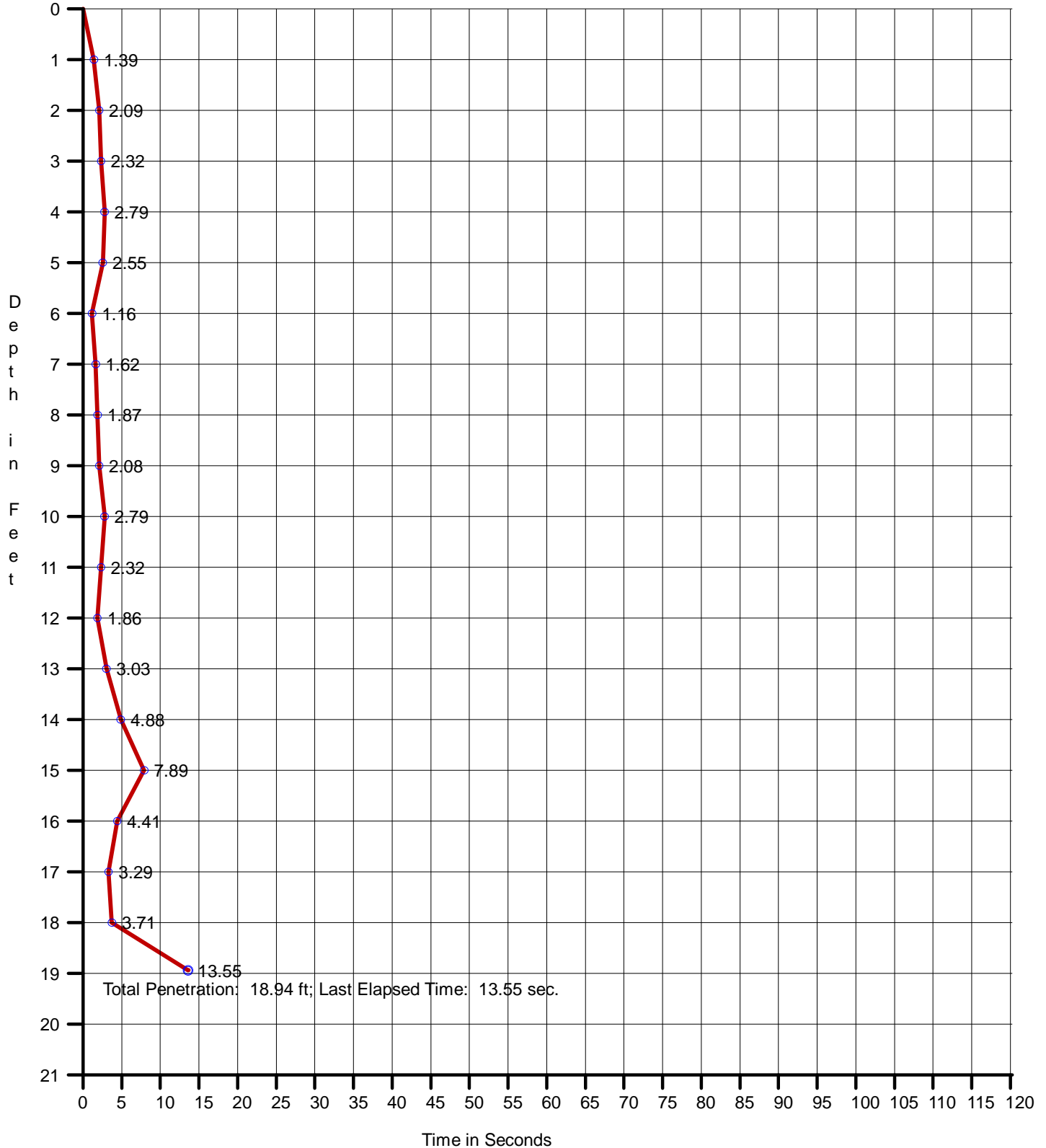
Date: 12/10/2011
Start Time: 11:21:12 AM
End Time: 11:22:29 AM

Penetration: 18.94 ft
Recovery: 15.70 ft
W. D. Corrected: 51.90 ft
W. D. Raw: 50.75 ft

Easting: 2682363.58
Northing: 330251.89
Coord. System: NCSPCS 83

Long: 76°43'52.7160"W
Lat: 034°38'09.5640"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O30, Run 1

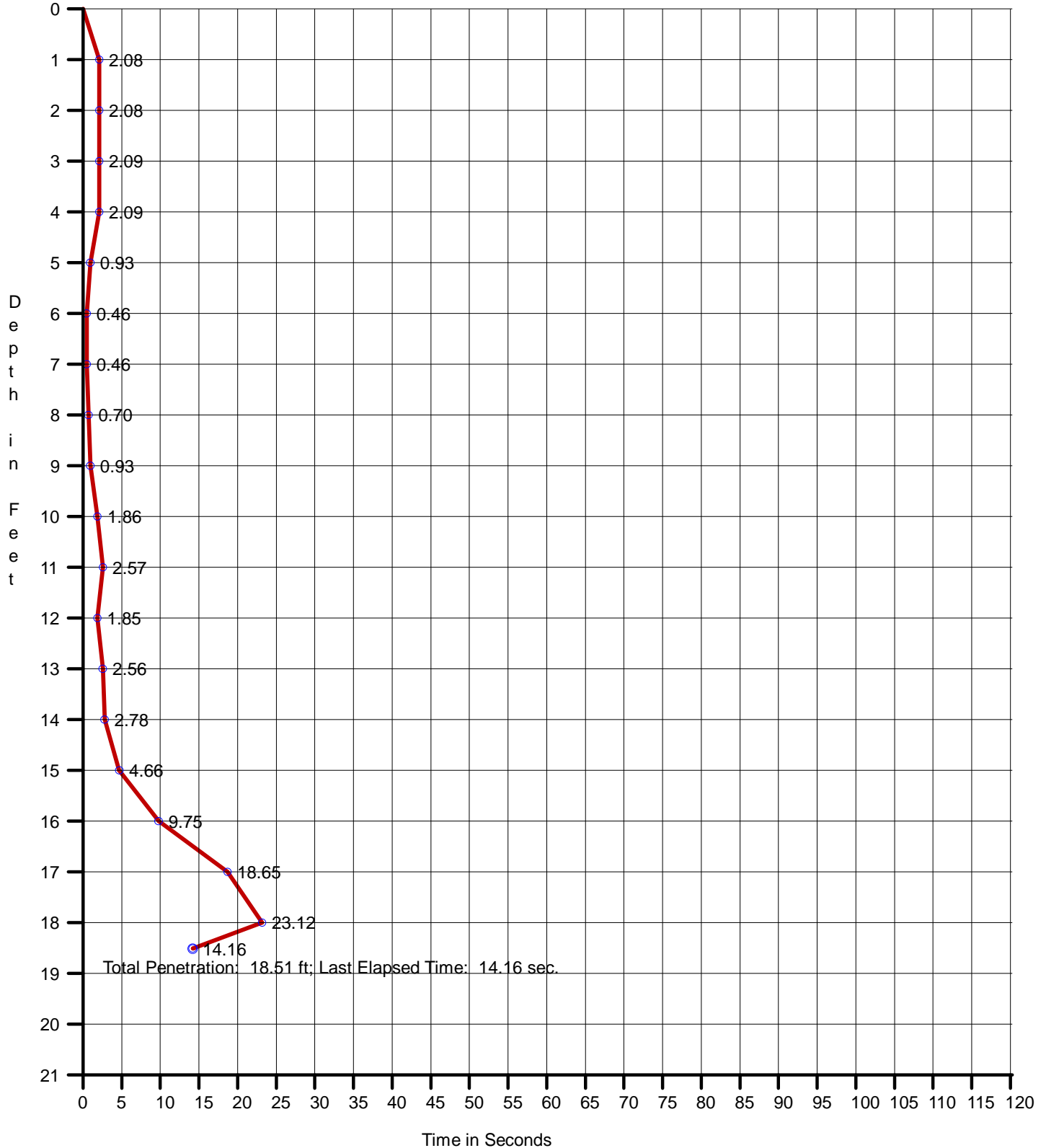
Date: 12/10/2011
Start Time: 11:42:51 AM
End Time: 11:44:32 AM

Penetration: 18.51 ft
Recovery: 18.80 ft
W. D. Corrected: 51.03 ft
W. D. Raw: 49.69 ft

Easting: 2684365.71
Northing: 330251.10
Coord. System: NCSPCS 83

Long: 76°43'28.7640"W
Lat: 034°38'09.1020"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 031, Run 1

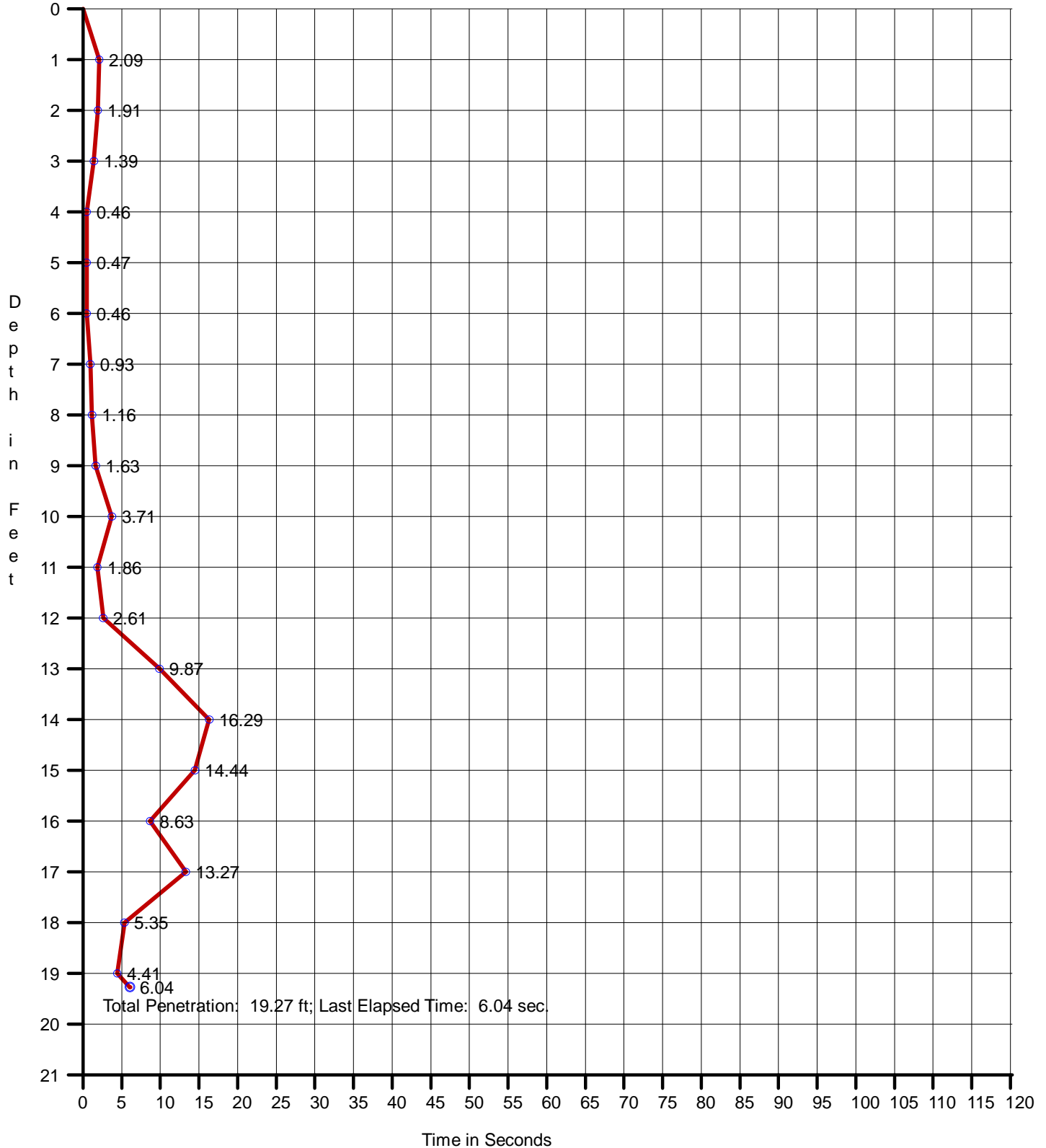
Date: 12/10/2011
Start Time: 12:10:34 PM
End Time: 12:12:25 PM

Penetration: 19.27 ft
Recovery: 17.90 ft
W. D. Corrected: 53.64 ft
W. D. Raw: 51.94 ft

Easting: 2686363.95
Northing: 330253.40
Coord. System: NCSPCS 83

Long: 76°43'04.8540"W
Lat: 034°38'08.6700"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O32, Run 1

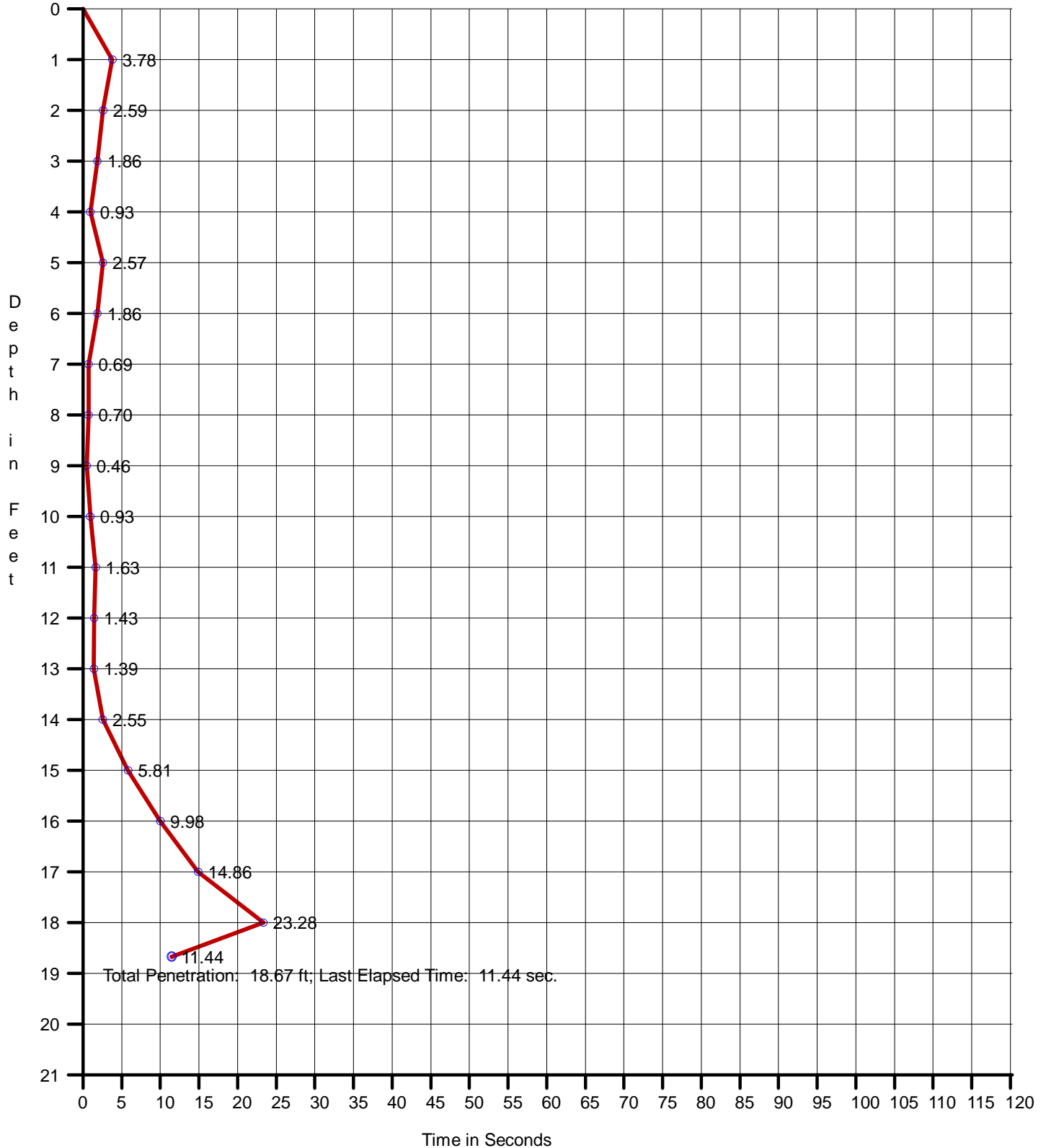
Date: 12/10/2011
Start Time: 1:19:55 PM
End Time: 1:21:31 PM

Penetration: 18.67 ft
Recovery: 17.50 ft
W. D. Corrected: 51.12 ft
W. D. Raw: 49.05 ft

Easting: 2688366.17
Northing: 330251.28
Coord. System: NCSPCS 83

Long: 76°42'40.8960"W
Lat: 034°38'08.1960"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O33, Run 1

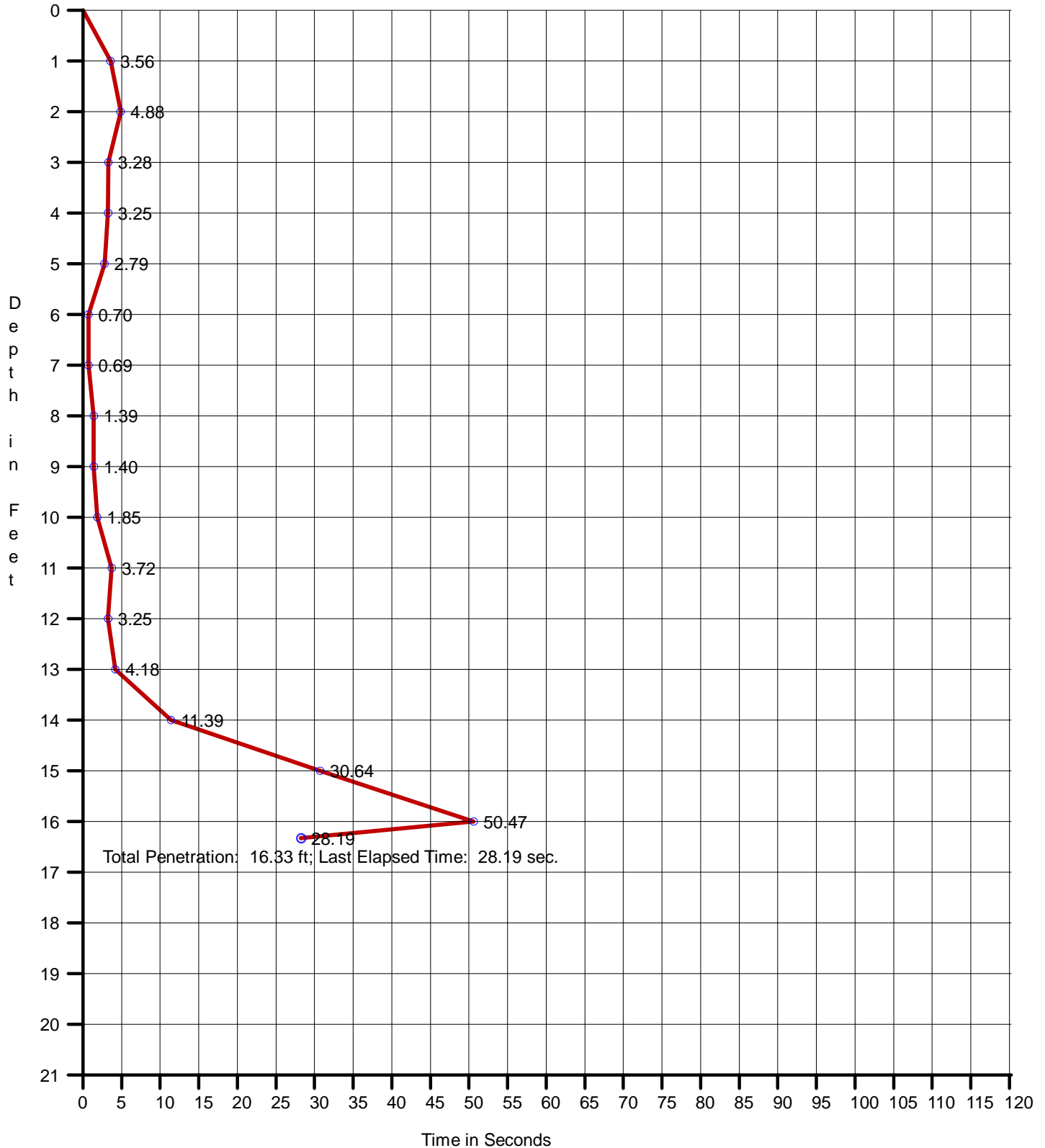
Date: 12/10/2011
Start Time: 1:42:02 PM
End Time: 1:44:42 PM

Penetration: 16.33 ft
Recovery: 18.20 ft
W. D. Corrected: 63.18 ft
W. D. Raw: 60.95 ft

Easting: 2690362.50
Northing: 330252.17
Coord. System: NCSPCS 83

Long: 76°42'17.0100"W
Lat: 034°38'07.7460"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 034, Run 1

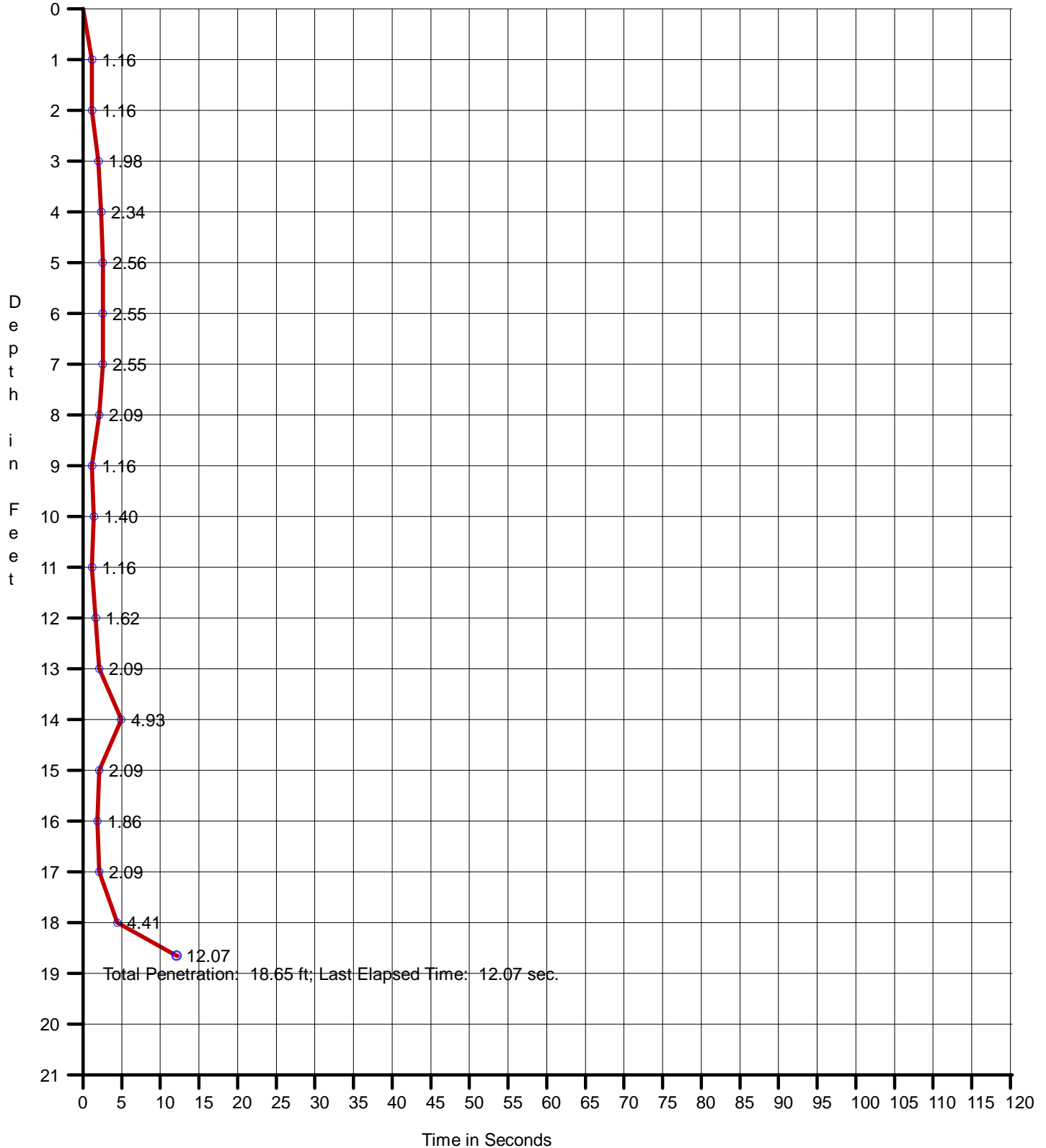
Date: 12/10/2011
Start Time: 2:06:23 PM
End Time: 2:07:27 PM

Penetration: 18.65 ft
Recovery: 12.50 ft
W. D. Corrected: 50.17 ft
W. D. Raw: 47.96 ft

Easting: 2692365.40
Northing: 330251.78
Coord. System: NCSPCS 83

Long: 76°41'53.0460"W
Lat: 034°38'07.2840"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O35, Run 2

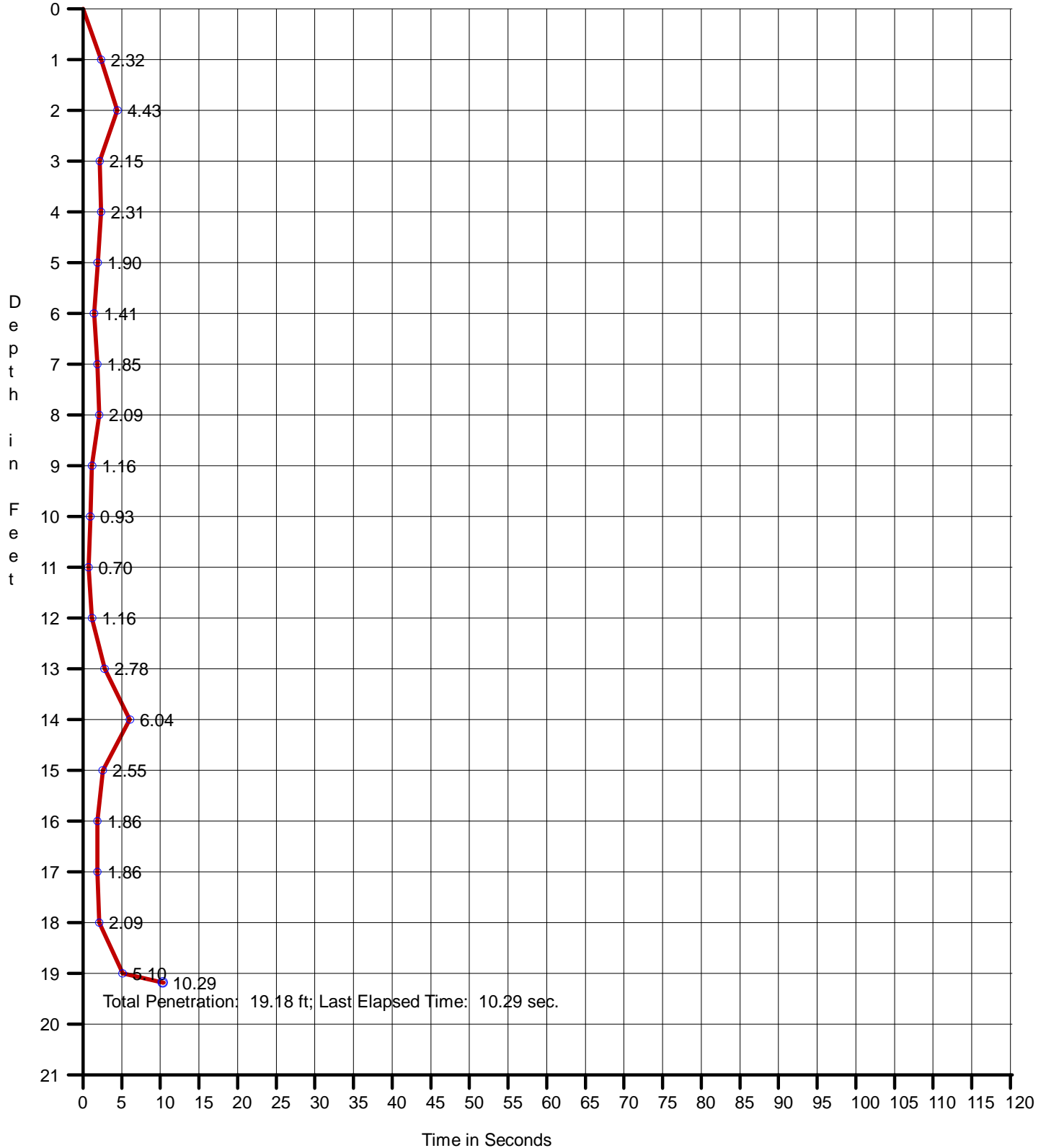
Date: 12/10/2011
Start Time: 2:41:15 PM
End Time: 2:42:10 PM

Penetration: 19.18 ft
Recovery: 11.90 ft
W. D. Corrected: 49.35 ft
W. D. Raw: 47.35 ft

Easting: 2694362.53
Northing: 330254.04
Coord. System: NCSPCS 83

Long: 76°41'29.1480"W
Lat: 034°38'06.8460"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O36, Run 1

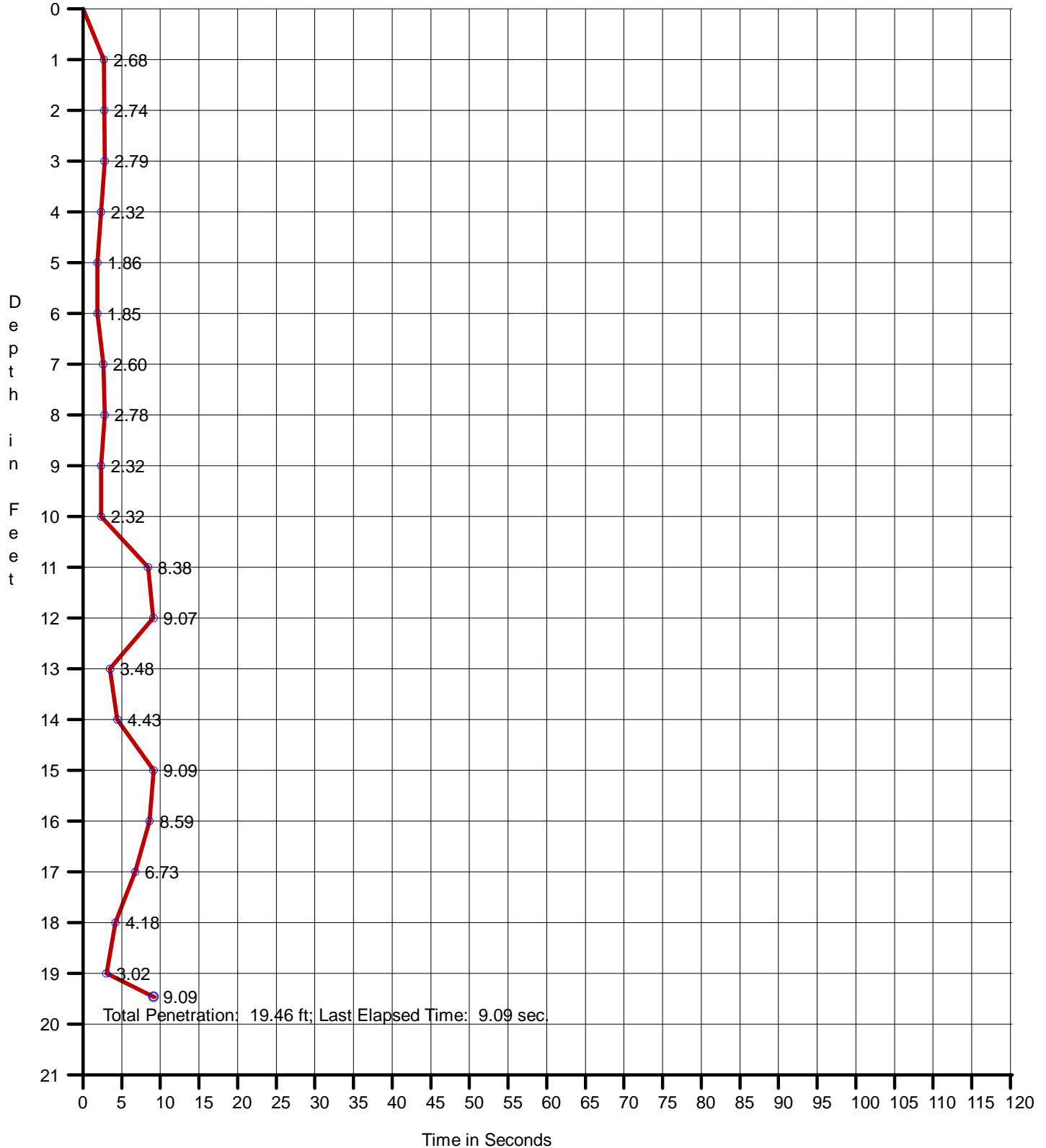
Date: 12/10/2011
Start Time: 3:08:54 PM
End Time: 3:10:43 PM

Penetration: 19.46 ft
Recovery: 15.63 ft
W. D. Corrected: 49.13 ft
W. D. Raw: 47.30 ft

Easting: 2696364.66
Northing: 330251.48
Coord. System: NCSPCS 83

Long: 76°41'05.1960"W
Lat: 034°38'06.3600"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O37, Run 1

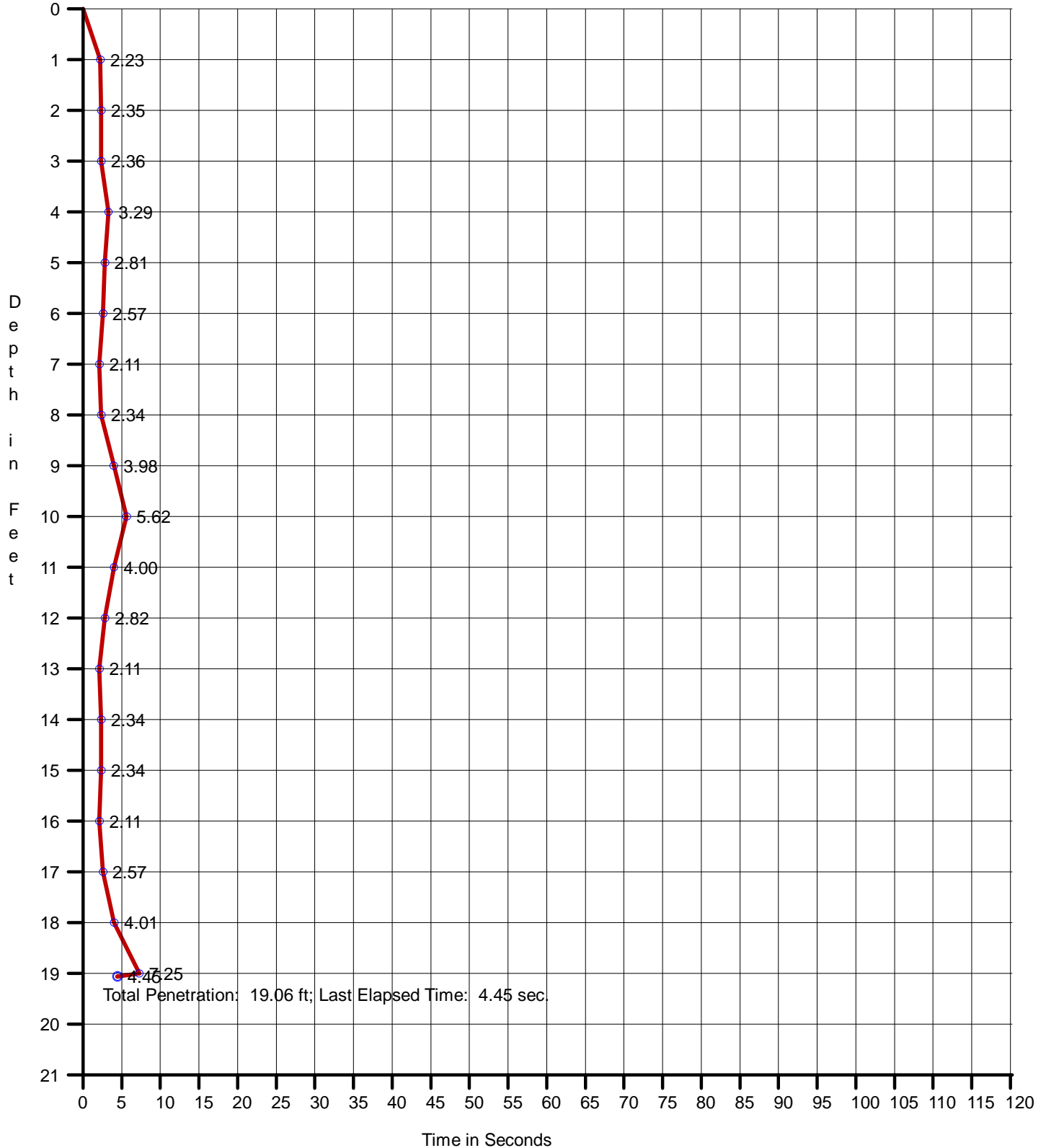
Date: 12/10/2011
Start Time: 10:34:58 AM
End Time: 10:36:09 AM

Penetration: 19.06 ft
Recovery: 14.90 ft
W. D. Corrected: 50.78 ft
W. D. Raw: 50.26 ft

Easting: 2682364.06
Northing: 328255.19
Coord. System: NCSPCS 83

Long: 76°43'53.2560"W
Lat: 034°37'49.8180"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 038, Run 1

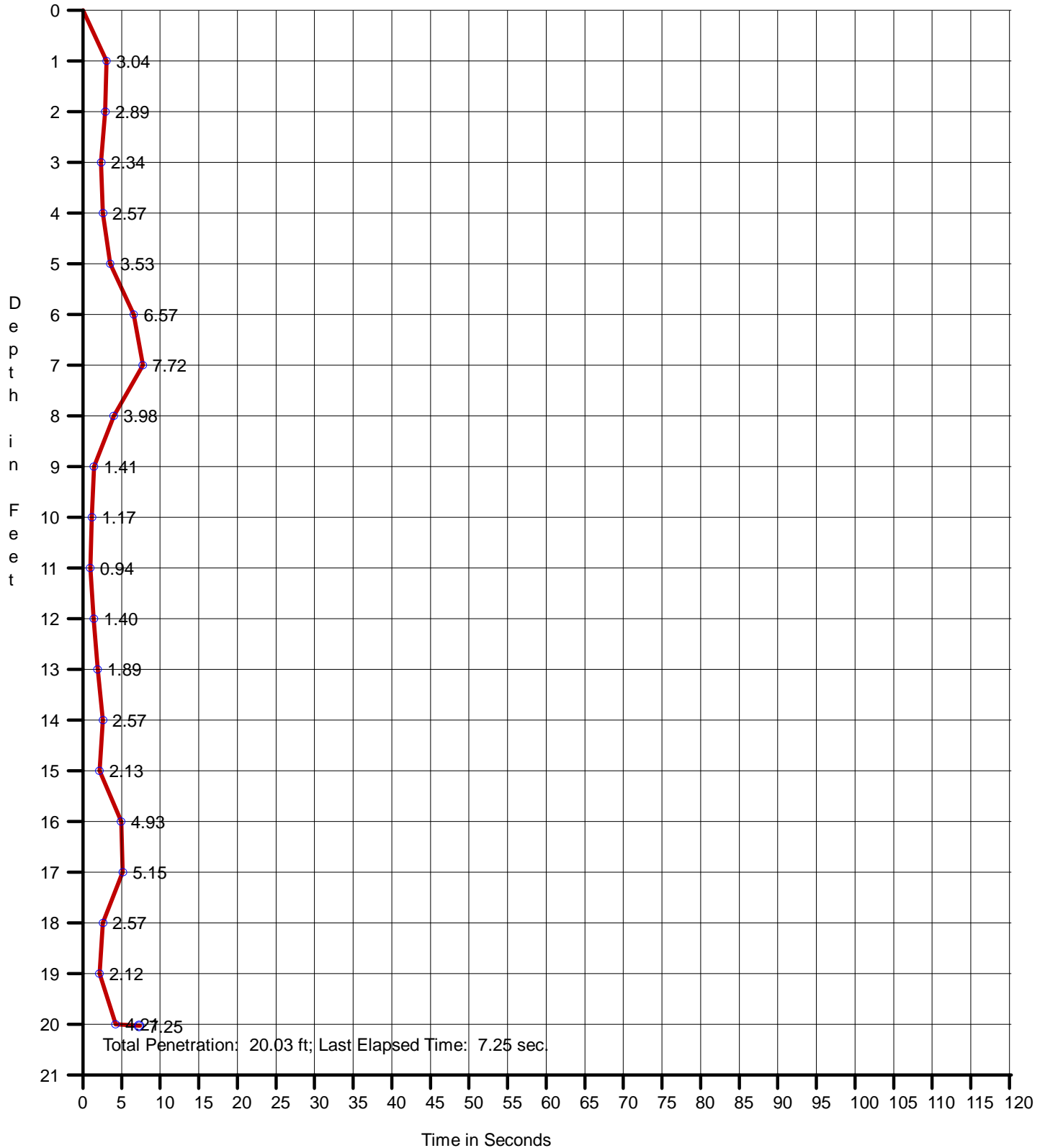
Date: 12/10/2011
Start Time: 10:07:41 AM
End Time: 10:08:55 AM

Penetration: 20.03 ft
Recovery: 13.80 ft
W. D. Corrected: 46.62 ft
W. D. Raw: 46.48 ft

Easting: 2684367.69
Northing: 328255.66
Coord. System: NCSPCS 83

Long: 76°43'29.2860"W
Lat: 034°37'49.3680"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 039, Run 1

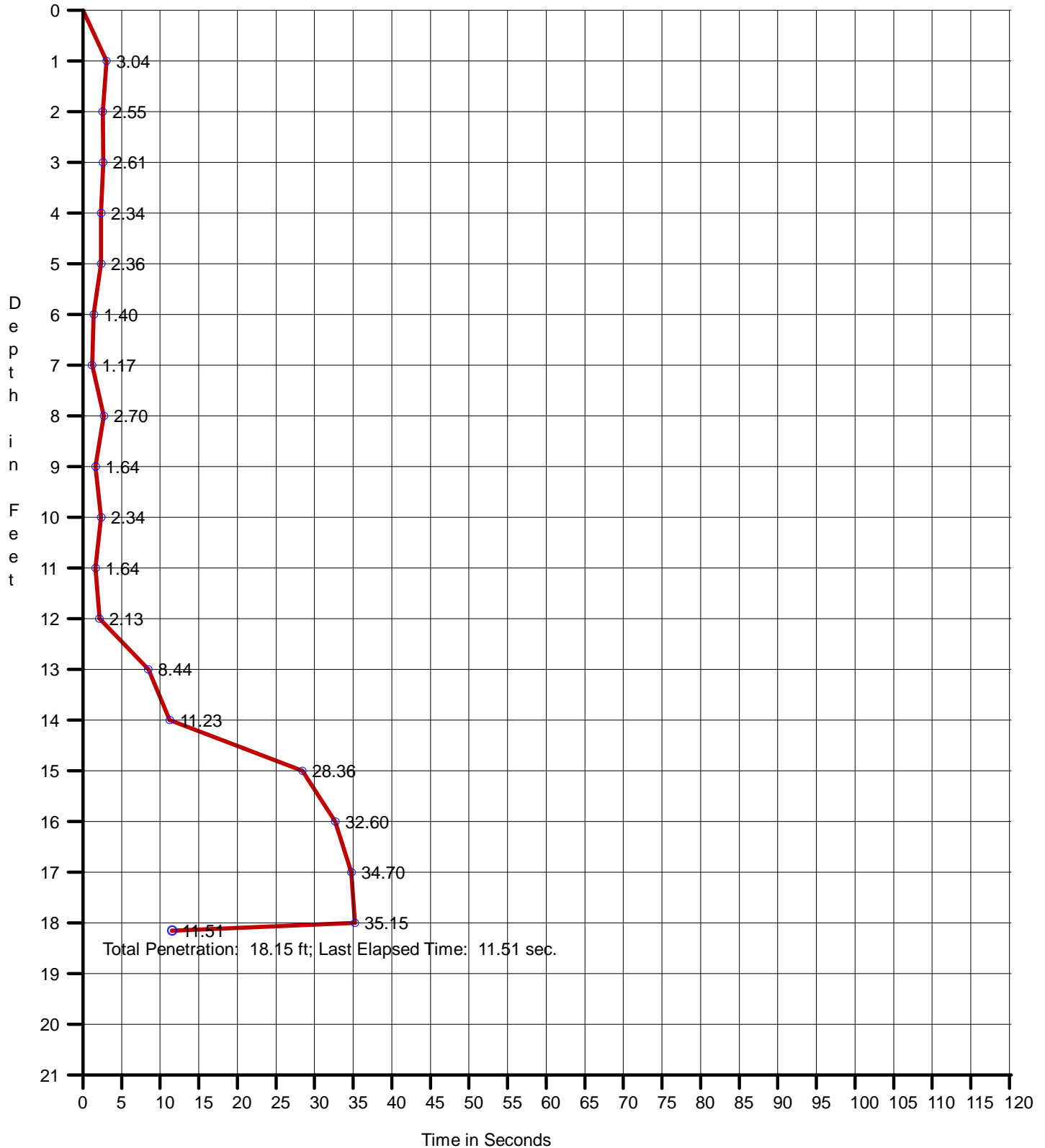
Date: 12/10/2011
Start Time: 9:44:48 AM
End Time: 9:48:02 AM

Penetration: 18.15 ft
Recovery: 17.75 ft
W. D. Corrected: 53.79 ft
W. D. Raw: 53.79 ft

Easting: 2686364.53
Northing: 328252.60
Coord. System: NCSPCS 83

Long: 76°43'05.3940"W
Lat: 034°37'48.8820"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O40, Run 1

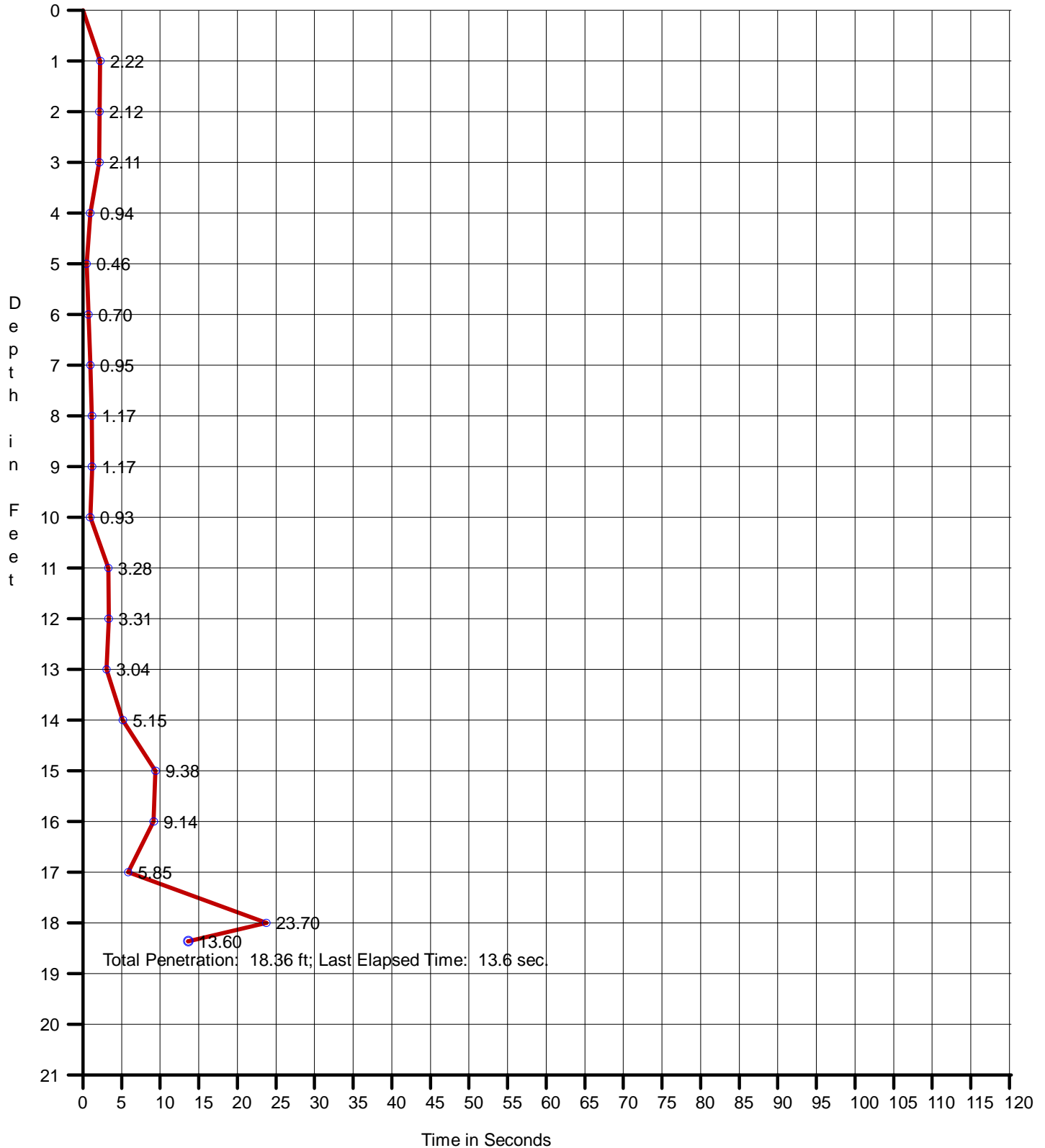
Date: 12/10/2011
Start Time: 9:22:05 AM
End Time: 9:23:41 AM

Penetration: 18.36 ft
Recovery: 18.80 ft
W. D. Corrected: 53.73 ft
W. D. Raw: 54.15 ft

Easting: 2688361.74
Northing: 328251.41
Coord. System: NCSPCS 83

Long: 76°42'41.5020"W
Lat: 034°37'48.4200"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O41, Run 1

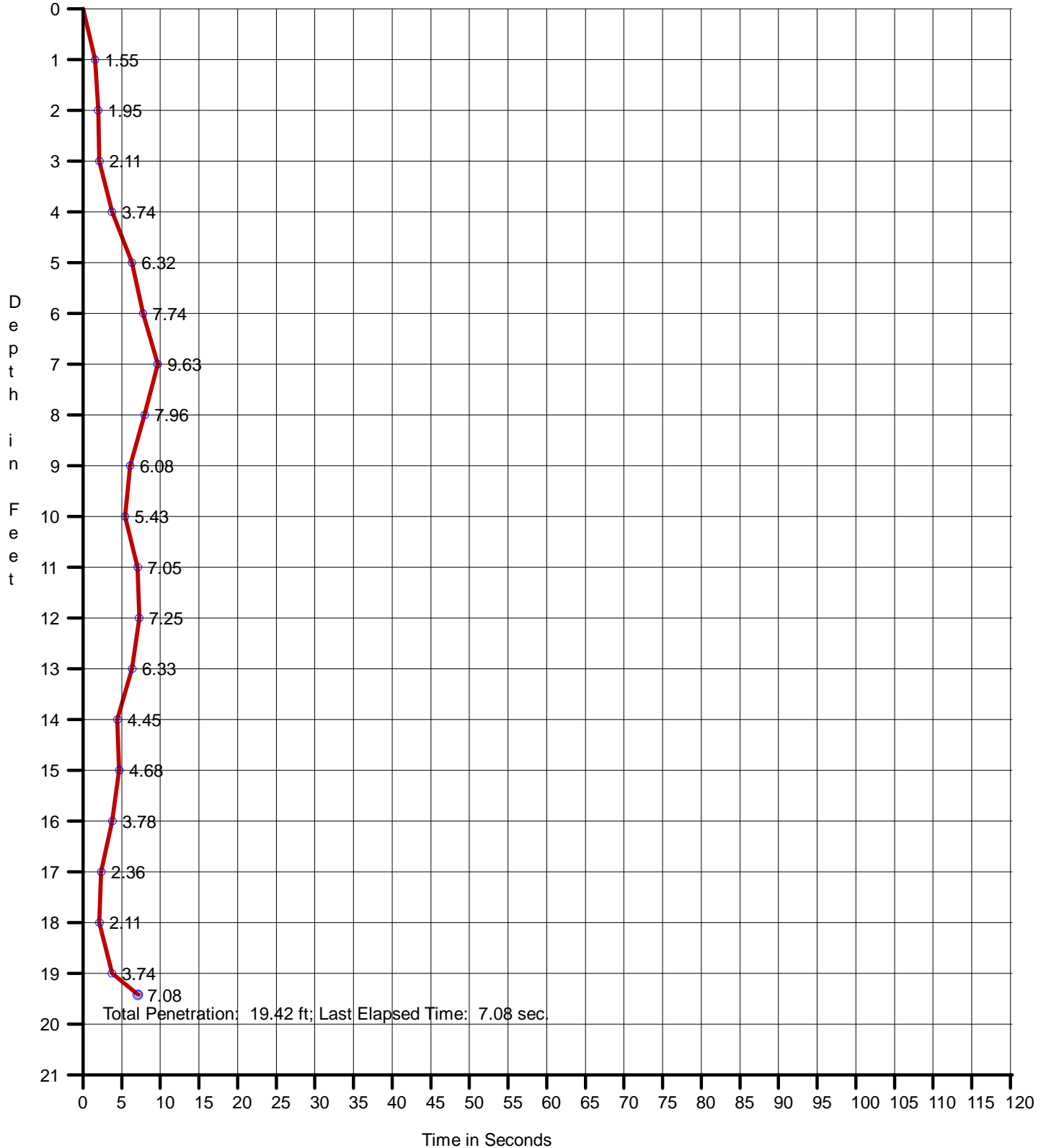
Date: 12/10/2011
Start Time: 9:00:10 AM
End Time: 9:02:21 AM

Penetration: 19.42 ft
Recovery: 16.25 ft
W. D. Corrected: 45.91 ft
W. D. Raw: 46.49 ft

Easting: 2690364.08
Northing: 328249.39
Coord. System: NCSPCS 83

Long: 76°42'17.5440"W
Lat: 034°37'47.9400"N
Datum: NCSPCS 83

Comment:



Penetration Graph for Core No. 042, Run 1

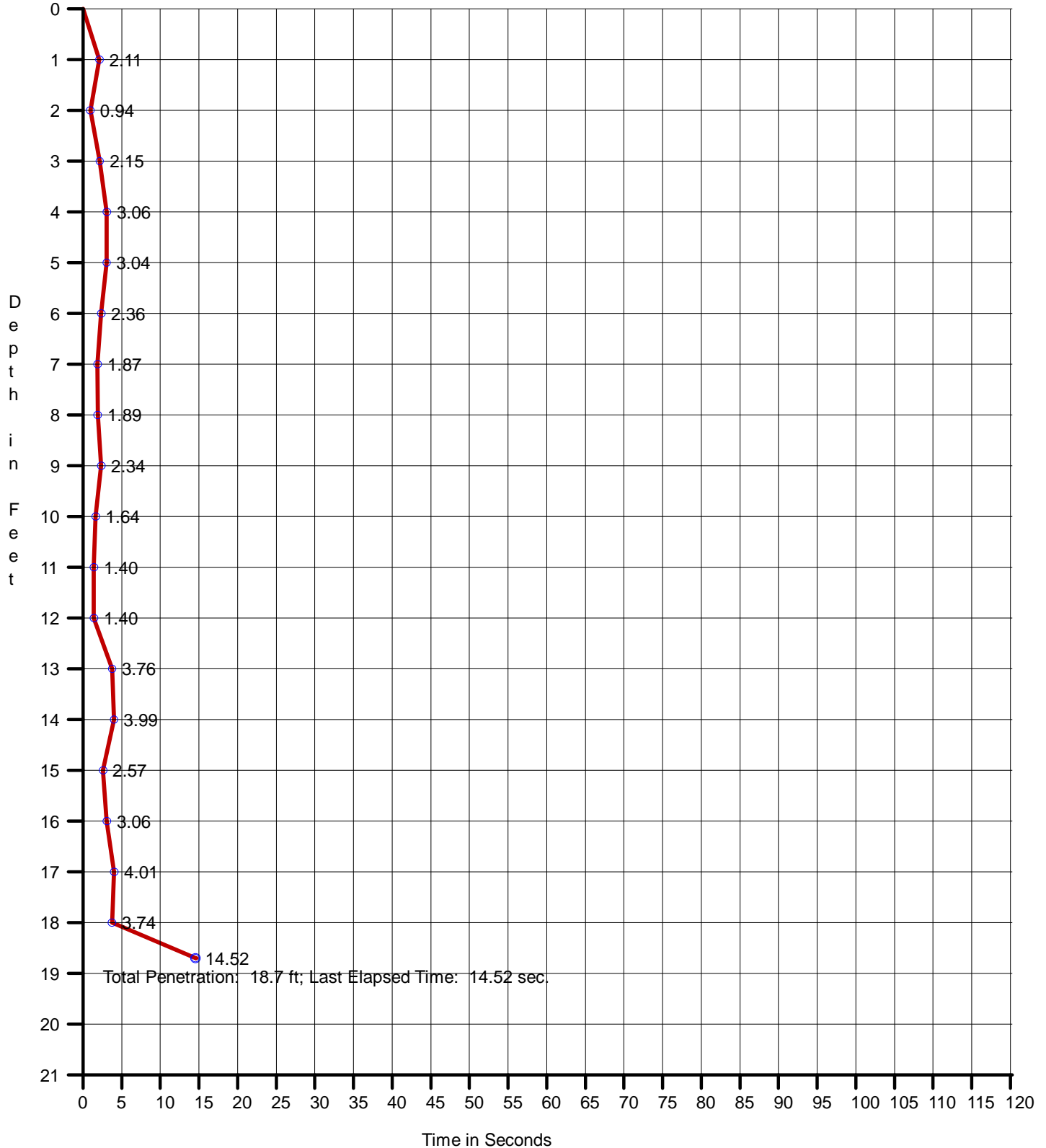
Date: 12/10/2011
Start Time: 8:38:14 AM
End Time: 8:39:23 AM

Penetration: 18.70 ft
Recovery: 13.80 ft
W. D. Corrected: 52.44 ft
W. D. Raw: 53.22 ft

Easting: 2692365.73
Northing: 328246.95
Coord. System: NCSPCS 83

Long: 76°41'53.5980"W
Lat: 034°37'47.4600"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 043, Run 1

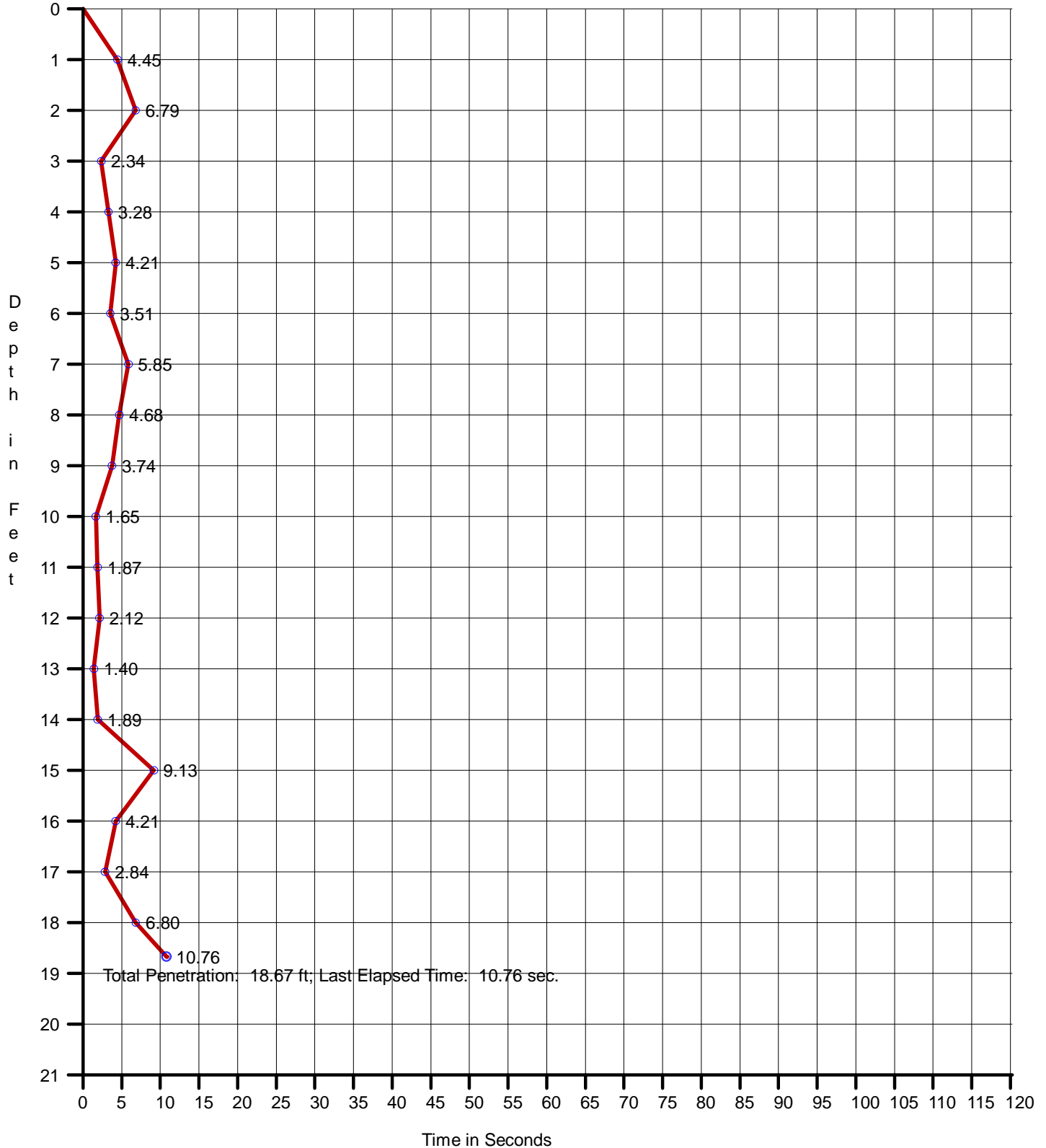
Date: 12/10/2011
Start Time: 8:12:39 AM
End Time: 8:14:00 AM

Penetration: 18.67 ft
Recovery: 14.40 ft
W. D. Corrected: 48.40 ft
W. D. Raw: 49.41 ft

Easting: 2694364.18
Northing: 328249.45
Coord. System: NCSPCS 83

Long: 76°41'29.6880"W
Lat: 034°37'47.0220"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O44, Run 1

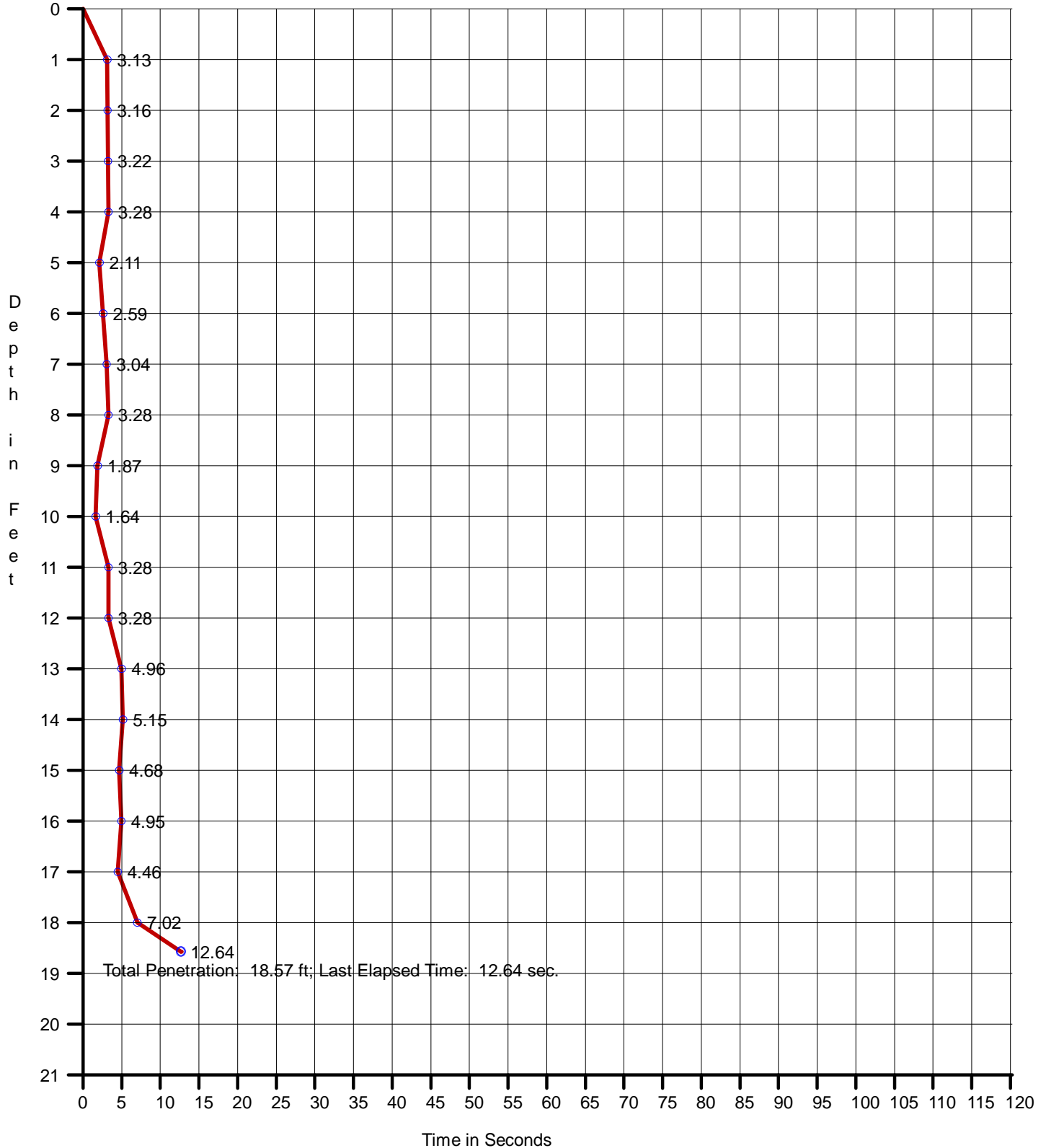
Date: 12/10/2011
Start Time: 7:44:03 AM
End Time: 7:45:38 AM

Penetration: 18.57 ft
Recovery: 14.30 ft
W. D. Corrected: 53.27 ft
W. D. Raw: 54.29 ft

Easting: 2696367.35
Northing: 328252.26
Coord. System: NCSPCS 83

Long: 76°41'05.7240"W
Lat: 034°37'46.5900"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 045, Run 1

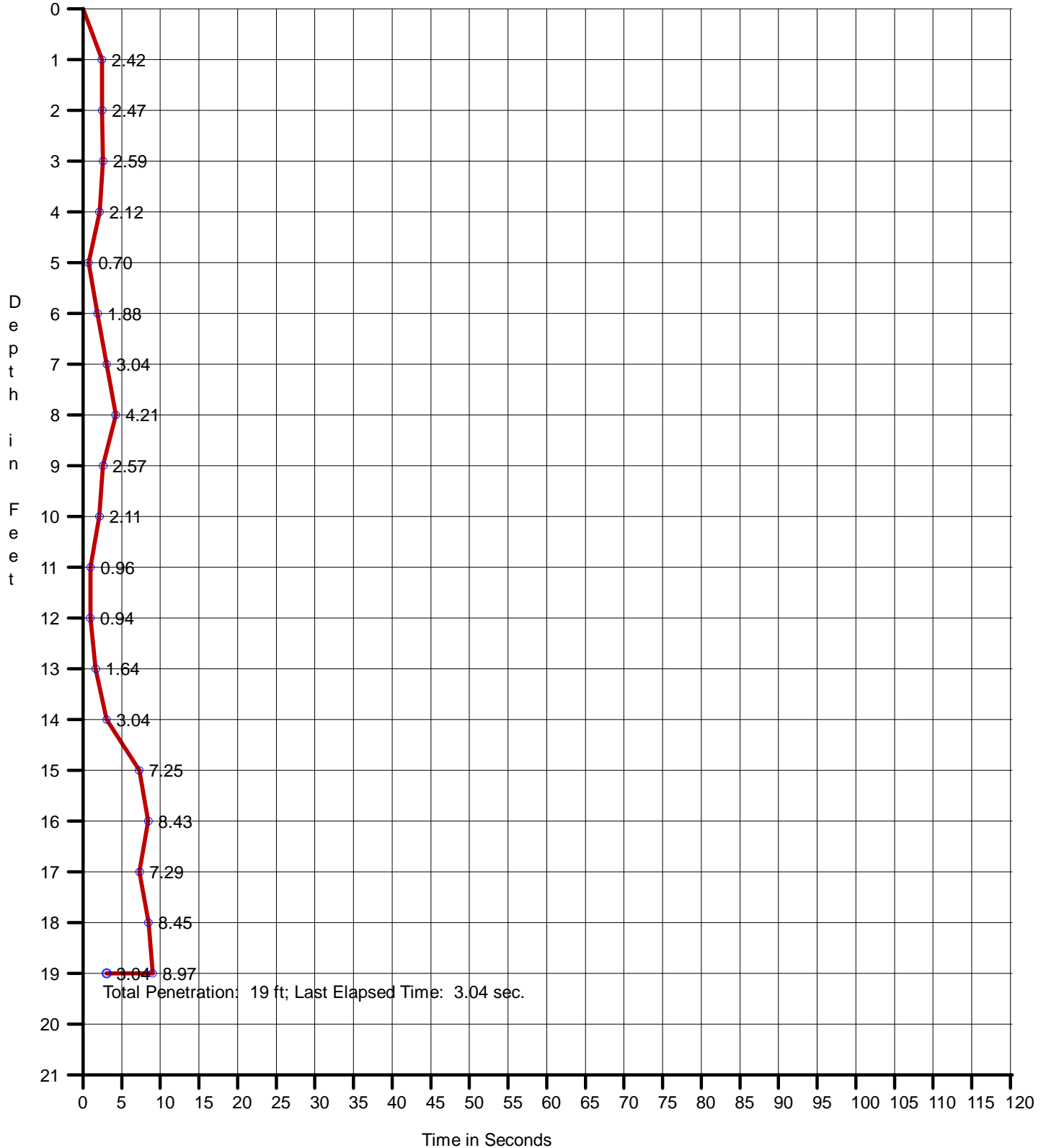
Date: 12/9/2011
Start Time: 1:32:36 PM
End Time: 1:33:57 PM

Penetration: 19.00 ft
Recovery: 19.00 ft
W. D. Corrected: 54.25 ft
W. D. Raw: 52.58 ft

Easting: 2682364.81
Northing: 326254.16
Coord. System: NCSPCS 83

Long: 76°43'53.7960"W
Lat: 034°37'30.0300"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O46, Run 1

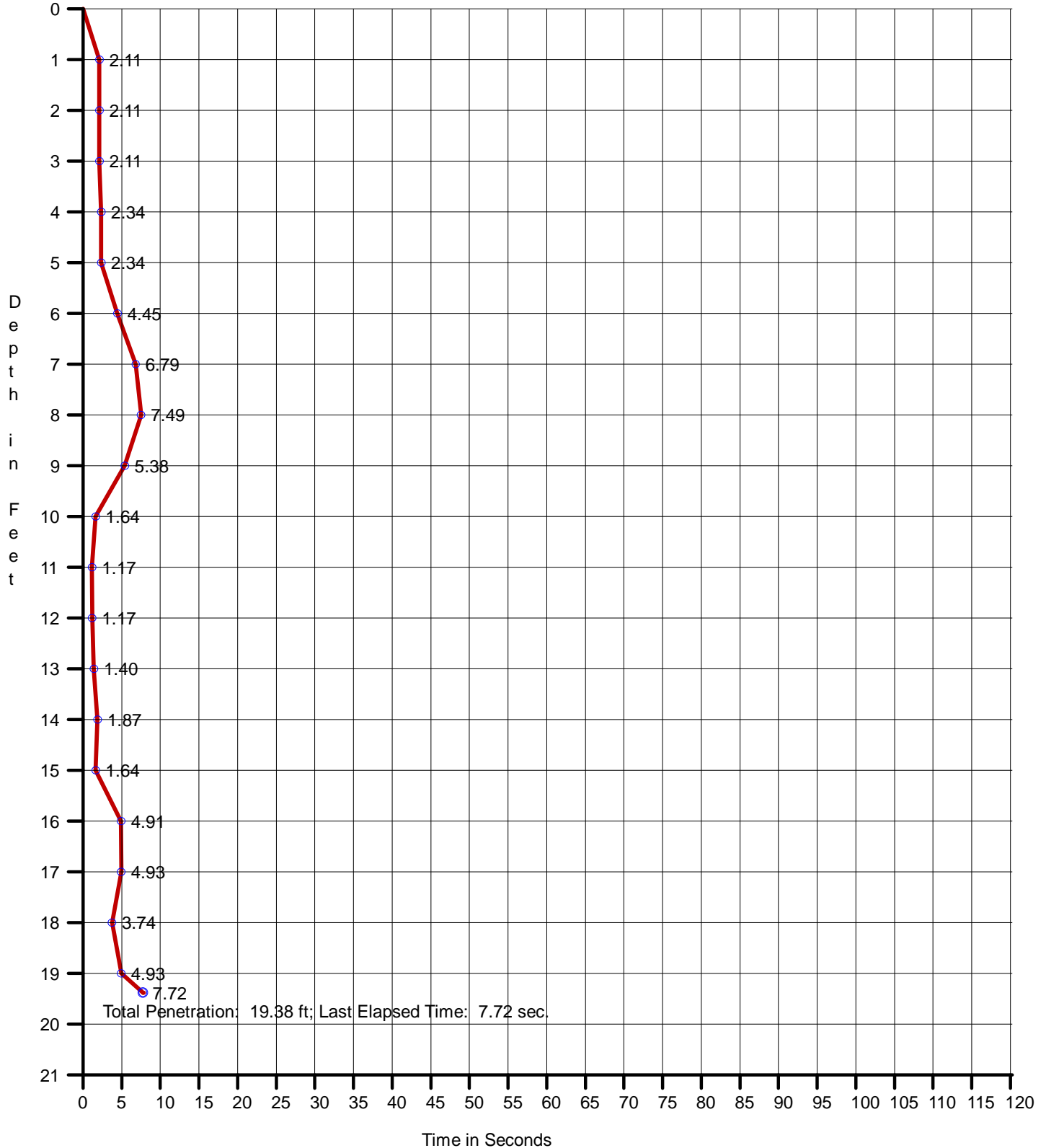
Date: 12/9/2011
Start Time: 2:02:49 PM
End Time: 2:04:06 PM

Penetration: 19.38 ft
Recovery: 15.25 ft
W. D. Corrected: 47.29 ft
W. D. Raw: 45.72 ft

Easting: 2684367.36
Northing: 326253.03
Coord. System: NCSPCS 83

Long: 76°43'29.8380"W
Lat: 034°37'29.5620"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O47, Run 1

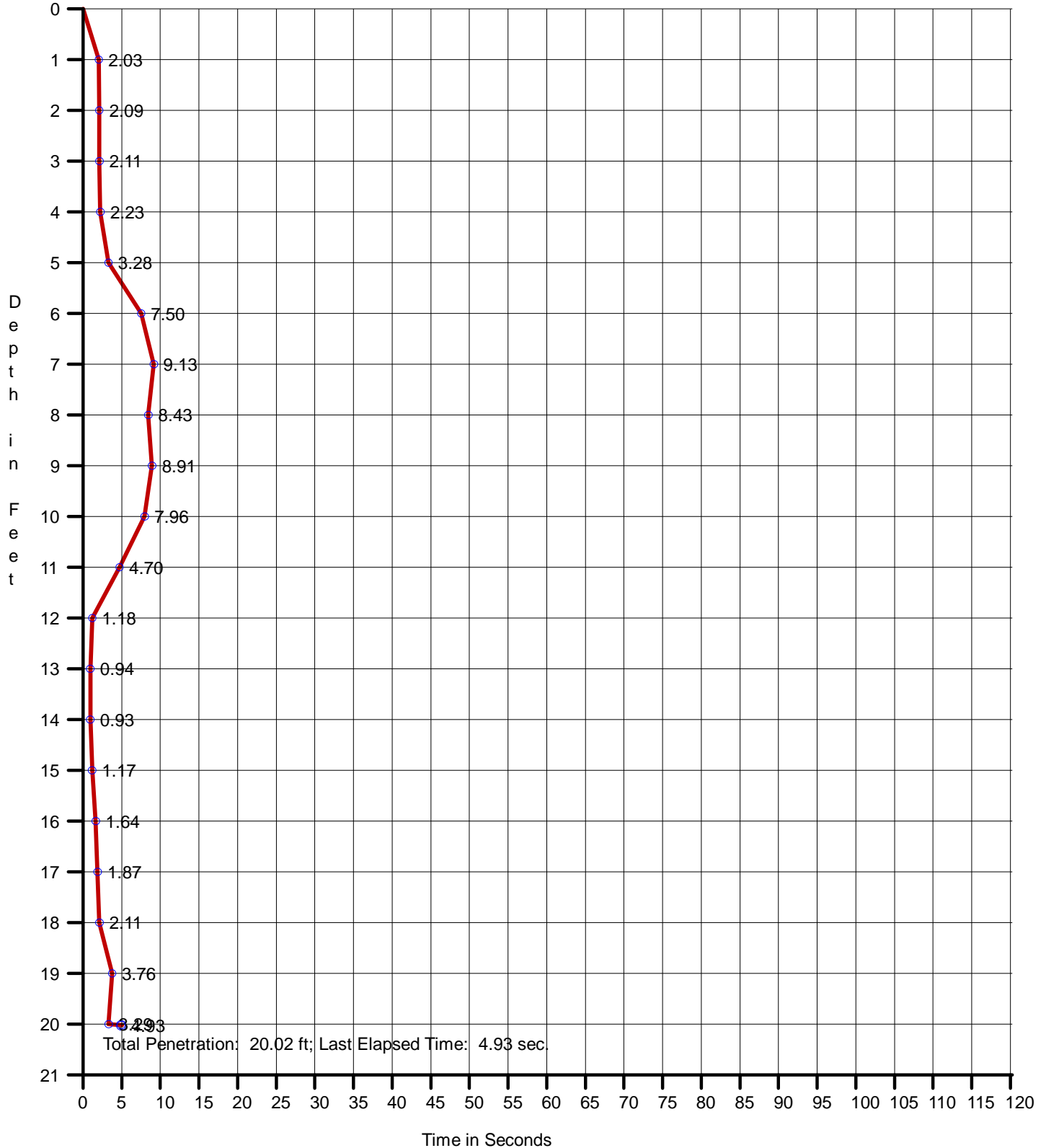
Date: 12/9/2011
Start Time: 2:29:31 PM
End Time: 2:30:59 PM

Penetration: 20.02 ft
Recovery: 18.00 ft
W. D. Corrected: 47.39 ft
W. D. Raw: 45.95 ft

Easting: 2686365.88
Northing: 326253.57
Coord. System: NCSPCS 83

Long: 76°43'05.9280"W
Lat: 034°37'29.1120"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 048, Run 1

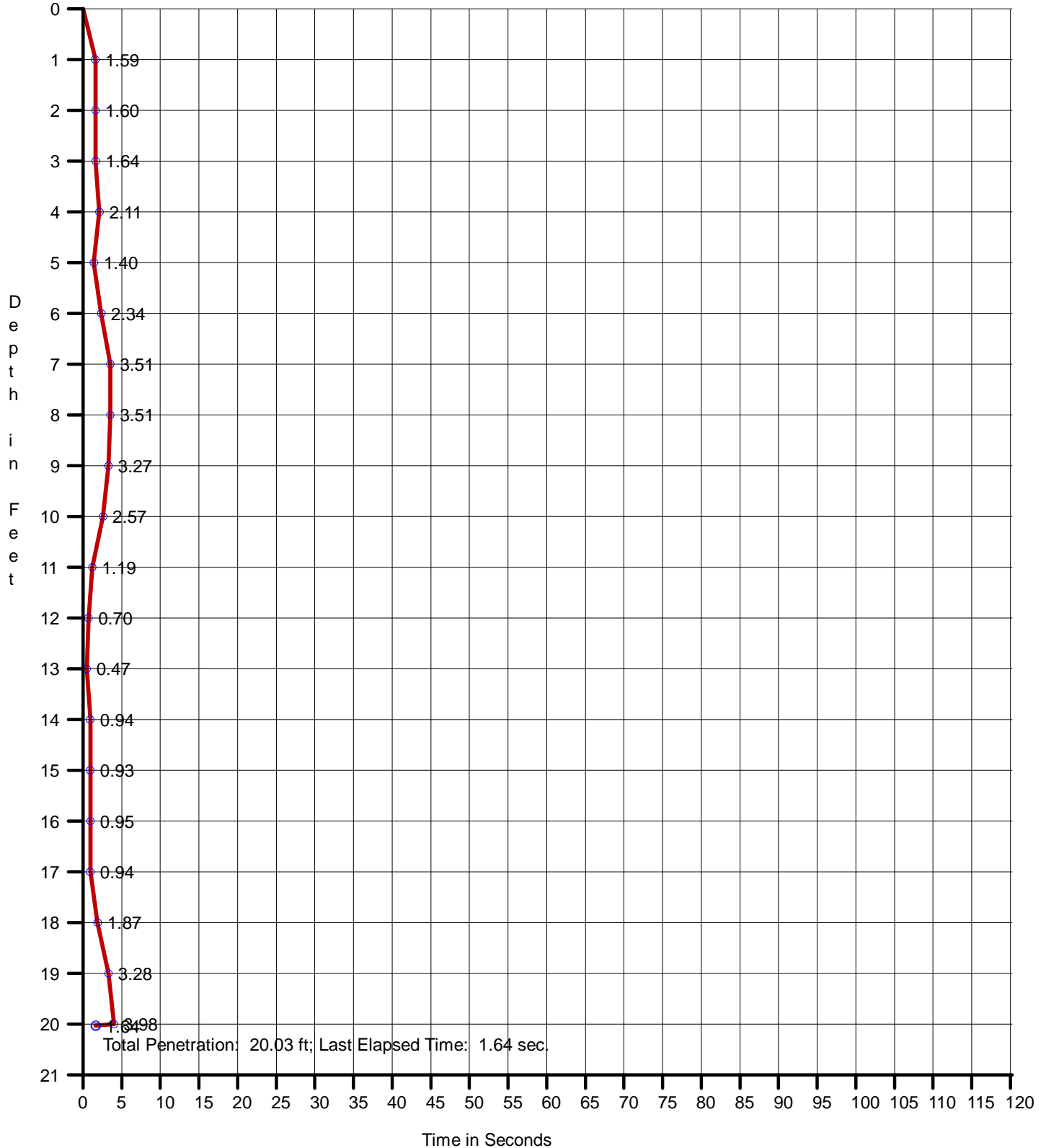
Date: 12/9/2011
Start Time: 2:54:41 PM
End Time: 2:55:29 PM

Penetration: 20.03 ft
Recovery: 8.83 ft
W. D. Corrected: 46.58 ft
W. D. Raw: 45.20 ft

Easting: 2688363.39
Northing: 326256.56
Coord. System: NCSPCS 83

Long: 76°42'42.0300"W
Lat: 034°37'28.6920"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O49, Run 1

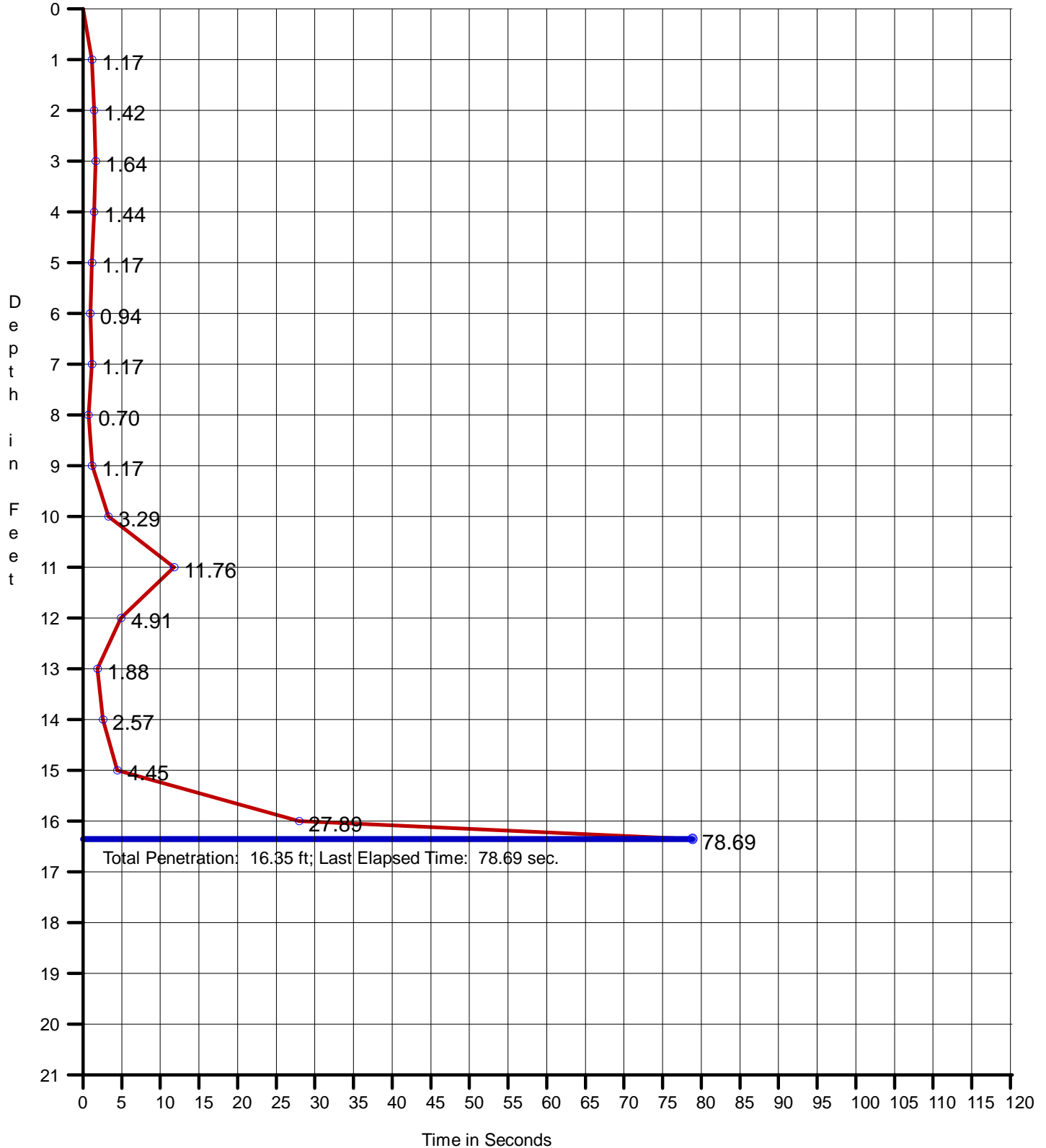
Date: 12/9/2011
Start Time: 3:38:45 PM
End Time: 3:41:27 PM

Penetration: 16.35 ft
Recovery: 16.50 ft
W. D. Corrected: 54.12 ft
W. D. Raw: 53.07 ft

Easting: 2690351.16
Northing: 326260.71
Coord. System: NCSPCS 83

Long: 76°42'18.2520"W
Lat: 034°37'28.2780"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O50, Run 1

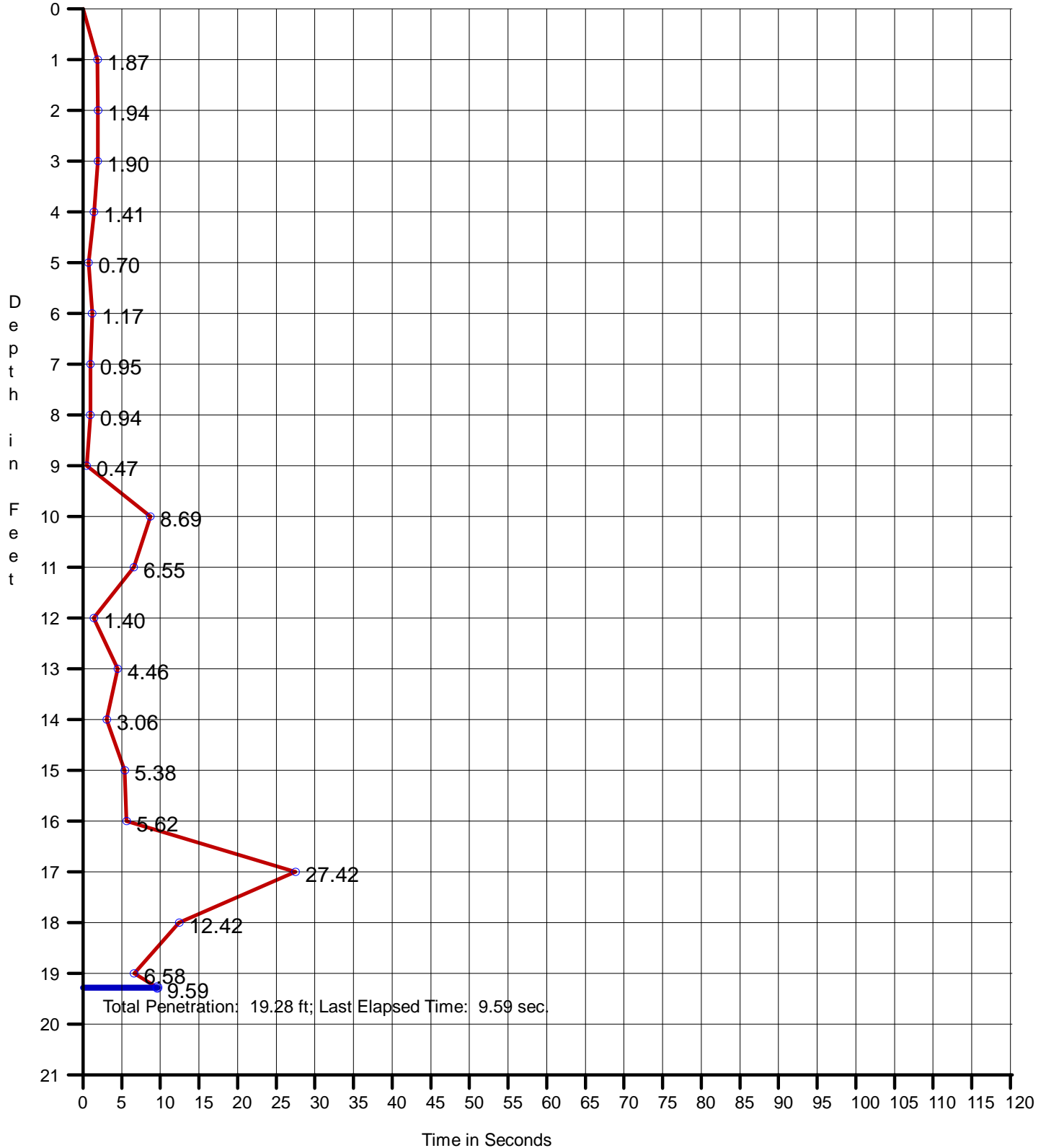
Date: 12/9/2011
Start Time: 4:05:04 PM
End Time: 4:06:56 PM

Penetration: 19.28 ft
Recovery: 19.80 ft
W. D. Corrected: 55.90 ft
W. D. Raw: 55.23 ft

Easting: 2692363.84
Northing: 326252.08
Coord. System: NCSPCS 83

Long: 76°41'54.1740"W
Lat: 034°37'27.7320"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. 051, Run 1

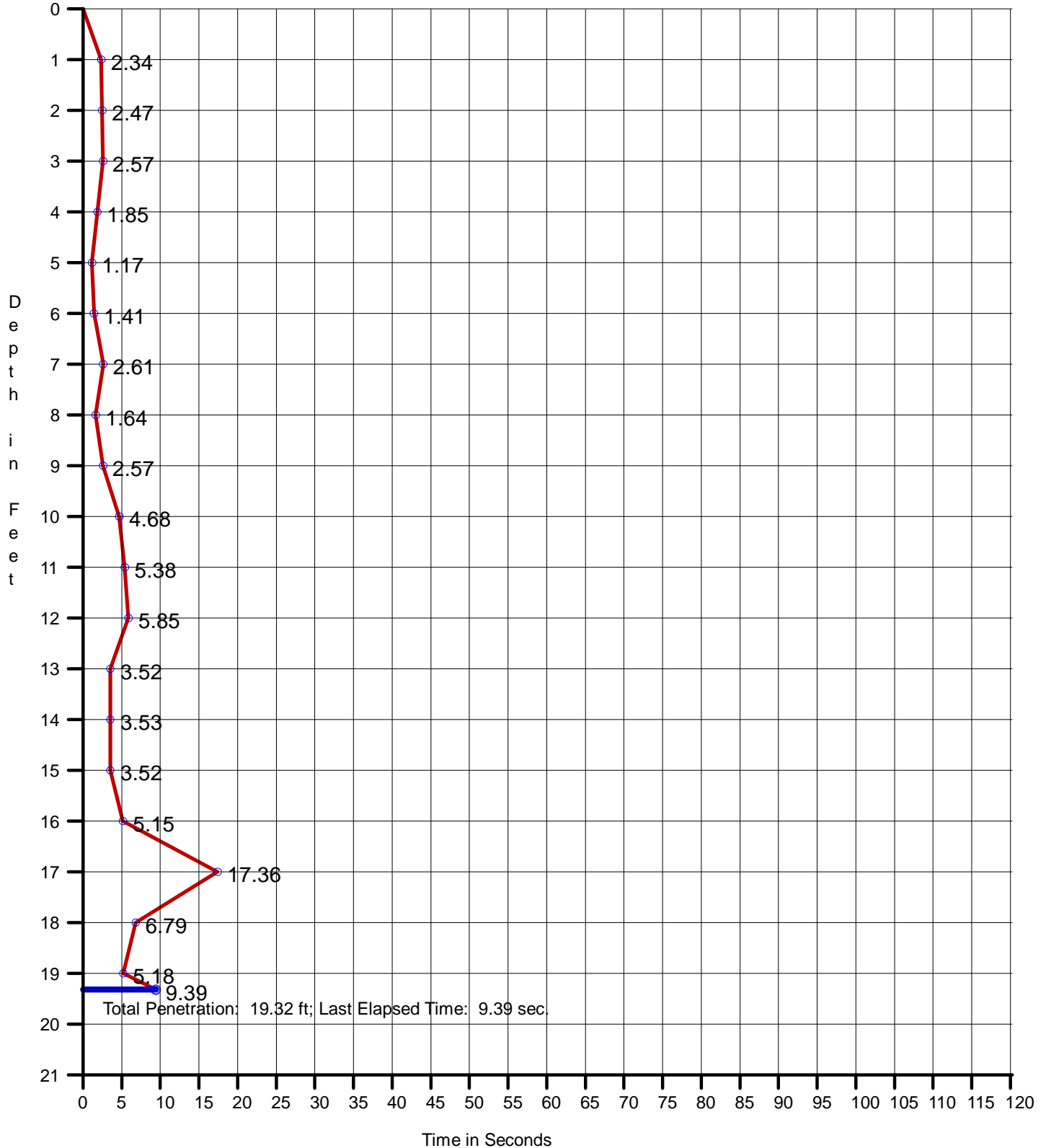
Date: 12/9/2011
Start Time: 4:30:48 PM
End Time: 4:32:34 PM

Penetration: 19.32 ft
Recovery: 17.33 ft
W. D. Corrected: 52.67 ft
W. D. Raw: 52.29 ft

Easting: 2694364.35
Northing: 326252.93
Coord. System: NCSPCS 83

Long: 76°41'30.2400"W
Lat: 034°37'27.2820"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O52, Run 1

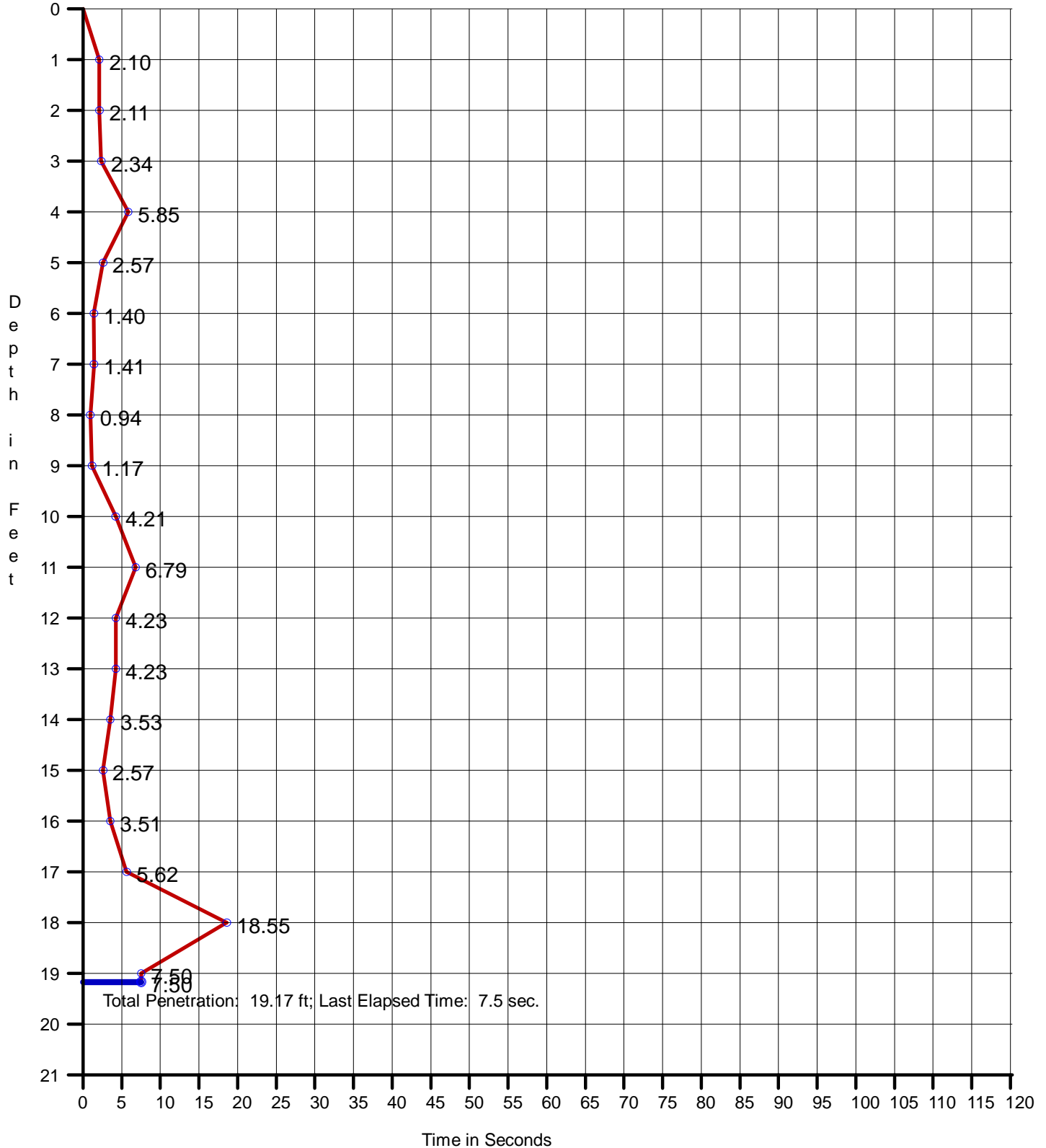
Date: 12/9/2011
Start Time: 4:59:04 PM
End Time: 5:00:53 PM

Penetration: 19.17 ft
Recovery: 18.33 ft
W. D. Corrected: 54.69 ft
W. D. Raw: 54.60 ft

Easting: 2696364.53
Northing: 326251.56
Coord. System: NCSPCS 83

Long: 76°41'06.3120"W
Lat: 034°37'26.8080"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O53, Run 1

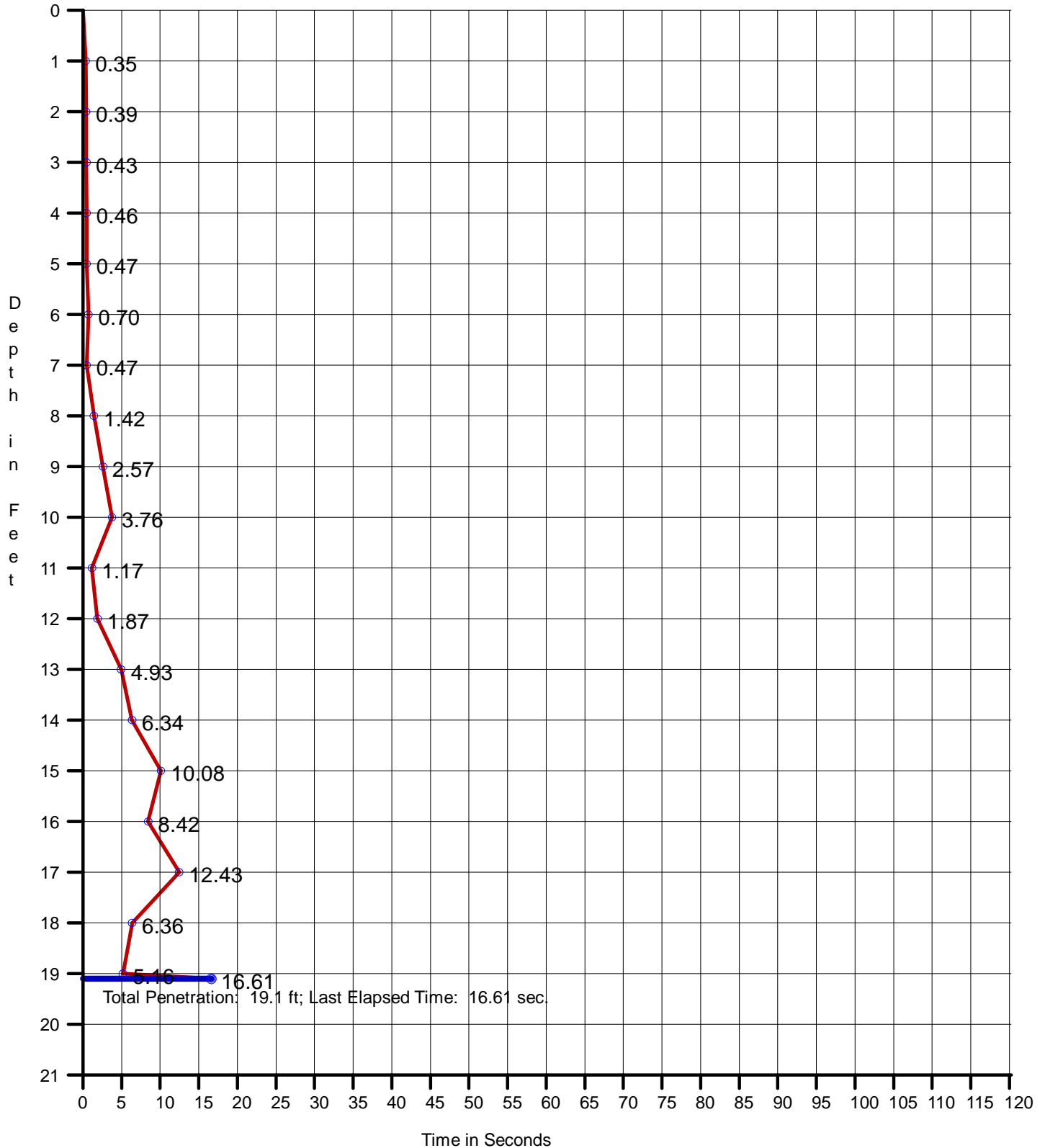
Date: 12/9/2011
Start Time: 1:08:09 PM
End Time: 1:09:45 PM

Penetration: 19.10 ft
Recovery: 17.50 ft
W. D. Corrected: 55.07 ft
W. D. Raw: 53.40 ft

Easting: 2682357.26
Northing: 324250.96
Coord. System: NCSPCS 83

Long: 76°43'54.4320"W
Lat: 034°37'10.2180"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O54, Run 1

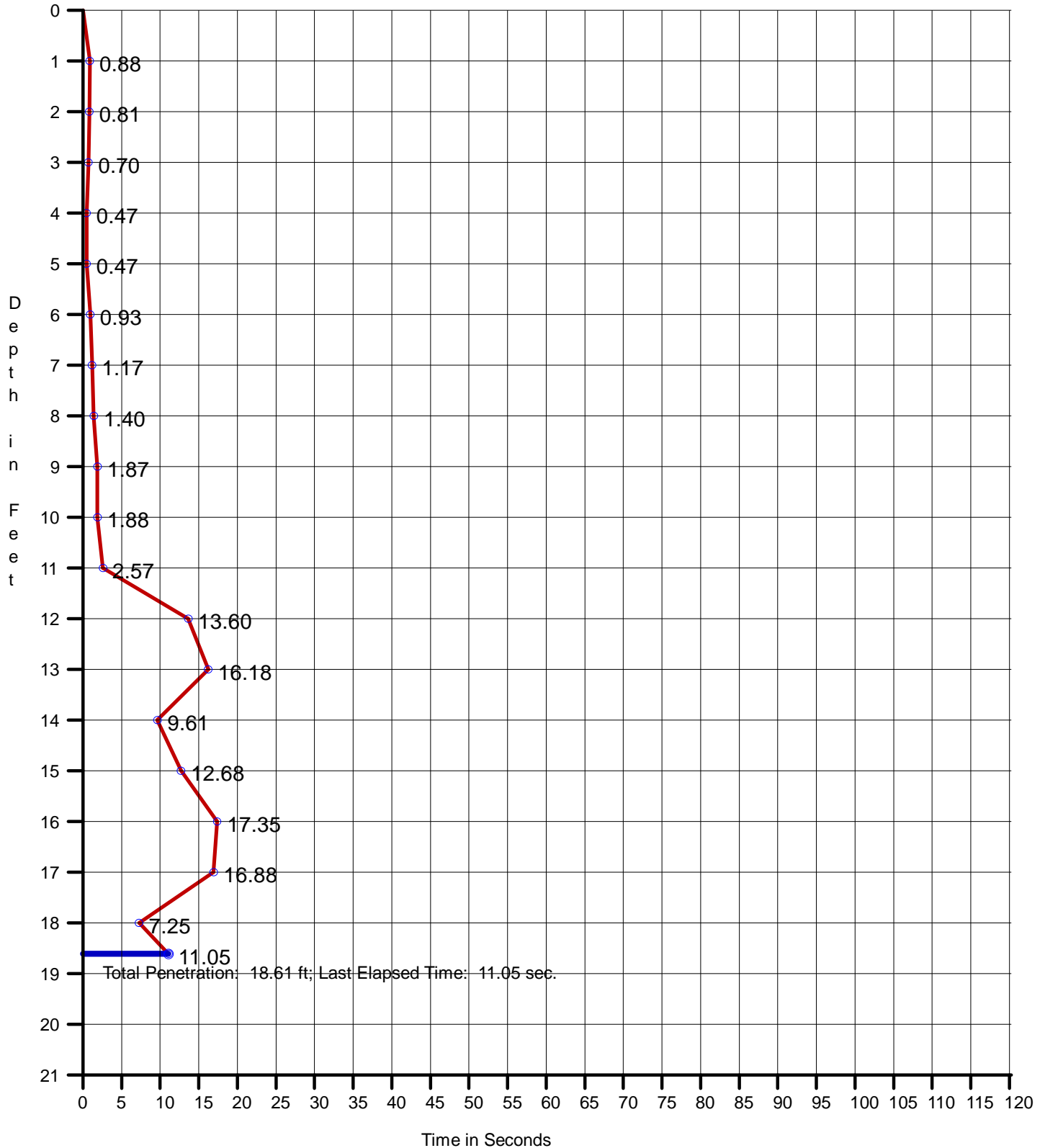
Date: 12/9/2011
Start Time: 12:04:55 PM
End Time: 12:07:01 PM

Penetration: 18.61 ft
Recovery: 19.00 ft
W. D. Corrected: 55.11 ft
W. D. Raw: 53.67 ft

Easting: 2684362.14
Northing: 324250.92
Coord. System: NCSPCS 83

Long: 76°43'30.4500"W
Lat: 034°37'09.7620"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O55, Run 1

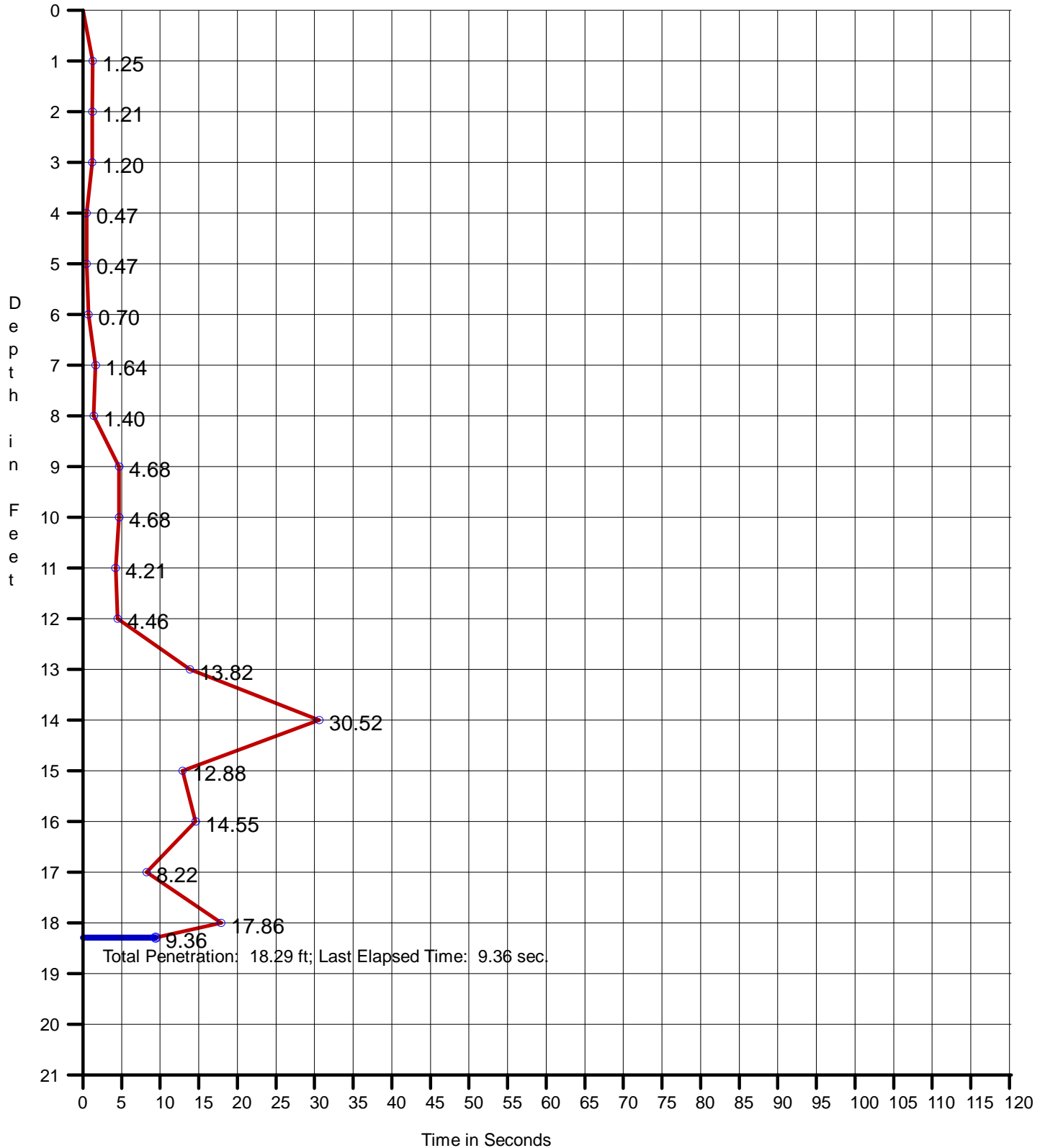
Date: 12/9/2011
Start Time: 11:35:03 AM
End Time: 11:37:25 AM

Penetration: 18.29 ft
Recovery: 19.20 ft
W. D. Corrected: 55.19 ft
W. D. Raw: 53.93 ft

Easting: 2686361.62
Northing: 324249.01
Coord. System: NCSPCS 83

Long: 76°43'06.5340"W
Lat: 034°37'09.2940"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O56, Run 2

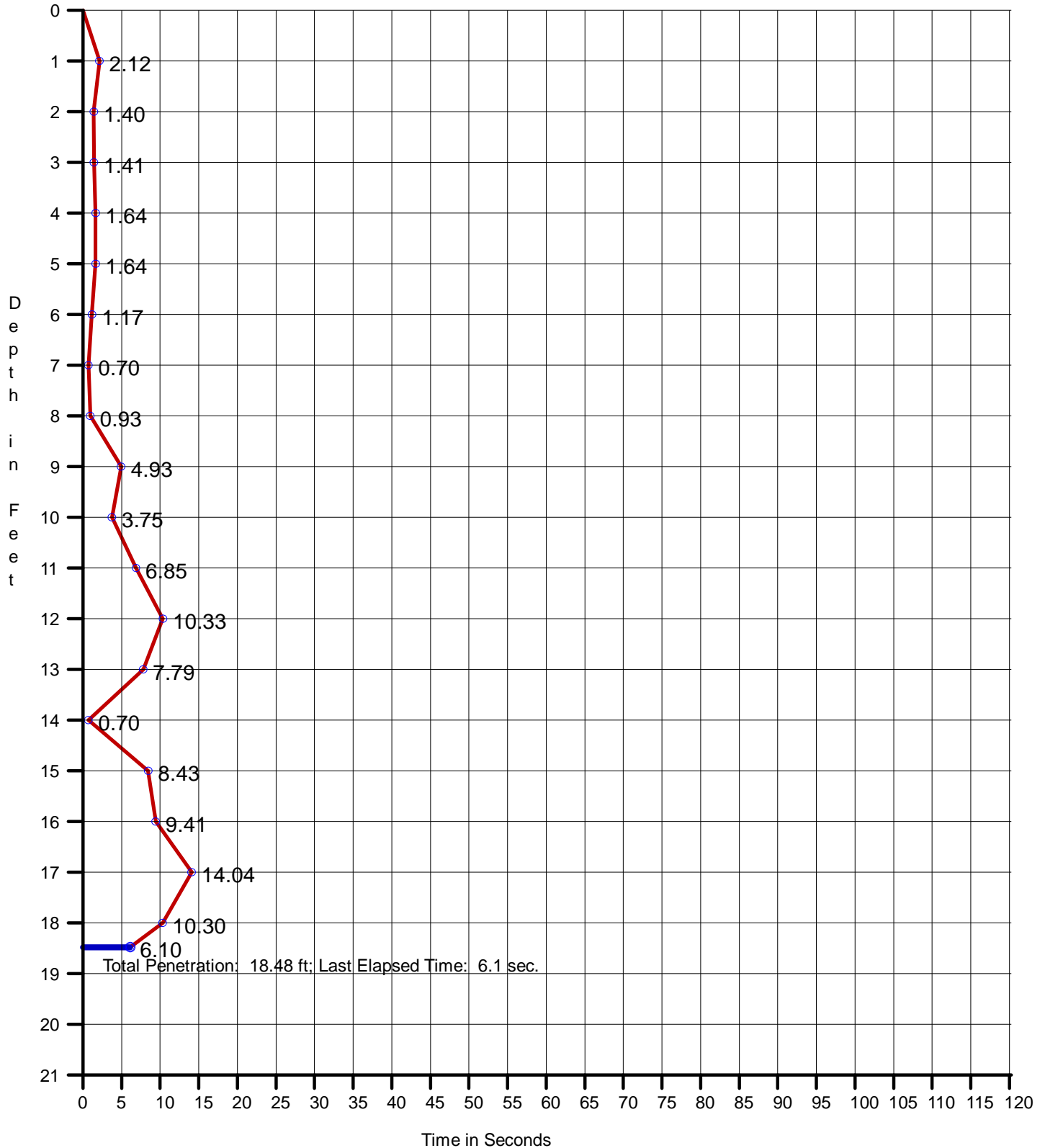
Date: 12/9/2011
Start Time: 10:26:31 AM
End Time: 10:28:05 AM

Penetration: 18.48 ft
Recovery: 16.75 ft
W. D. Corrected: 57.69 ft
W. D. Raw: 57.04 ft

Easting: 2688369.39
Northing: 324252.95
Coord. System: NCSPCS 83

Long: 76°42'42.5100"W
Lat: 034°37'08.8740"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O57, Run 1

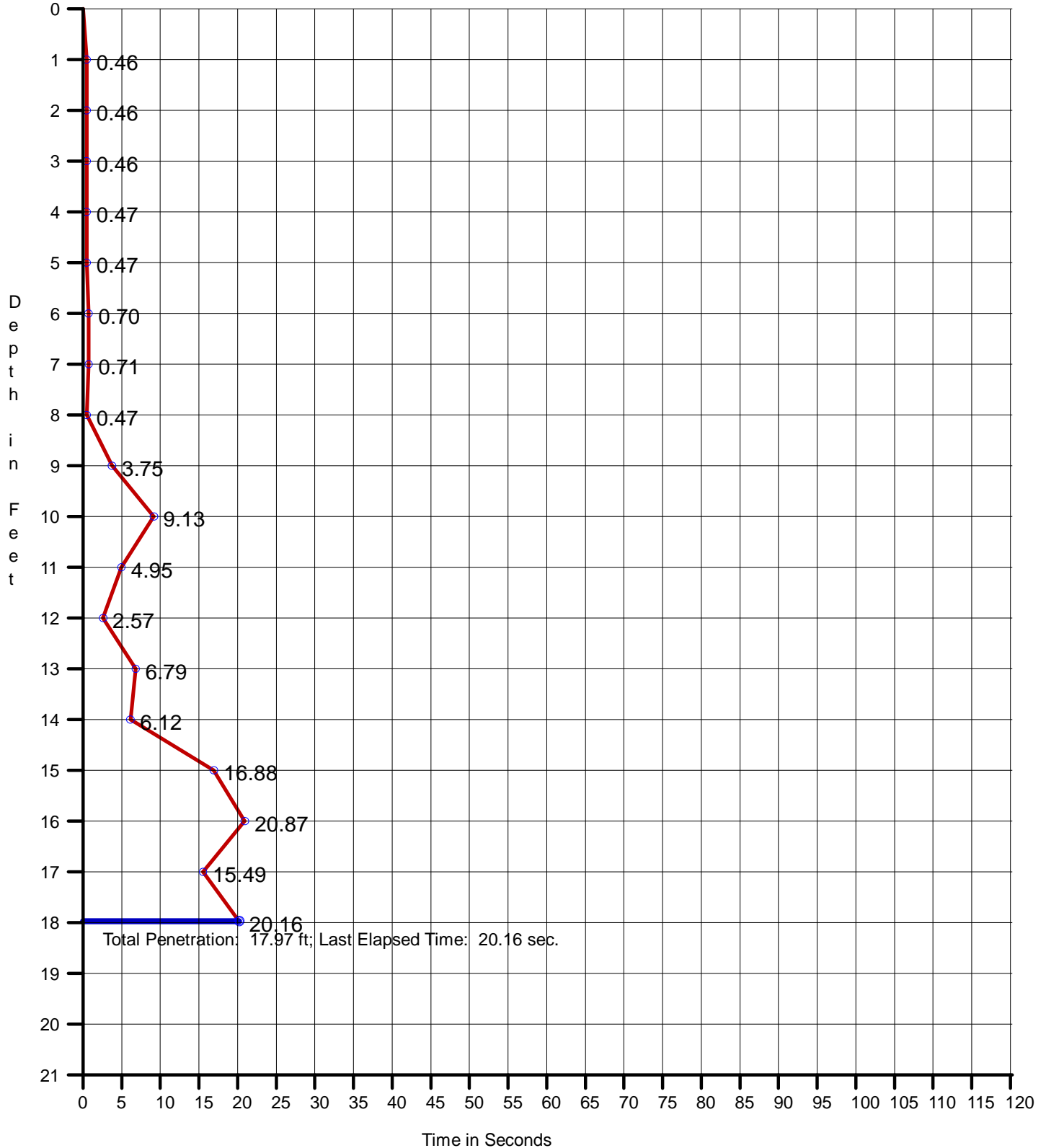
Date: 12/9/2011
Start Time: 9:47:12 AM
End Time: 9:49:17 AM

Penetration: 17.97 ft
Recovery: 18.00 ft
W. D. Corrected: 54.70 ft
W. D. Raw: 54.47 ft

Easting: 2690363.38
Northing: 324250.44
Coord. System: NCSPCS 83

Long: 76°42'18.6600"W
Lat: 034°37'08.3940"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O58, Run 1

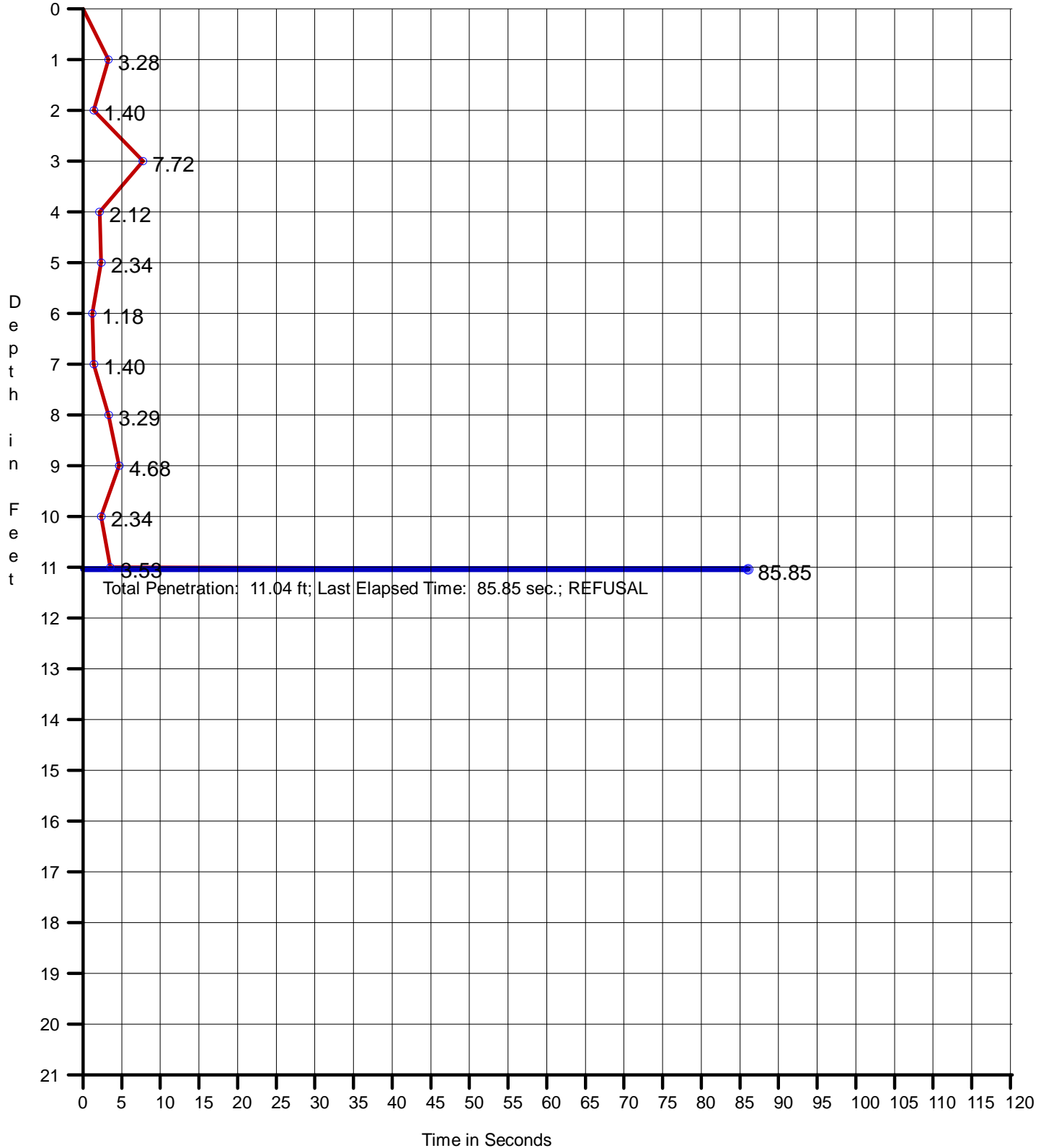
Date: 12/9/2011
Start Time: 9:20:22 AM
End Time: 9:22:21 AM

Penetration: 11.04 ft
Recovery: 9.70 ft
W. D. Corrected: 55.66 ft
W. D. Raw: 55.80 ft

Easting: 2692363.73
Northing: 324253.91
Coord. System: NCSPCS 83

Long: 76°41'54.7320"W
Lat: 034°37'07.9680"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O59, Run 2

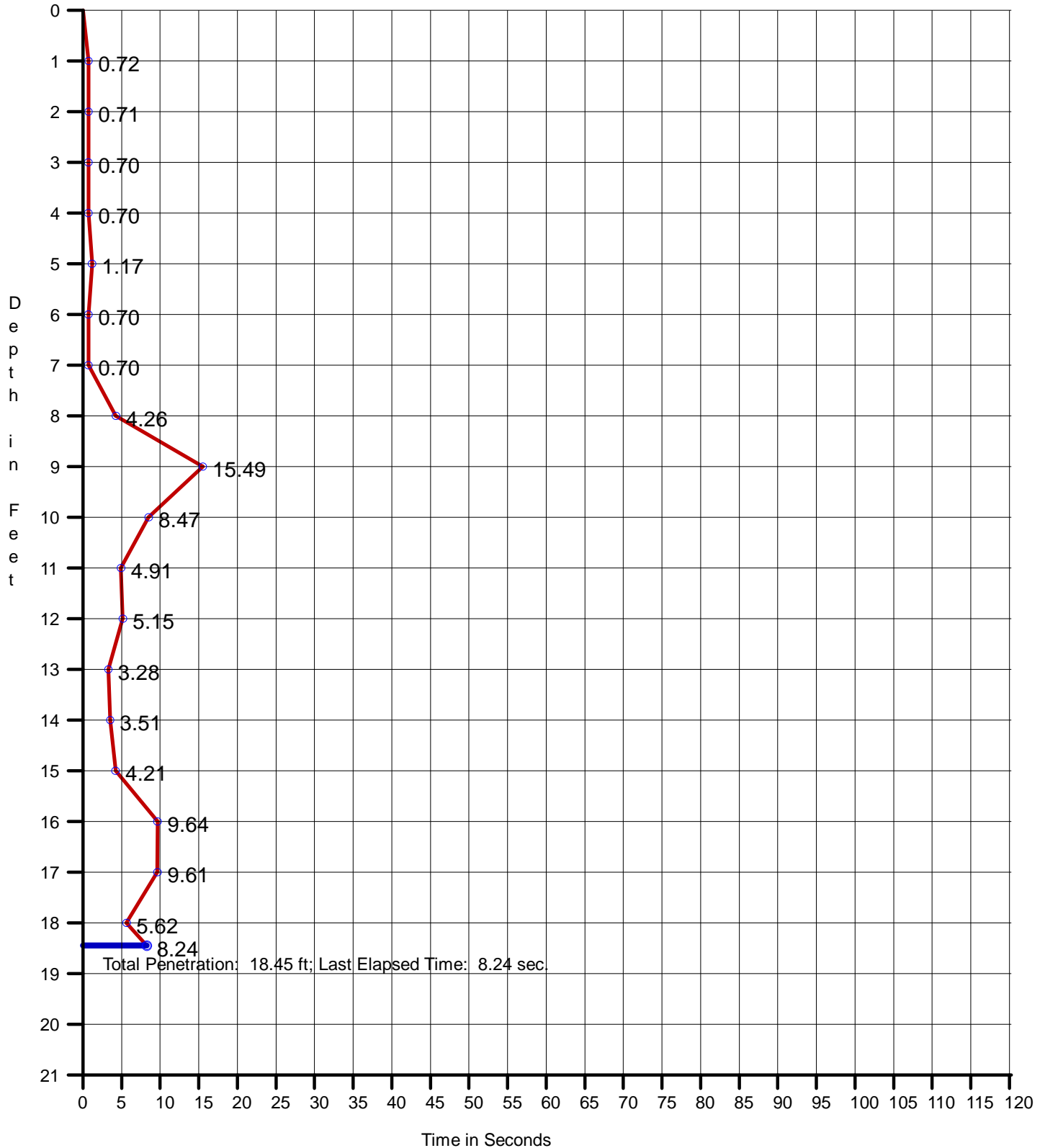
Date: 12/9/2011
Start Time: 8:49:26 AM
End Time: 8:51:03 AM

Penetration: 18.45 ft
Recovery: 18.20 ft
W. D. Corrected: 54.91 ft
W. D. Raw: 55.40 ft

Easting: 2694360.70
Northing: 324250.38
Coord. System: NCSPCS 83

Long: 76°41'30.8400"W
Lat: 034°37'07.4760"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O60, Run 2

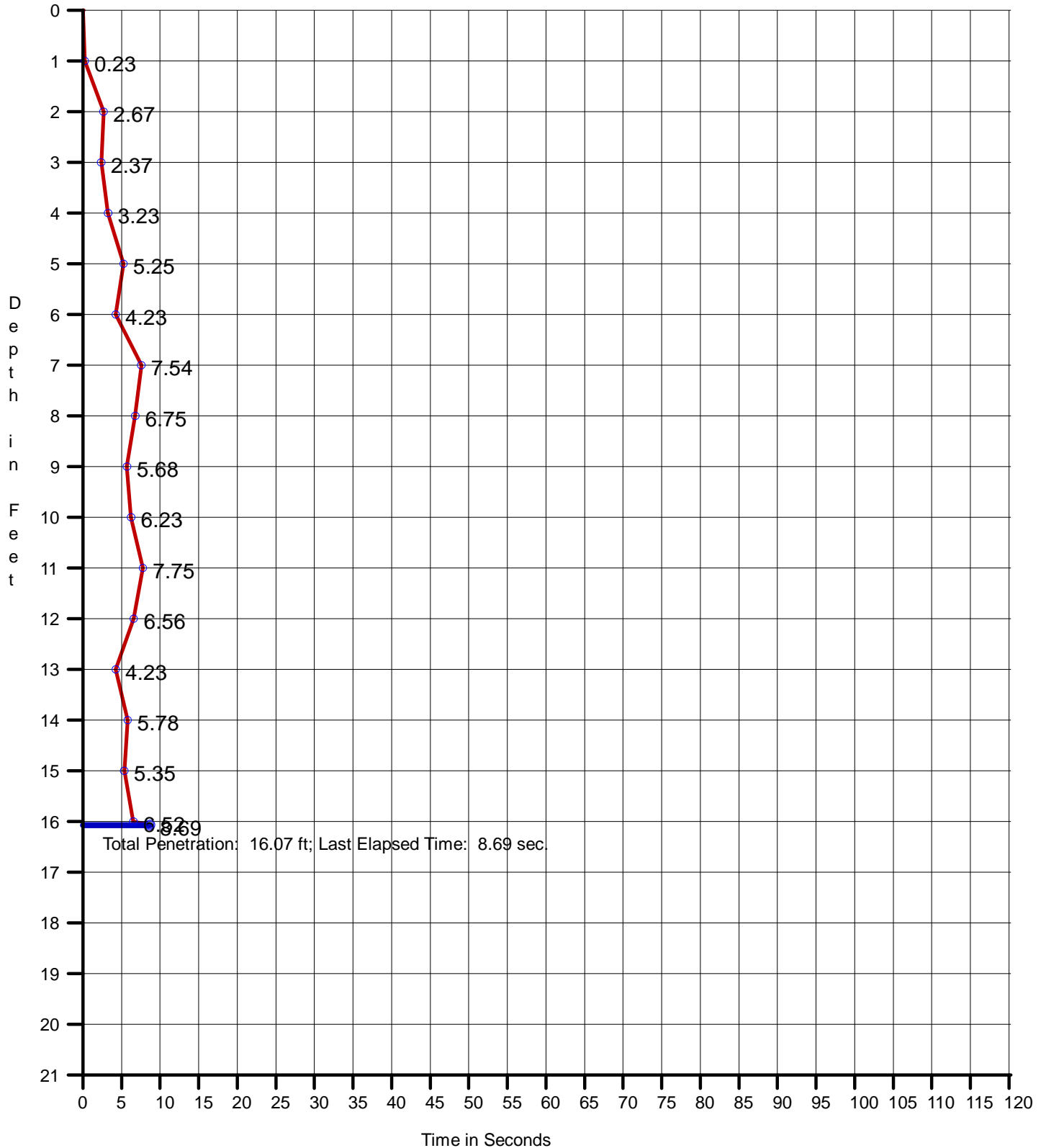
Date: 12/9/2011
Start Time: 8:07:10 AM
End Time: 8:07:29 AM

Penetration: 16.07 ft
Recovery: 13.10 ft
W. D. Corrected: 56.16 ft
W. D. Raw: 56.00 ft

Easting: 2696356.23
Northing: 324248.29
Coord. System: NCSPCS 83

Long: 76°41'06.9720"W
Lat: 034°37'06.9960"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. O192, Run 1

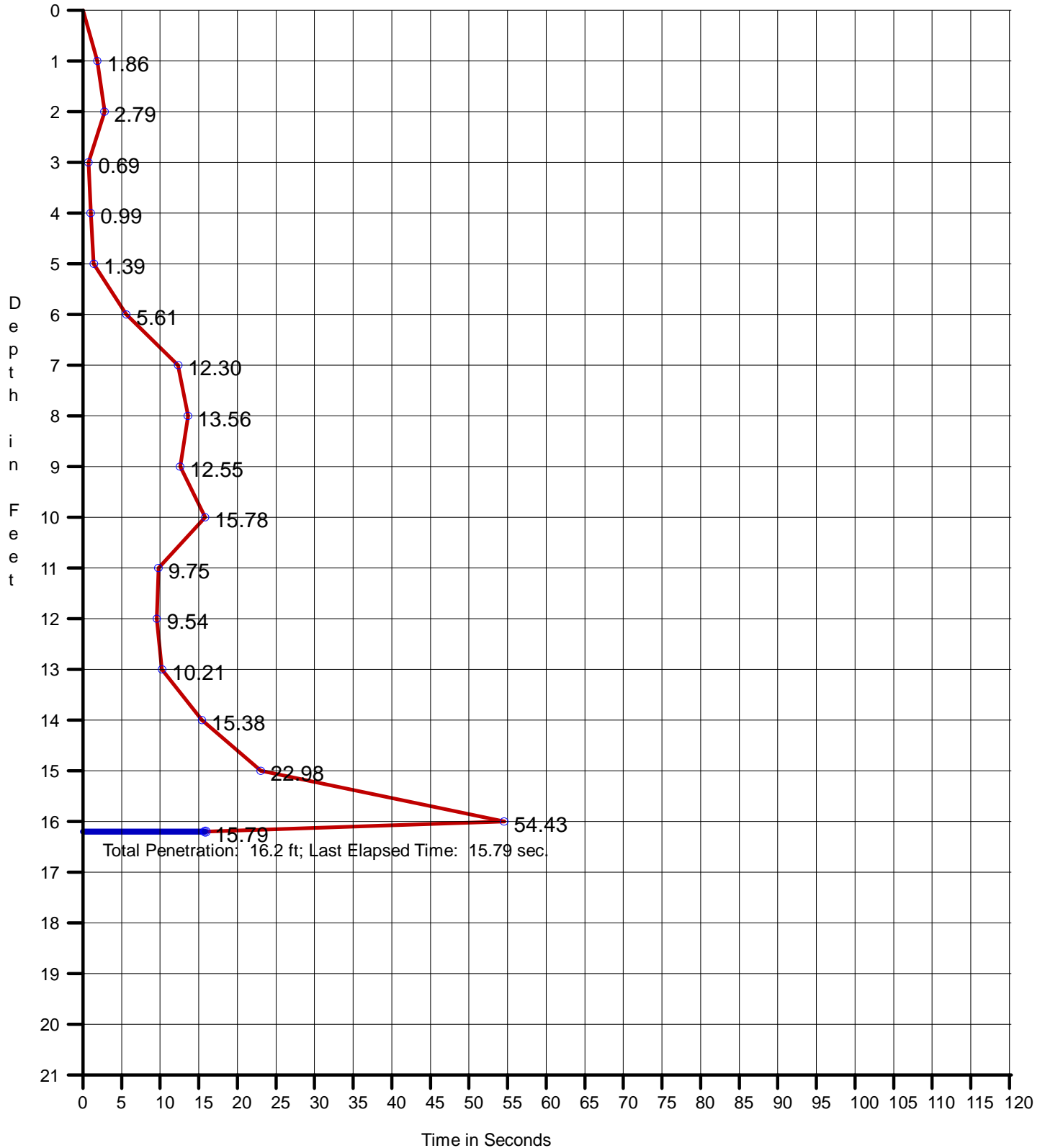
Date: 12/11/2011
Start Time: 11:28:46 AM
End Time: 11:32:20 AM

Penetration: 16.20 ft
Recovery: 17.30 ft
W. D. Corrected: 41.66 ft
W. D. Raw: 41.00 ft

Easting: 2690549.40
Northing: 329052.07
Coord. System: NCSPCS 83

Long: 76°42'15.1080"W
Lat: 034°37'55.8360"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y66, Run 1

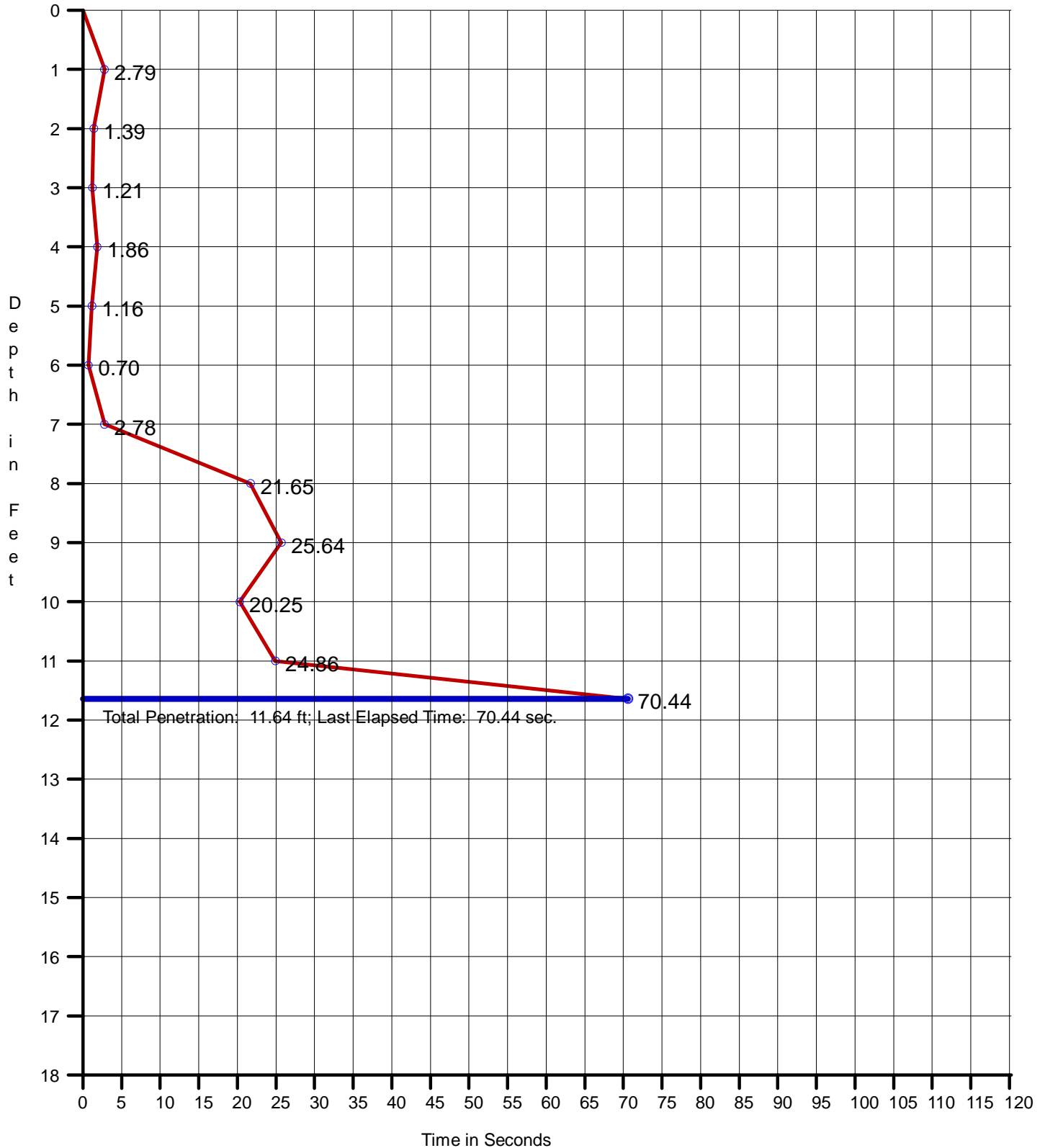
Date: 12/15/2011
Start Time: 12:28:55 PM
End Time: 12:31:50 PM

Penetration: 11.64 ft
Recovery: 10.20 ft
W. D. Corrected: 40.26 ft
W. D. Raw: 40.60 ft

Easting: 2581068.17
Northing: 330290.99
Coord. System: NCSPCS 83

Long: 77°04'04.7880"W
Lat: 034°38'31.1460"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y67, Run 1

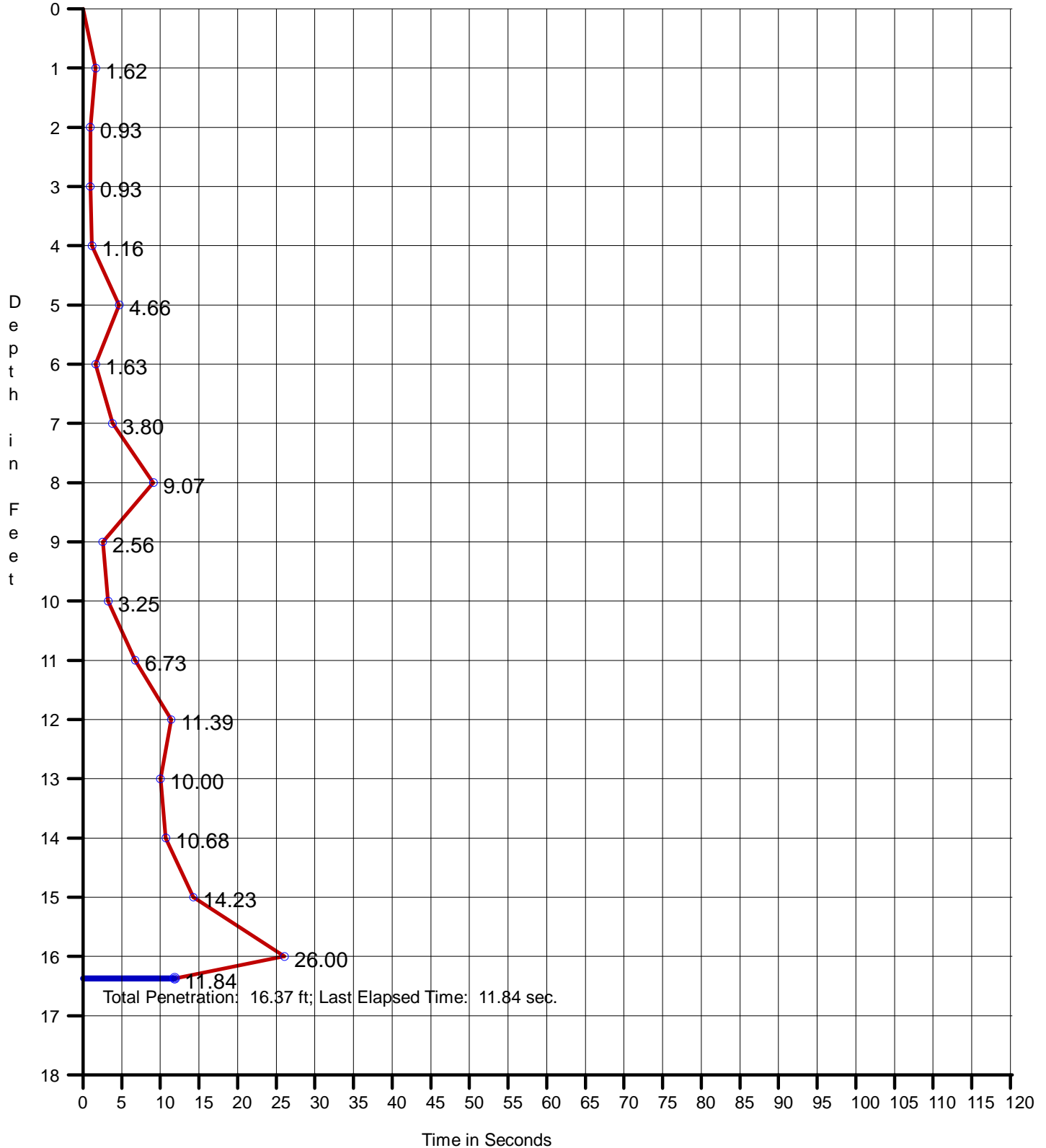
Date: 12/15/2011
Start Time: 12:53:42 PM
End Time: 12:55:42 PM

Penetration: 16.37 ft
Recovery: 15.00 ft
W. D. Corrected: 39.90 ft
W. D. Raw: 39.92 ft

Easting: 2582861.40
Northing: 331179.80
Coord. System: NCSPCS 83

Long: 77°03'43.1220"W
Lat: 034°38'39.5940"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y68, Run 1

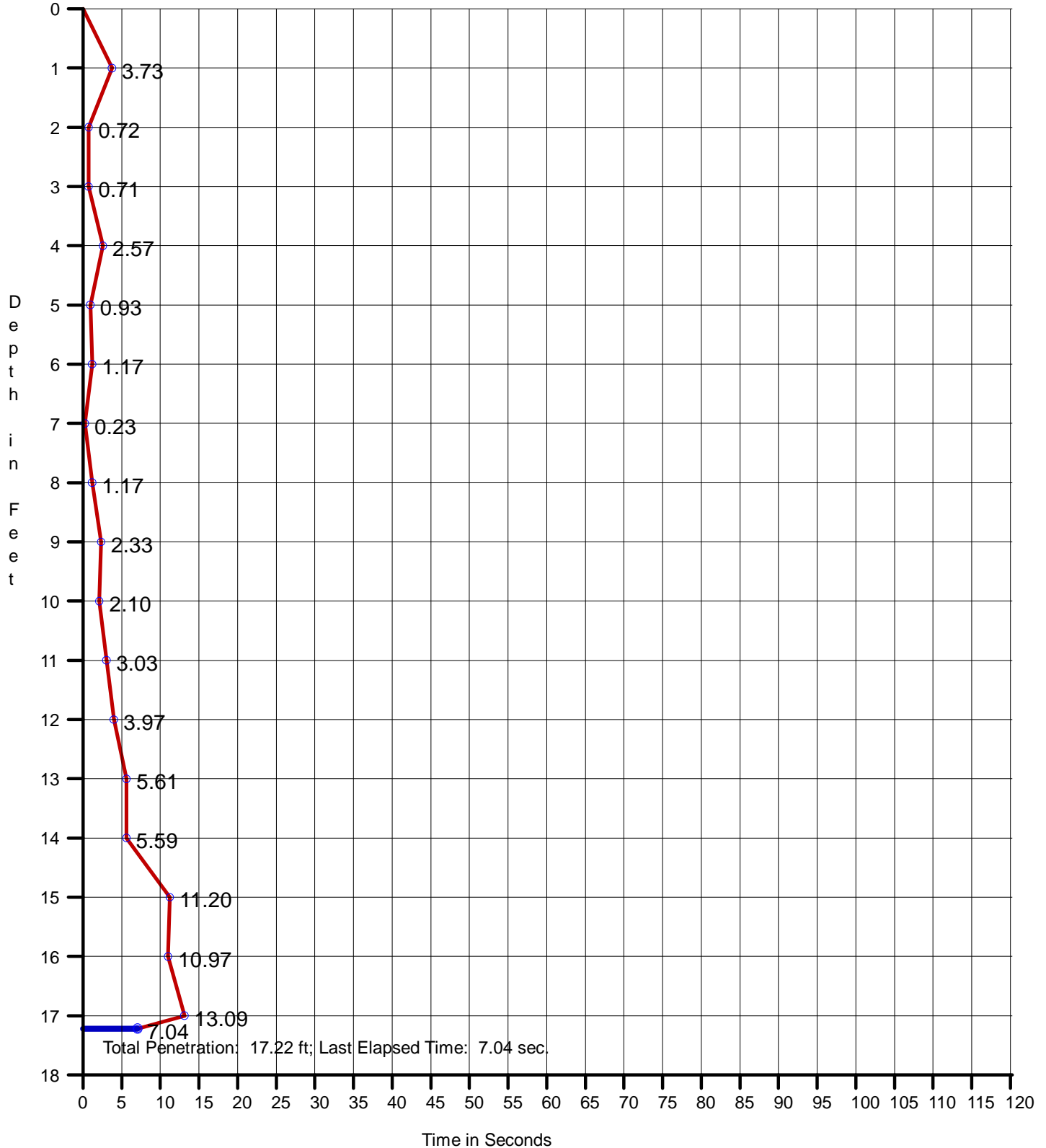
Date: 12/16/2011
Start Time: 8:48:29 AM
End Time: 8:49:45 AM

Penetration: 17.22 ft
Recovery: 17.50 ft
W. D. Corrected: 40.55 ft
W. D. Raw: 39.98 ft

Easting: 2584652.54
Northing: 332068.24
Coord. System: NCSPCS 83

Long: 77°03'21.4800"W
Lat: 034°38'48.0360"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y69, Run 1

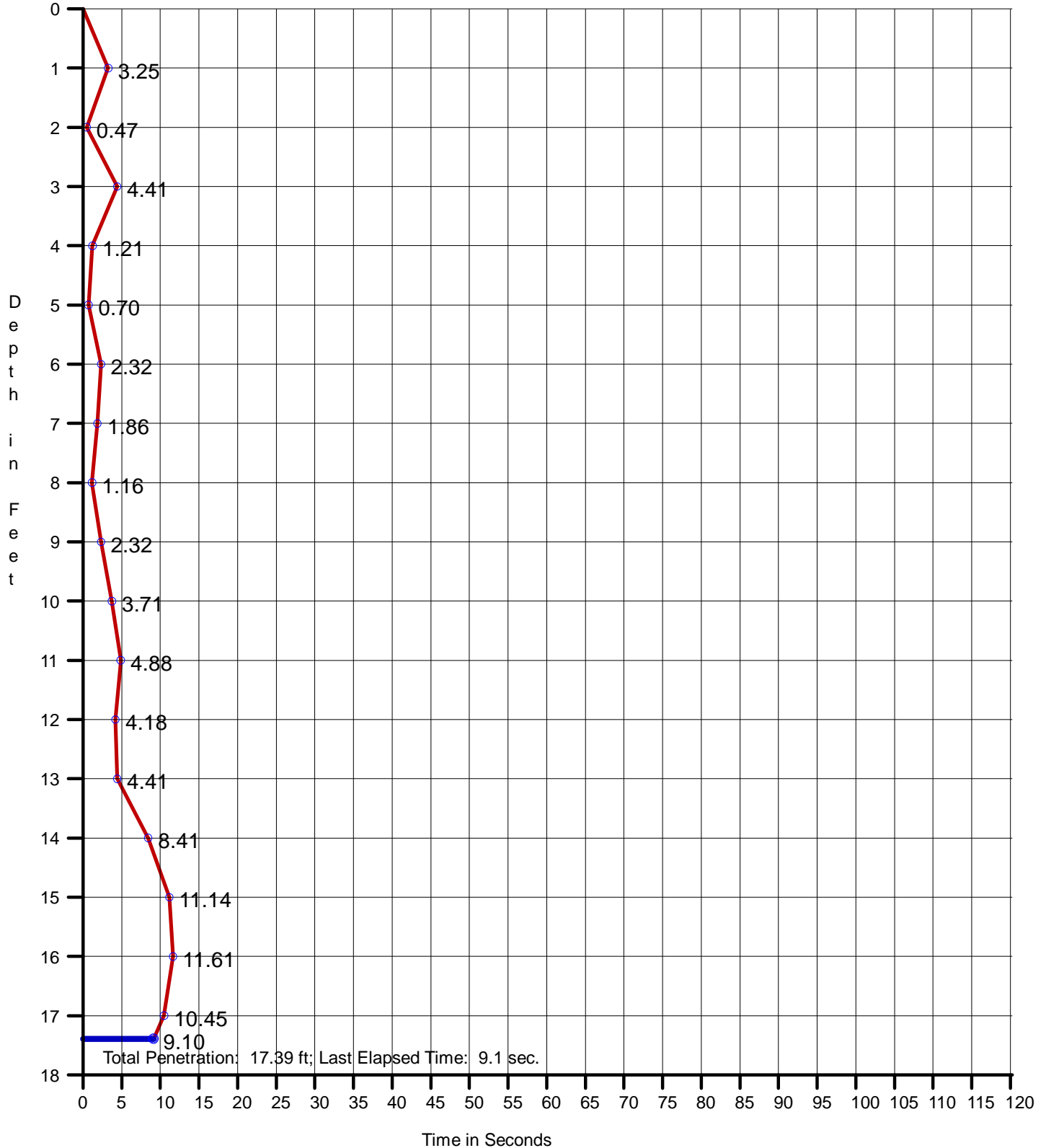
Date: 12/16/2011
Start Time: 9:07:28 AM
End Time: 9:08:53 AM

Penetration: 17.39 ft
Recovery: 17.90 ft
W. D. Corrected: 40.36 ft
W. D. Raw: 40.00 ft

Easting: 2586445.77
Northing: 332954.66
Coord. System: NCSPCS 83

Long: 77°02'59.8140"W
Lat: 034°38'56.4540"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y70, Run 1

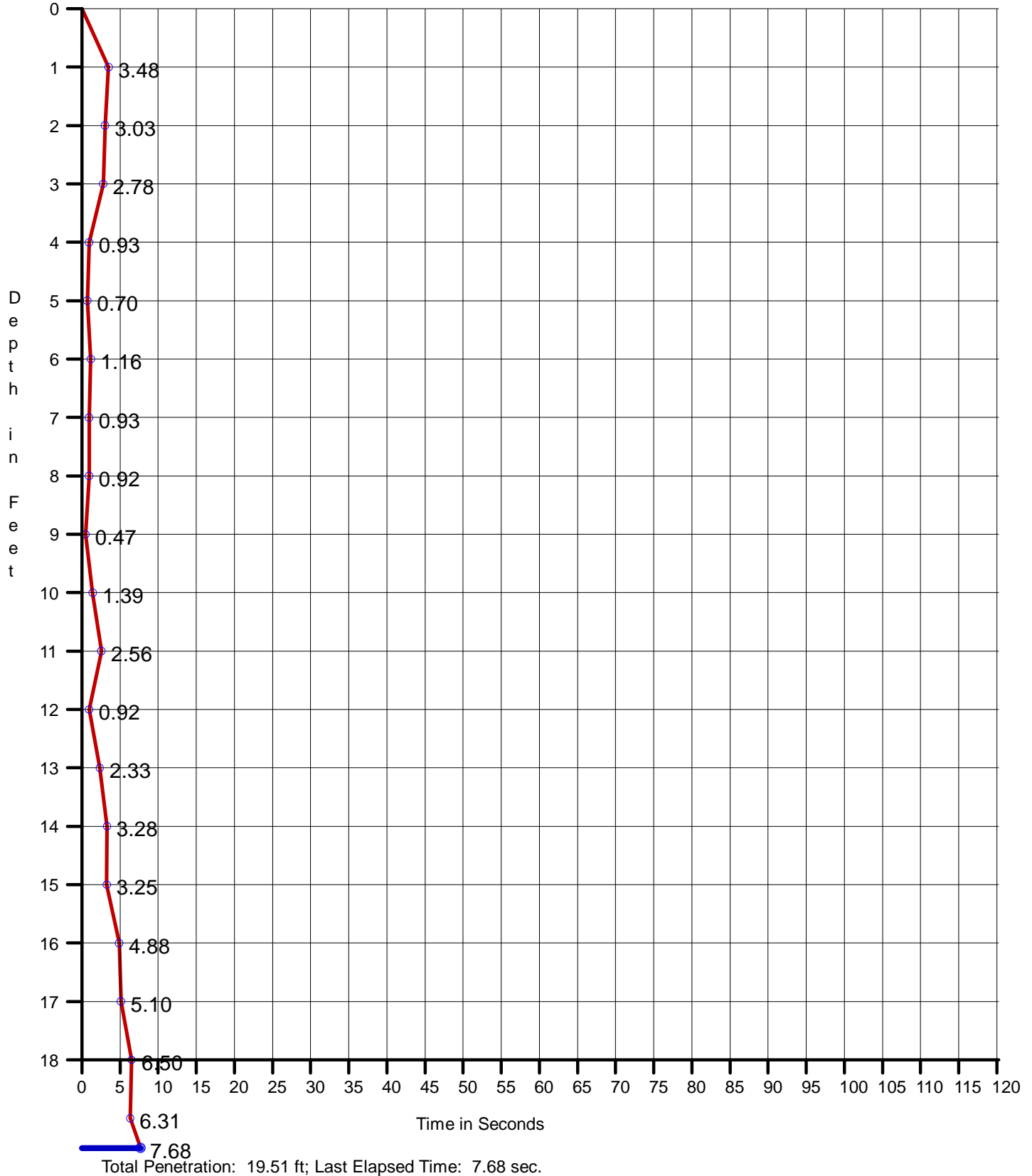
Date: 12/14/2011
Start Time: 10:29:25 AM
End Time: 10:30:28 AM

Penetration: 19.51 ft
Recovery: 19.20 ft
W. D. Corrected: 35.91 ft
W. D. Raw: 37.16 ft

Easting: 2588236.45
Northing: 333843.16
Coord. System: NCSPCS 83

Long: 77°02'38.1720"W
Lat: 034°39'04.8900"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y71, Run 2

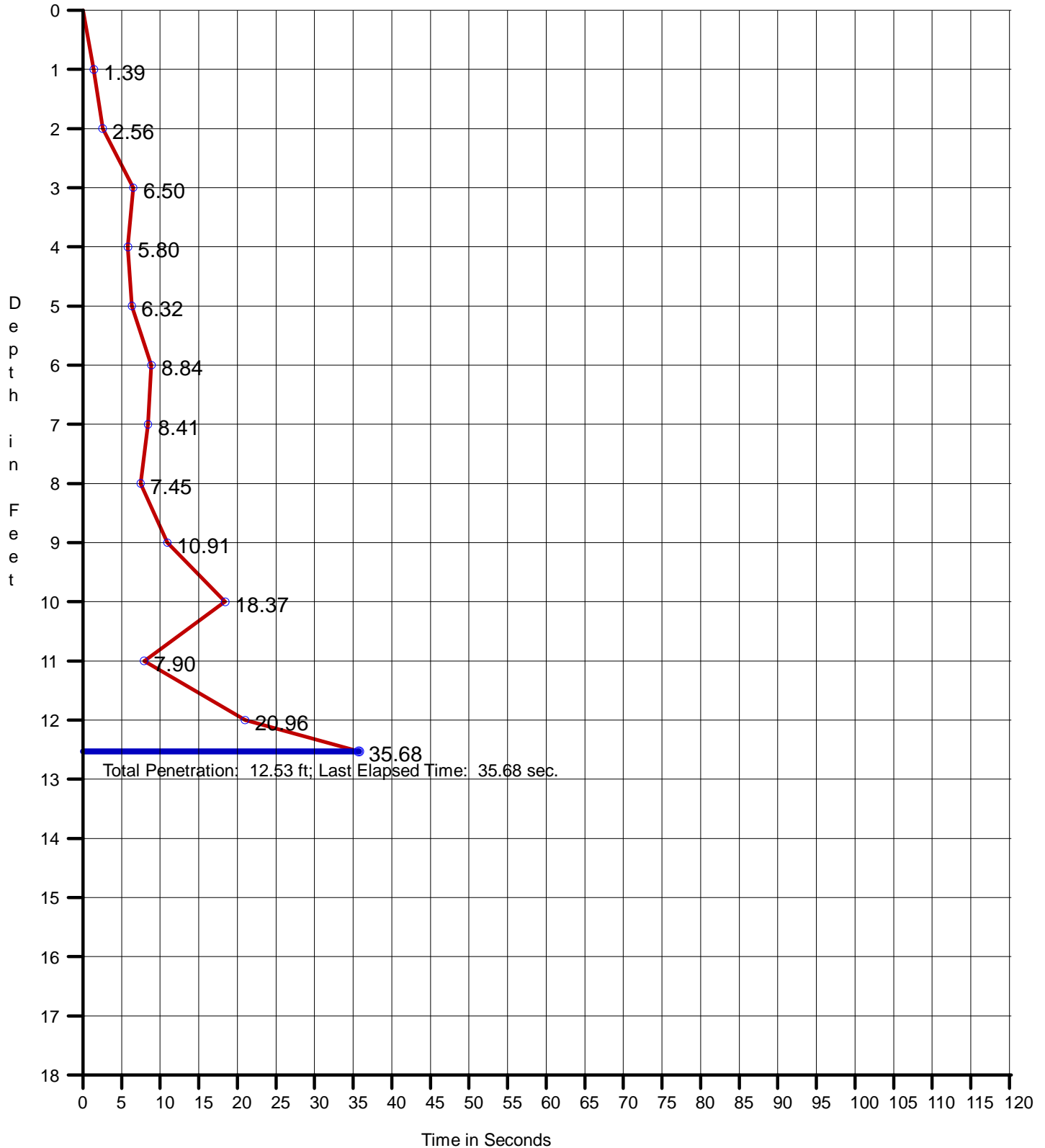
Date: 12/15/2011
Start Time: 12:04:57 PM
End Time: 12:07:18 PM

Penetration: 12.53 ft
Recovery: 15.5 ft
W. D. Corrected: 45.70 ft
W. D. Raw: 46.41 ft

Easting: 2581958.90
Northing: 328498.09
Coord. System: NCSPCS 83

Long: 77°03'54.5520"W
Lat: 034°38'13.2420"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y72, Run 1

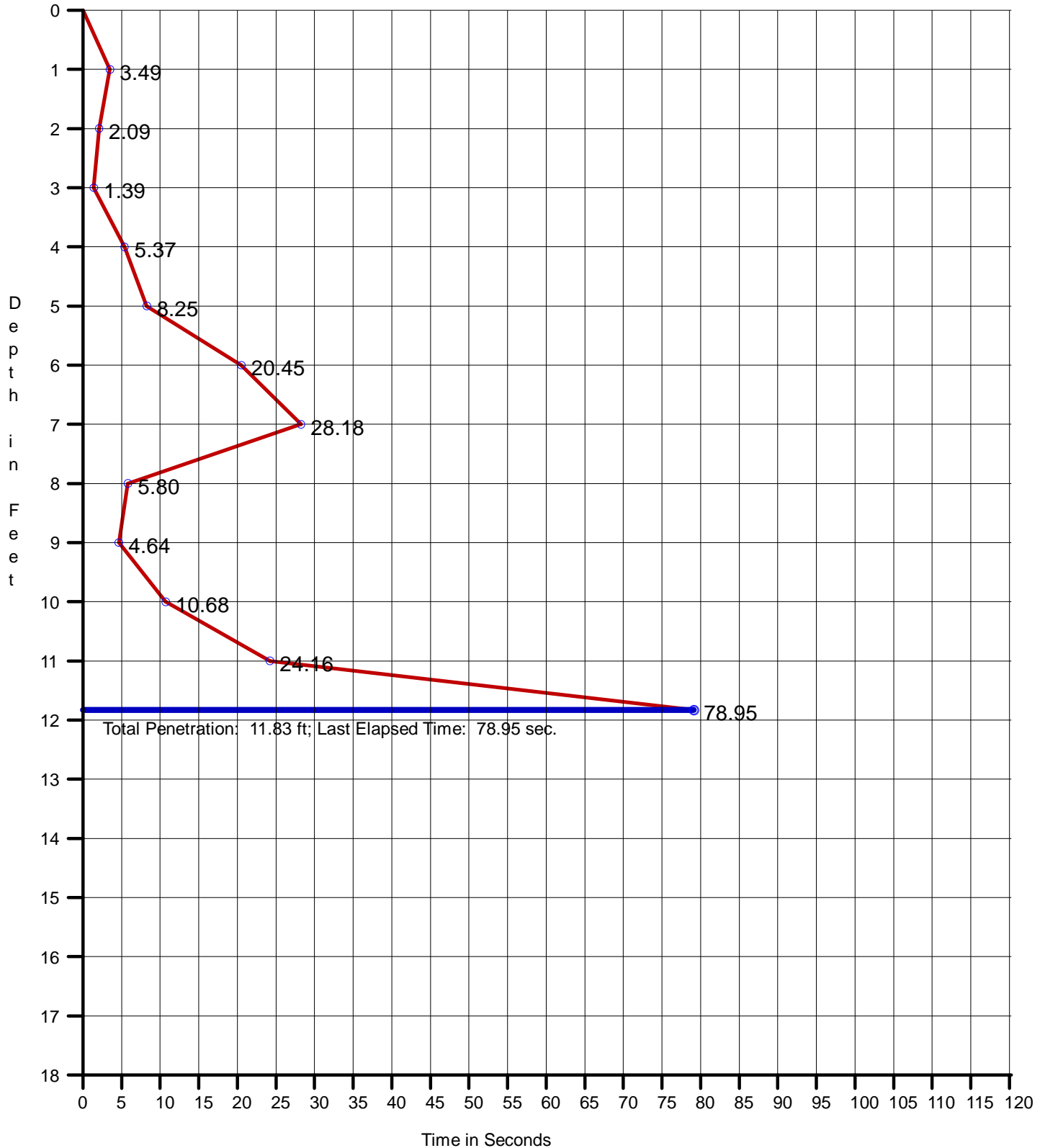
Date: 12/15/2011
Start Time: 1:35:32 PM
End Time: 1:38:45 PM

Penetration: 11.83 ft
Recovery: 13.50 ft
W. D. Corrected: 46.30 ft
W. D. Raw: 45.76 ft

Easting: 2583748.74
Northing: 329384.70
Coord. System: NCSPCS 83

Long: 77°03'32.9220"W
Lat: 034°38'21.6660"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y73, Run 1

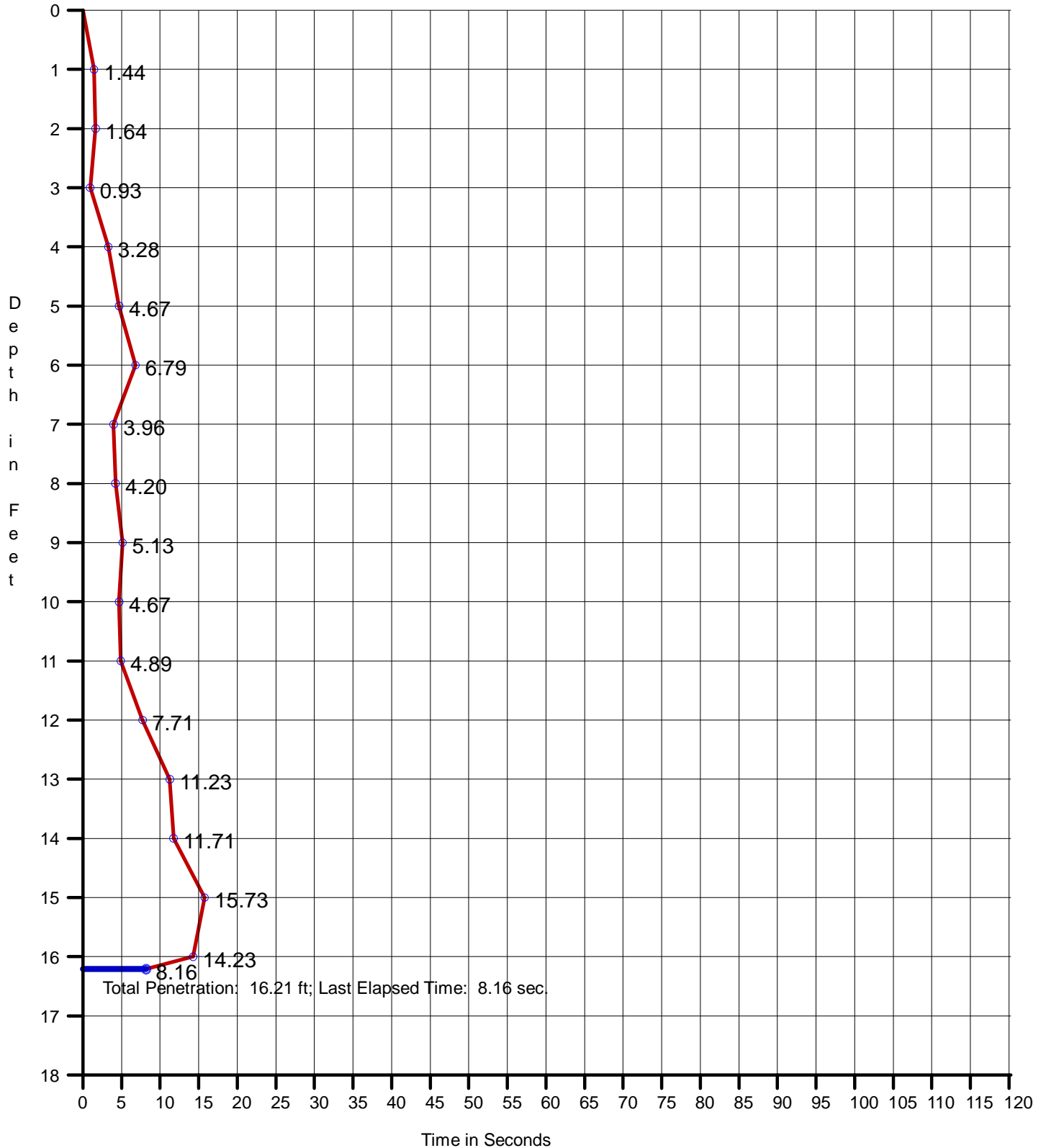
Date: 12/16/2011
Start Time: 8:30:13 AM
End Time: 8:32:03 AM

Penetration: 16.21 ft
Recovery: 16.25 ft
W. D. Corrected: 46.20 ft
W. D. Raw: 45.40 ft

Easting: 2585541.18
Northing: 330274.65
Coord. System: NCSPCS 83

Long: 77°03'11.2680"W
Lat: 034°38'30.1200"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y74, Run 1

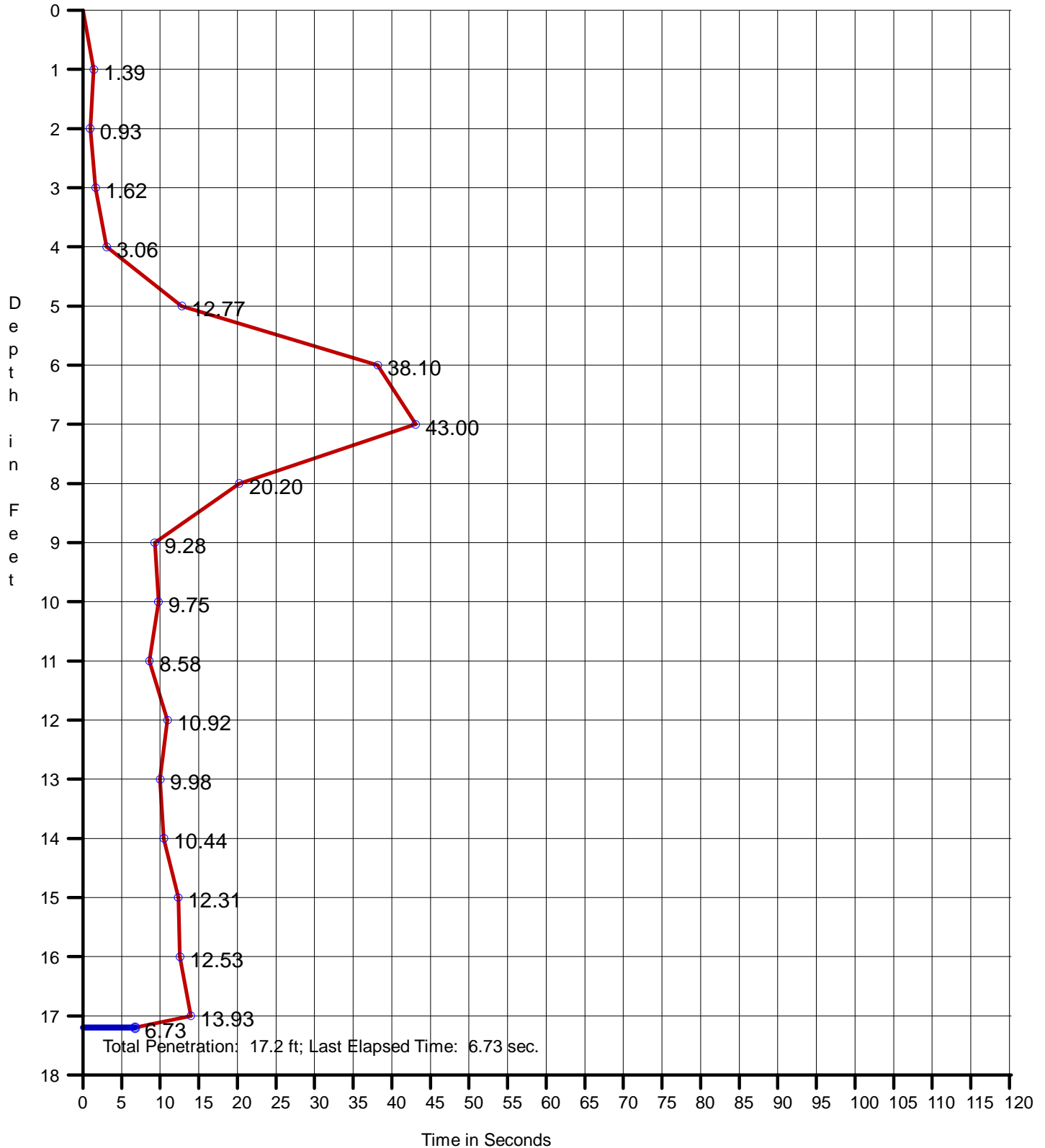
Date: 12/16/2011
Start Time: 9:27:02 AM
End Time: 9:30:47 AM

Penetration: 17.20 ft
Recovery: 19.10 ft
W. D. Corrected: 48.83 ft
W. D. Raw: 48.74 ft

Easting: 2587333.66
Northing: 331159.67
Coord. System: NCSPCS 83

Long: 77°02'49.6080"W
Lat: 034°38'38.5260"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y75, Run 1

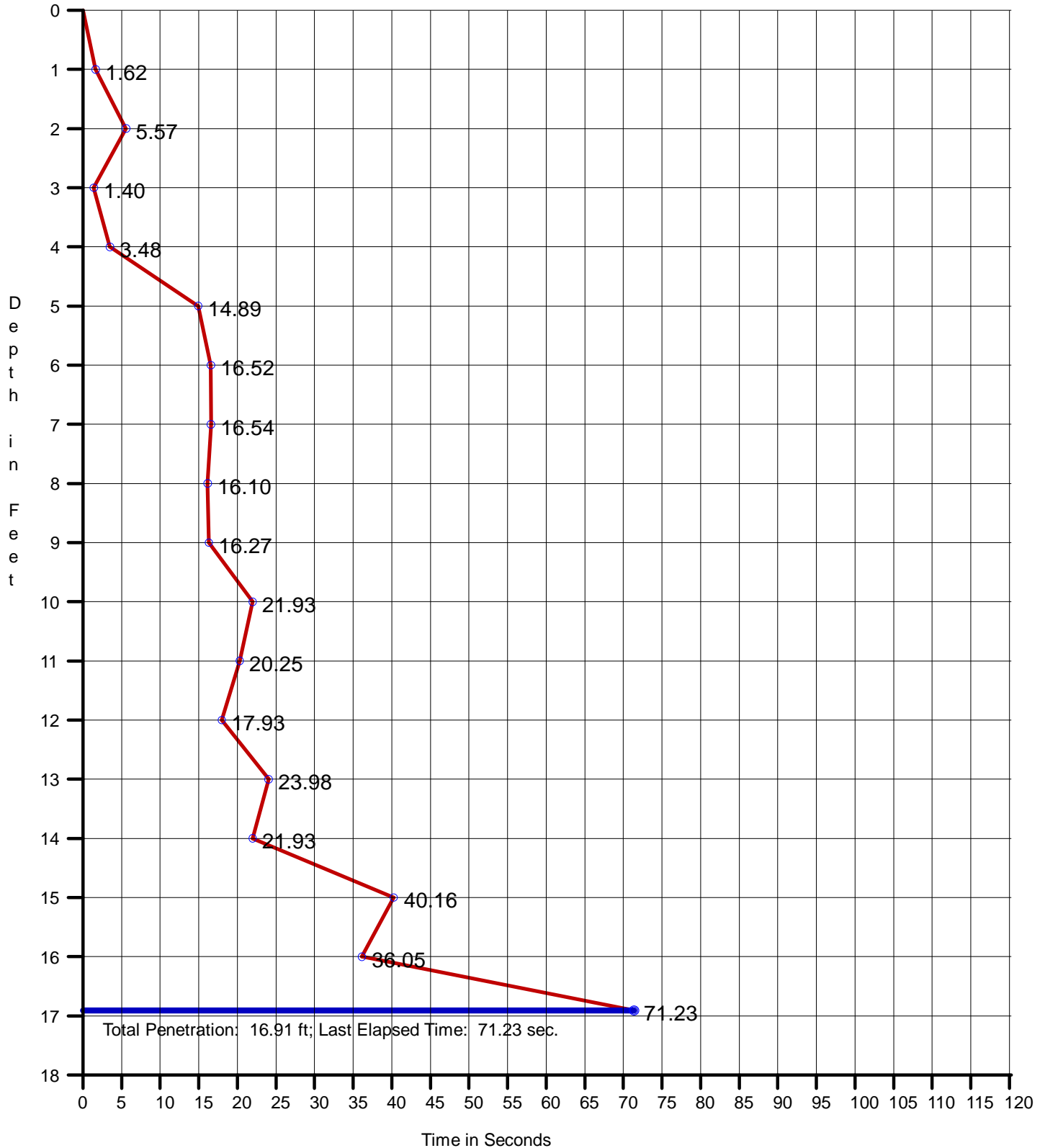
Date: 12/14/2011
Start Time: 12:01:49 PM
End Time: 12:07:35 PM

Penetration: 16.91 ft
Recovery: 19.20 ft
W. D. Corrected: 47.79 ft
W. D. Raw: 48.19 ft

Easting: 2589122.90
Northing: 332046.48
Coord. System: NCSPCS 83

Long: 77°02'27.9900"W
Lat: 034°38'46.9500"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y76, Run 1

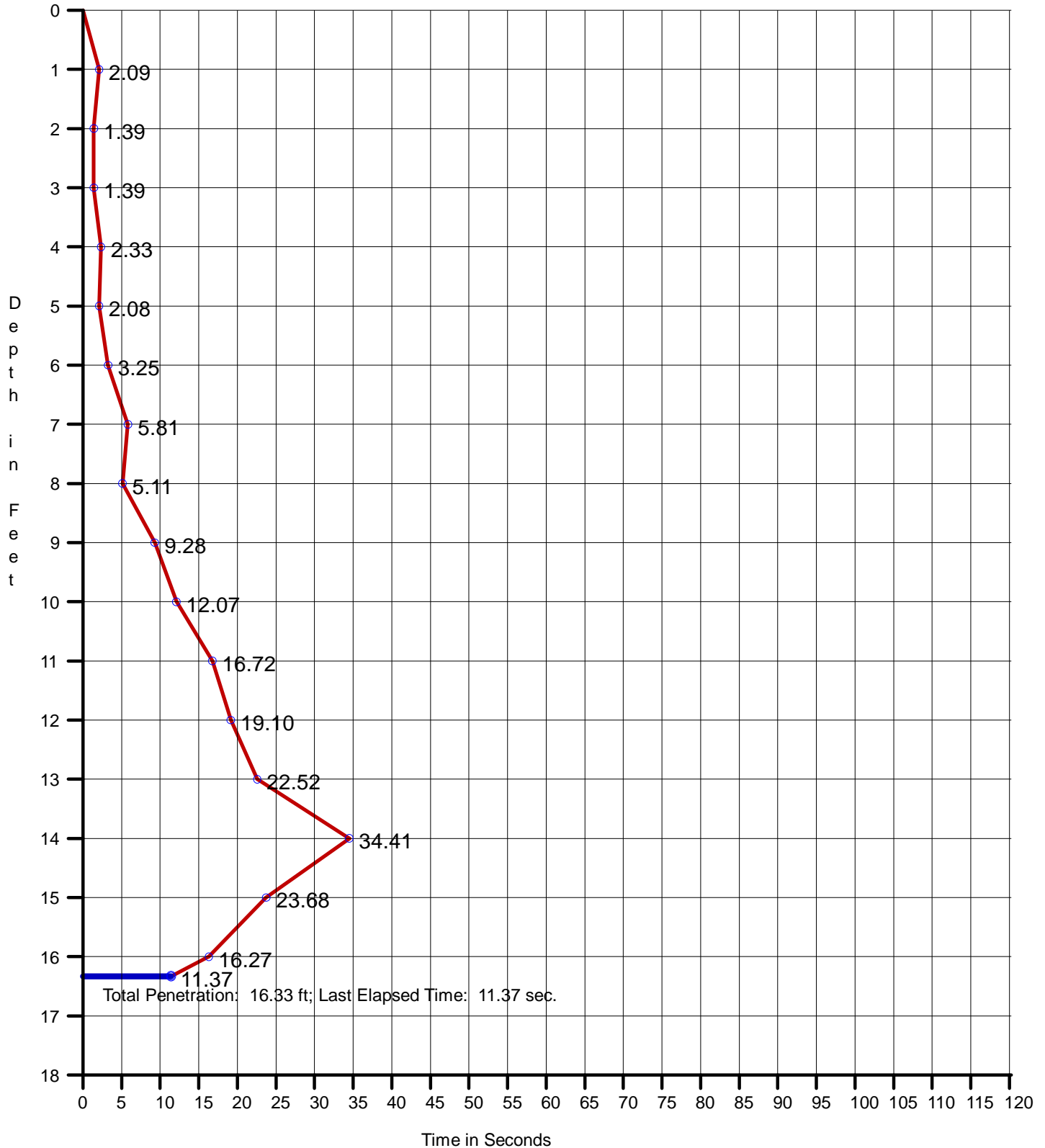
Date: 12/15/2011
Start Time: 9:29:07 AM
End Time: 9:32:16 AM

Penetration: 16.33 ft
Recovery: 15.10 ft
W. D. Corrected: 49.58 ft
W. D. Raw: 50.42 ft

Easting: 2582843.22
Northing: 326707.43
Coord. System: NCSPCS 83

Long: 77°03'44.3880"W
Lat: 034°37'55.3620"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y77, Run 1

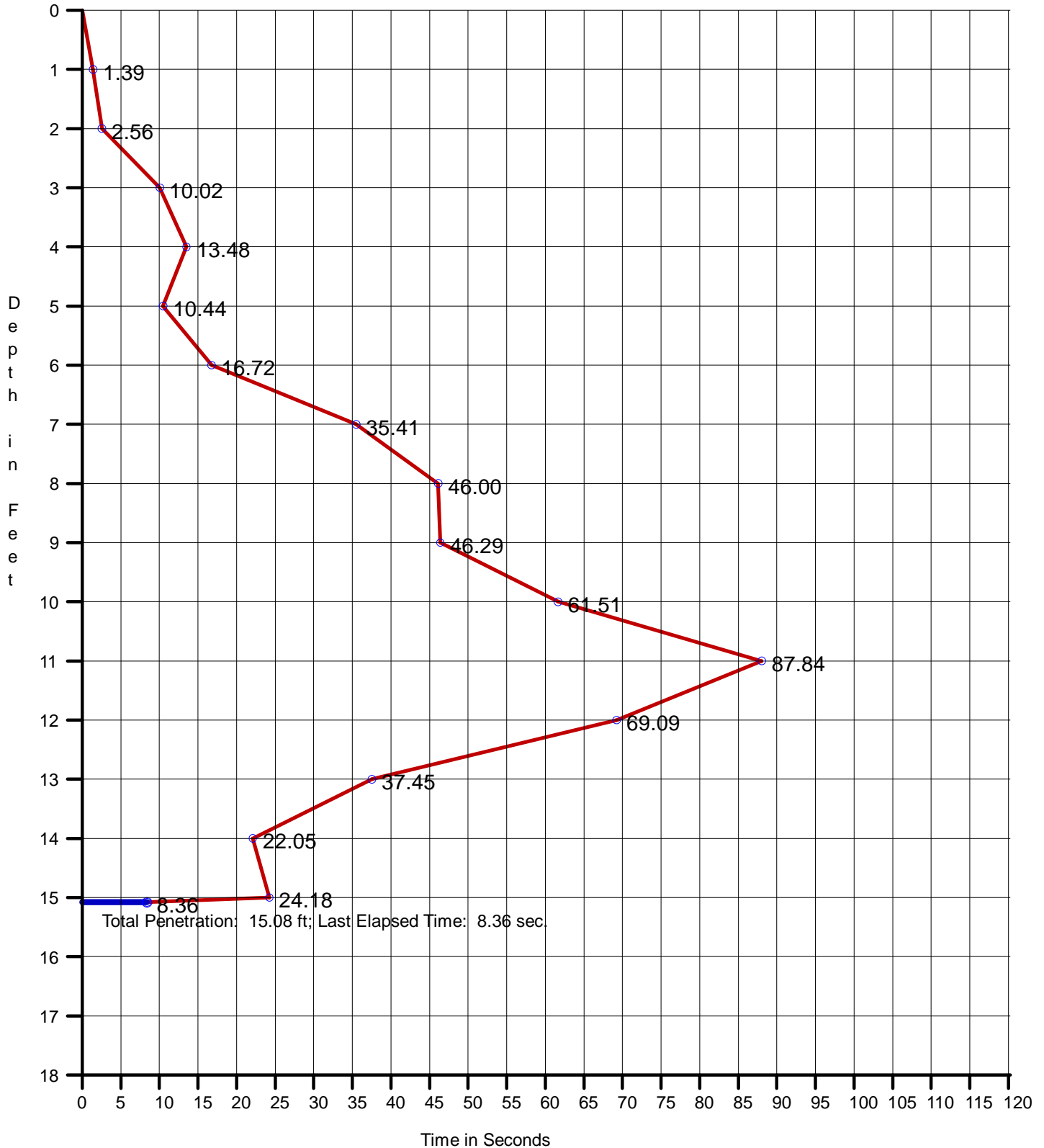
Date: 12/15/2011
Start Time: 1:56:00 PM
End Time: 2:04:13 PM

Penetration: 15.08 ft
Recovery: 20.10 ft
W. D. Corrected: 47.78 ft
W. D. Raw: 47.05 ft

Easting: 2584636.12
Northing: 327594.67
Coord. System: NCSPCS 83

Long: 77°03'22.7280"W
Lat: 034°38'03.7920"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y78, Run 1

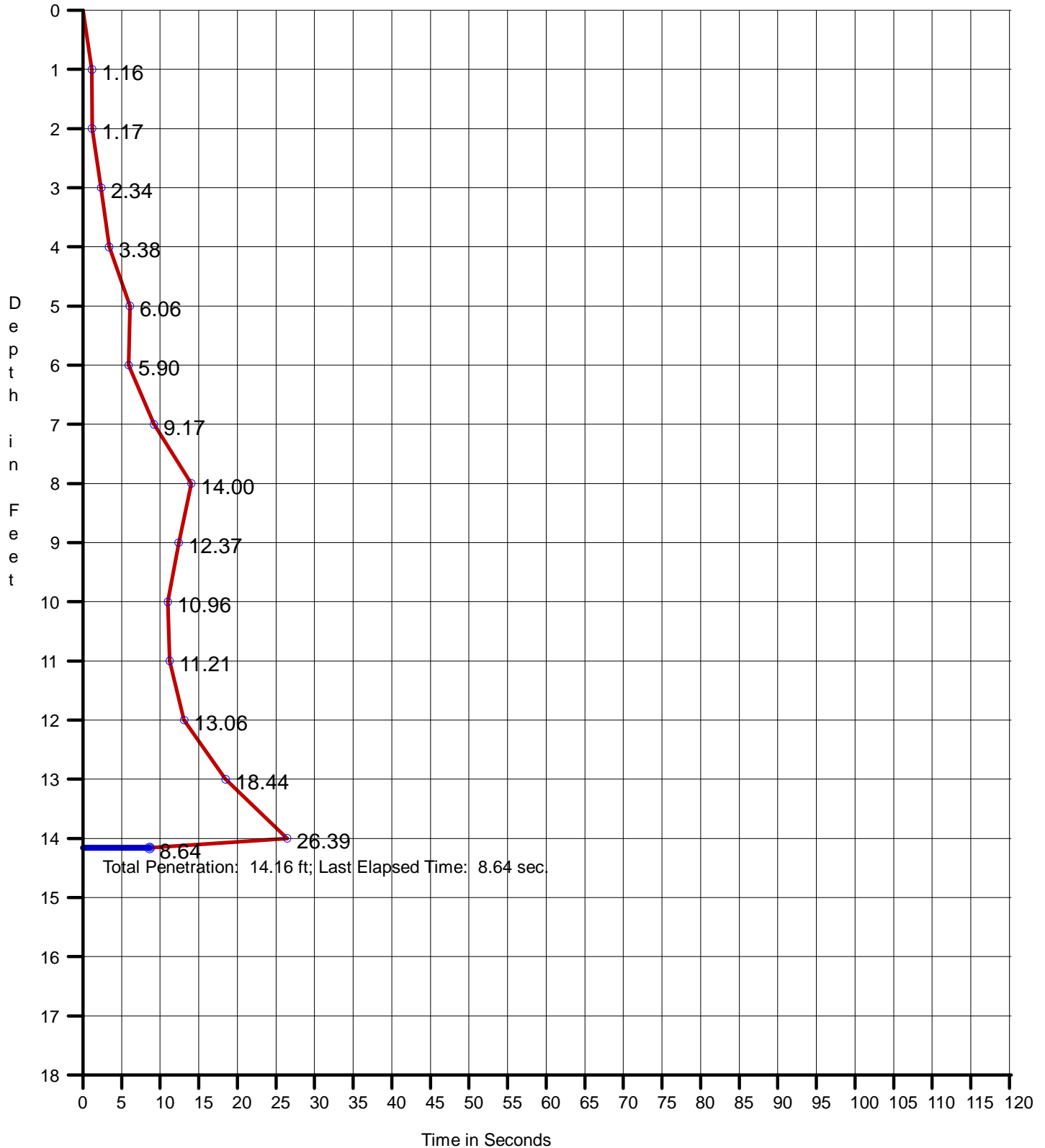
Date: 12/16/2011
Start Time: 8:11:49 AM
End Time: 8:14:13 AM

Penetration: 14.16 ft
Recovery: 16.90 ft
W. D. Corrected: 48.52 ft
W. D. Raw: 47.49 ft

Easting: 2586422.94
Northing: 328481.03
Coord. System: NCSPCS 83

Long: 77°03'01.1400"W
Lat: 034°38'12.2100"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y79, Run 1

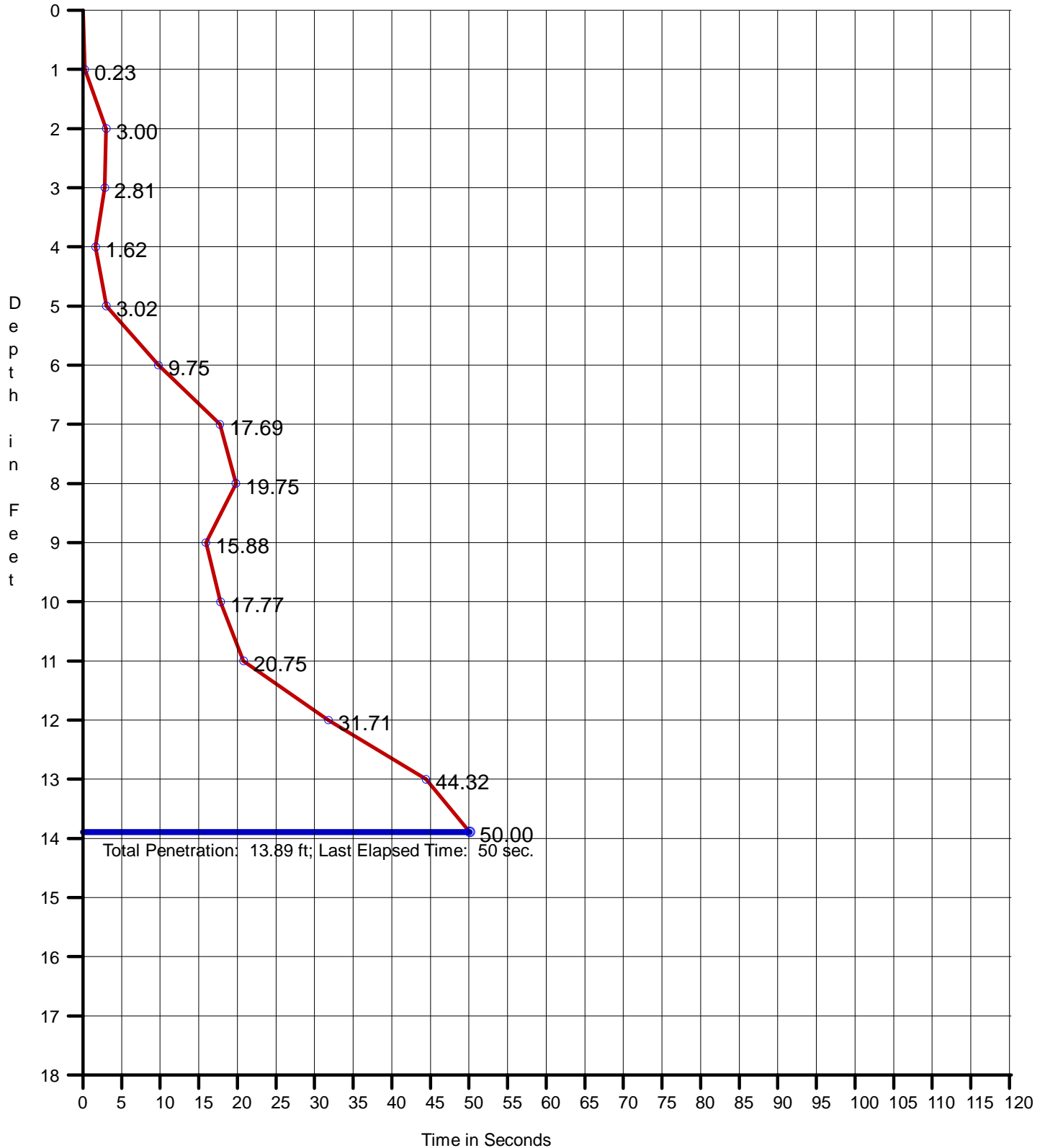
Date: 12/14/2011
Start Time: 1:49:12 PM
End Time: 1:57:03 PM

Penetration: 13.89 ft
Recovery: 19.50 ft
W. D. Corrected: 48.67 ft
W. D. Raw: 47.67 ft

Easting: 2588219.74
Northing: 329370.00
Coord. System: NCSPCS 83

Long: 77°02'39.4260"W
Lat: 034°38'20.6520"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y80, Run 1

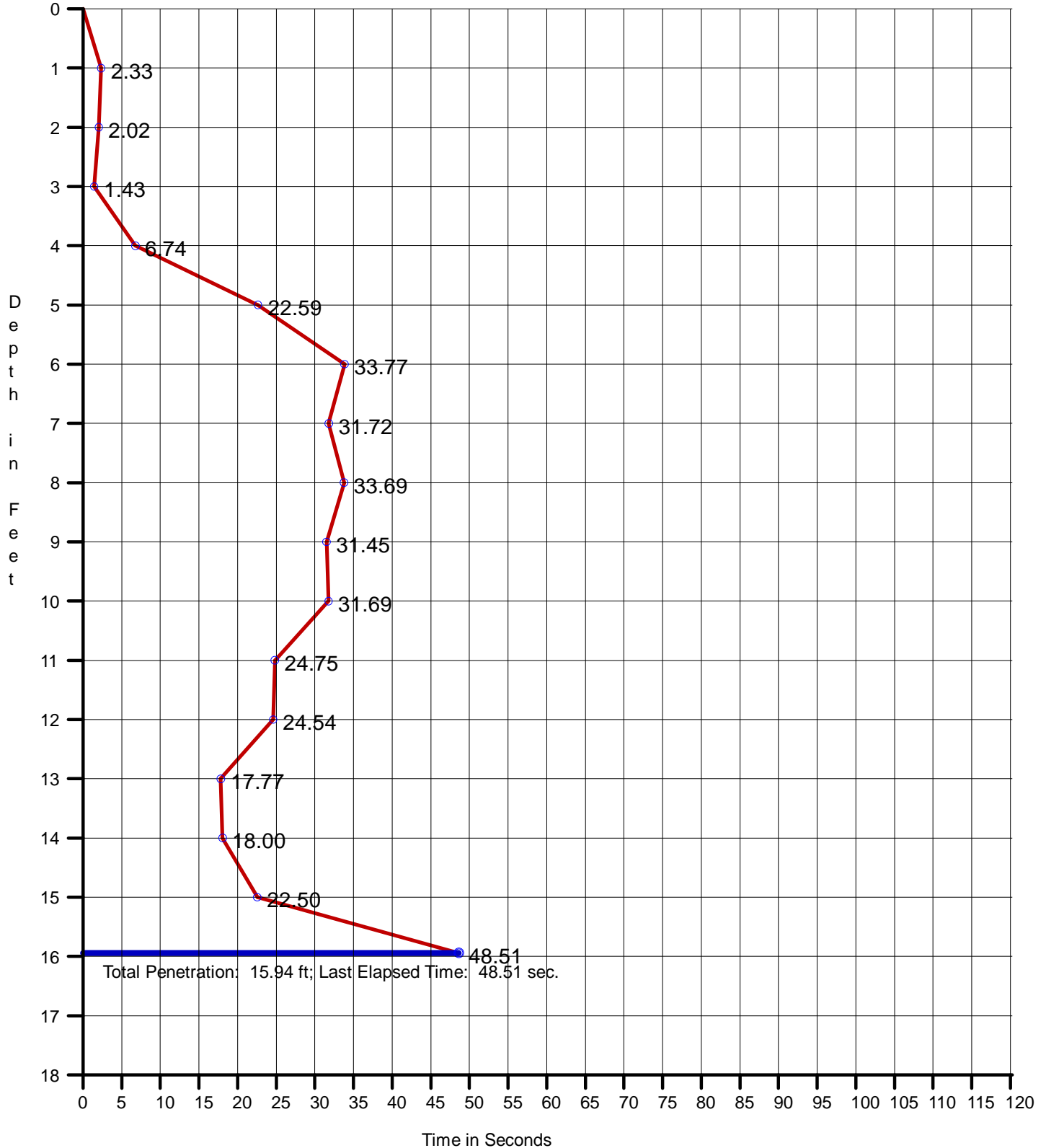
Date: 12/14/2011
Start Time: 12:38:28 PM
End Time: 12:44:27 PM

Penetration: 15.94 ft
Recovery: 19.40 ft
W. D. Corrected: 48.47 ft
W. D. Raw: 48.42 ft

Easting: 2590014.88
Northing: 330255.73
Coord. System: NCSPCS 83

Long: 77°02'17.7360"W
Lat: 034°38'29.0640"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y81, Run 1

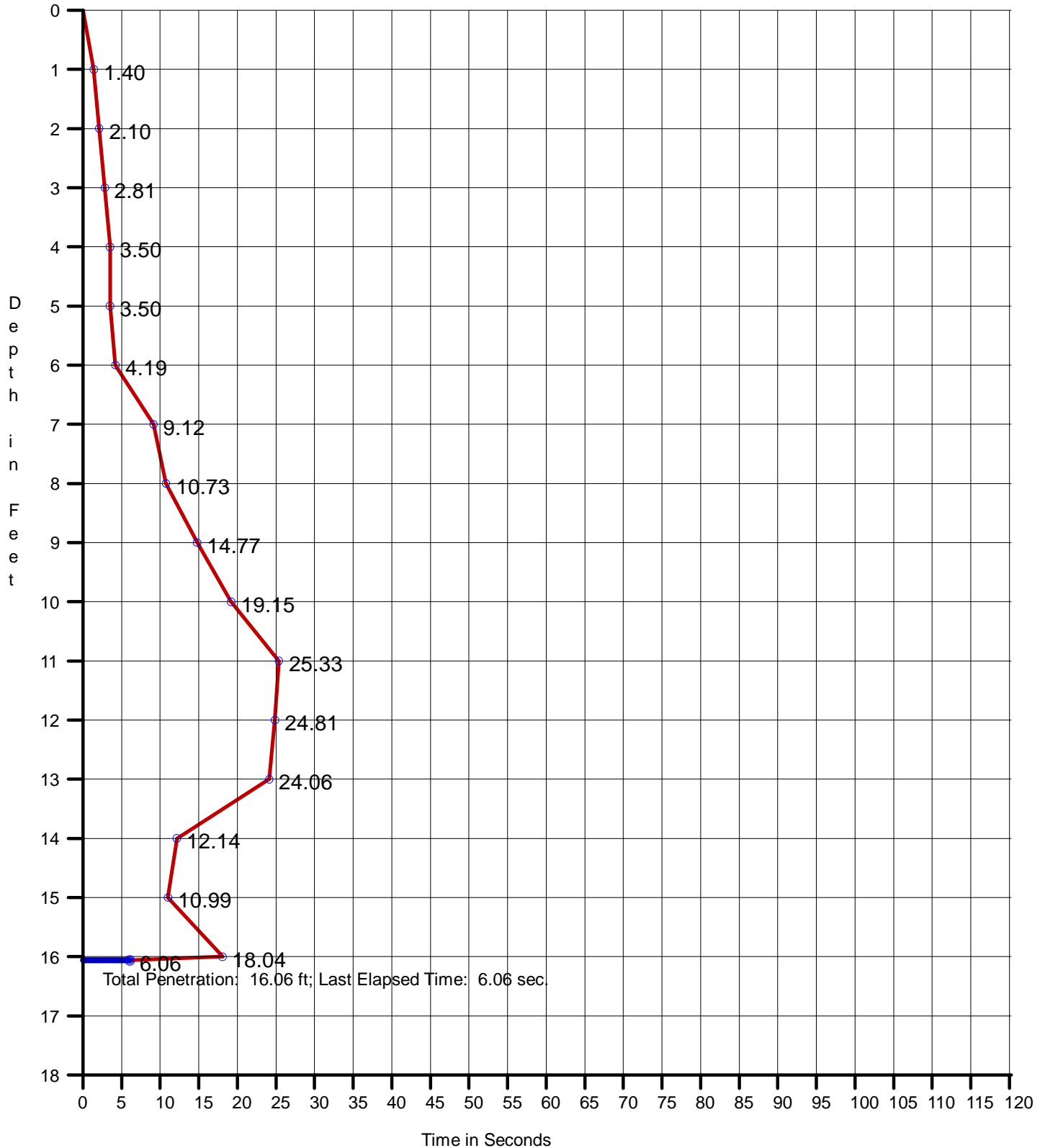
Date: 12/15/2011
Start Time: 9:01:43 AM
End Time: 9:04:56 AM

Penetration: 16.06 ft
Recovery: 19.40 ft
W. D. Corrected: 50.65 ft
W. D. Raw: 51.23 ft

Easting: 2583729.96
Northing: 324915.65
Coord. System: NCSPCS 83

Long: 77°03'34.1940"W
Lat: 034°37'37.4700"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y82, Run 1

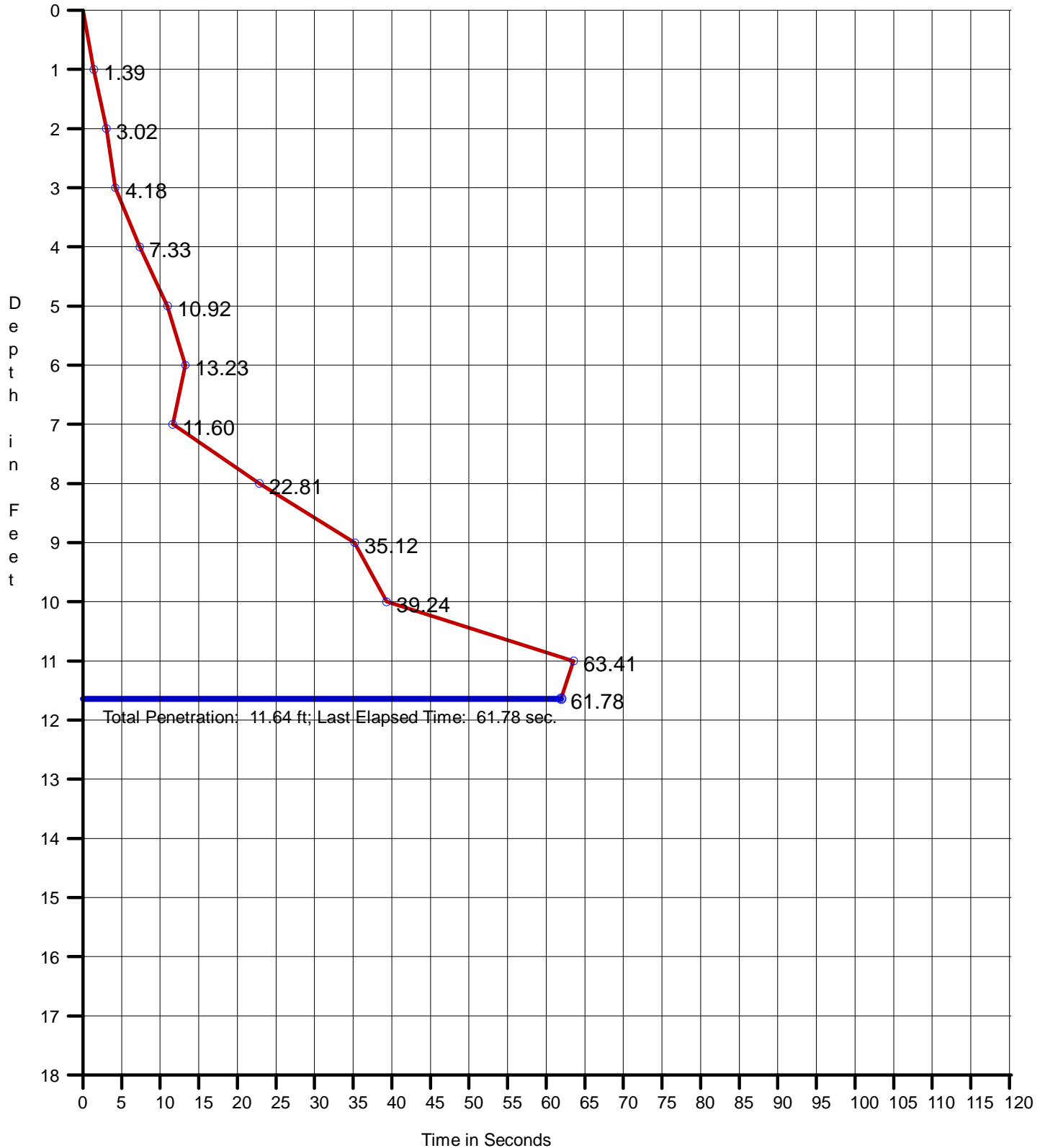
Date: 12/15/2011
Start Time: 2:44:06 PM
End Time: 2:48:40 PM

Penetration: 11.64 ft
Recovery: 14.60 ft
W. D. Corrected: 48.88 ft
W. D. Raw: 47.60 ft

Easting: 2585524.25
Northing: 325799.94
Coord. System: NCSPCS 83

Long: 77°03'12.5220"W
Lat: 034°37'45.8700"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y83, Run 1

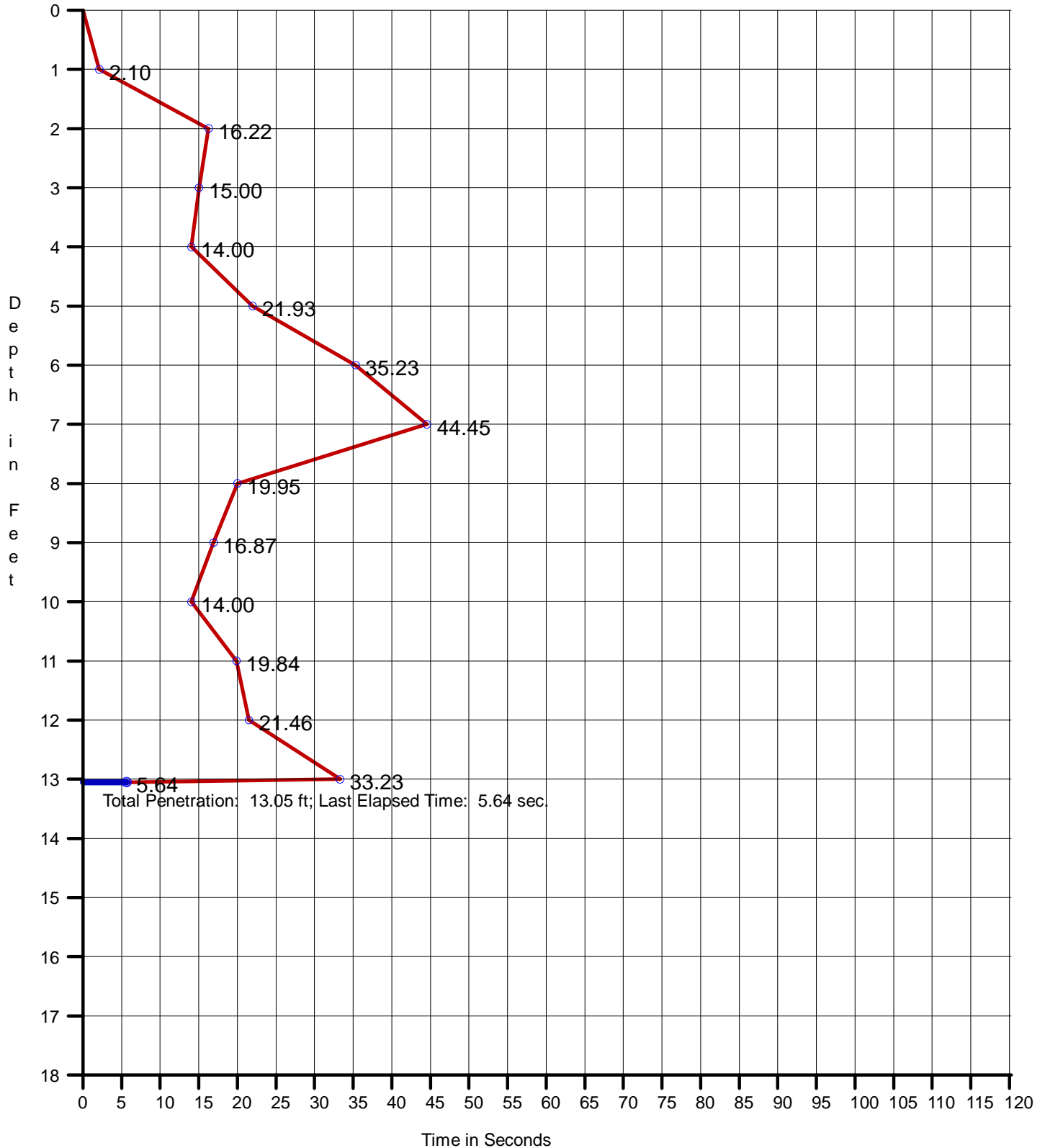
Date: 12/16/2011
Start Time: 7:39:04 AM
End Time: 7:43:44 AM

Penetration: 13.05 ft
Recovery: 19.80 ft
W. D. Corrected: 51.46 ft
W. D. Raw: 50.02 ft

Easting: 2587316.76
Northing: 326689.74
Coord. System: NCSPCS 83

Long: 77°02'50.8620"W
Lat: 034°37'54.3240"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y84, Run 1

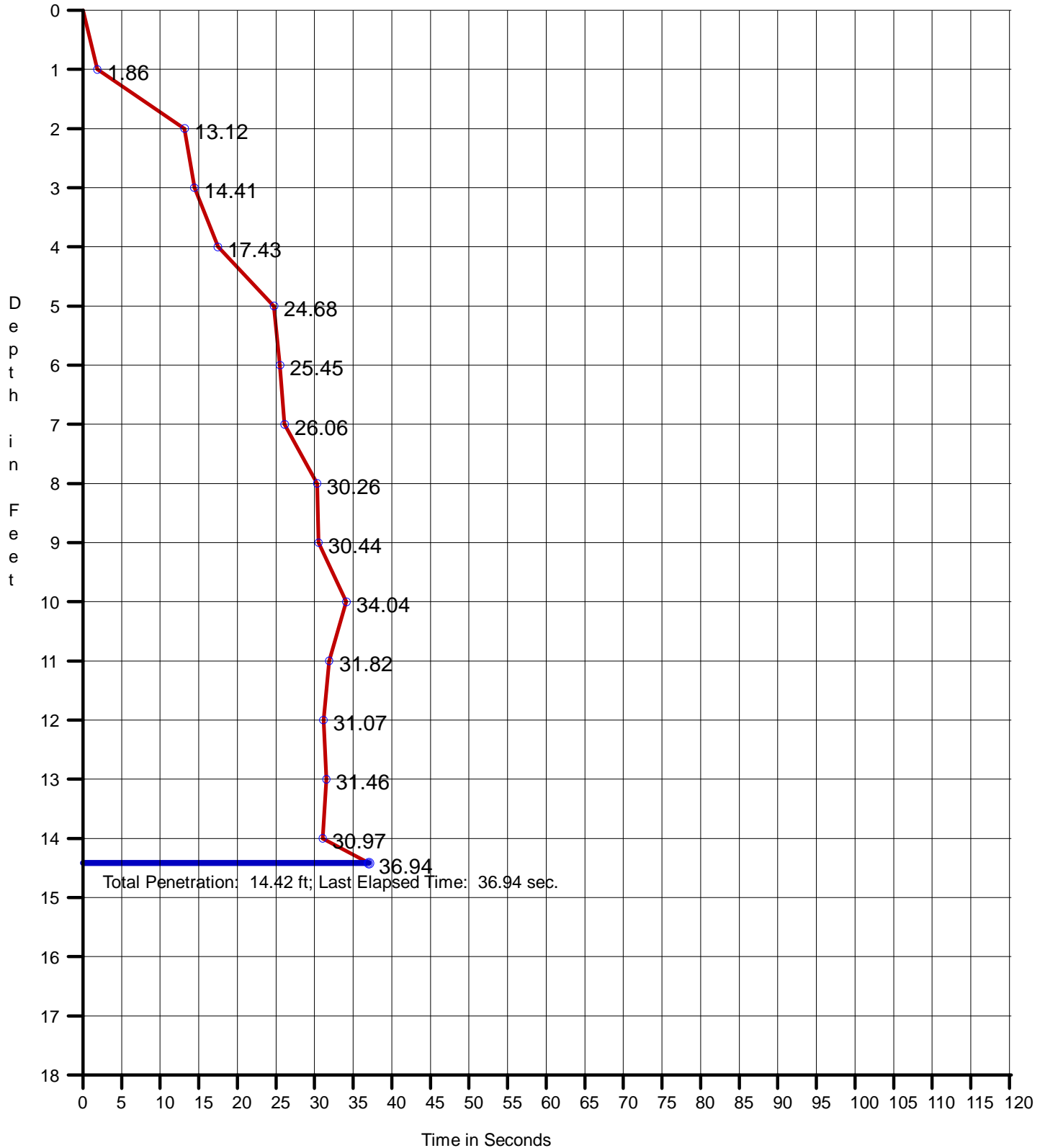
Date: 12/14/2011
Start Time: 2:29:53 PM
End Time: 2:36:13 PM

Penetration: 14.42 ft
Recovery: 19.70 ft
W. D. Corrected: 51.30 ft
W. D. Raw: 49.92 ft

Easting: 2589107.52
Northing: 327575.40
Coord. System: NCSPCS 83

Long: 77°02'29.2260"W
Lat: 034°38'02.7300"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y85, Run 1

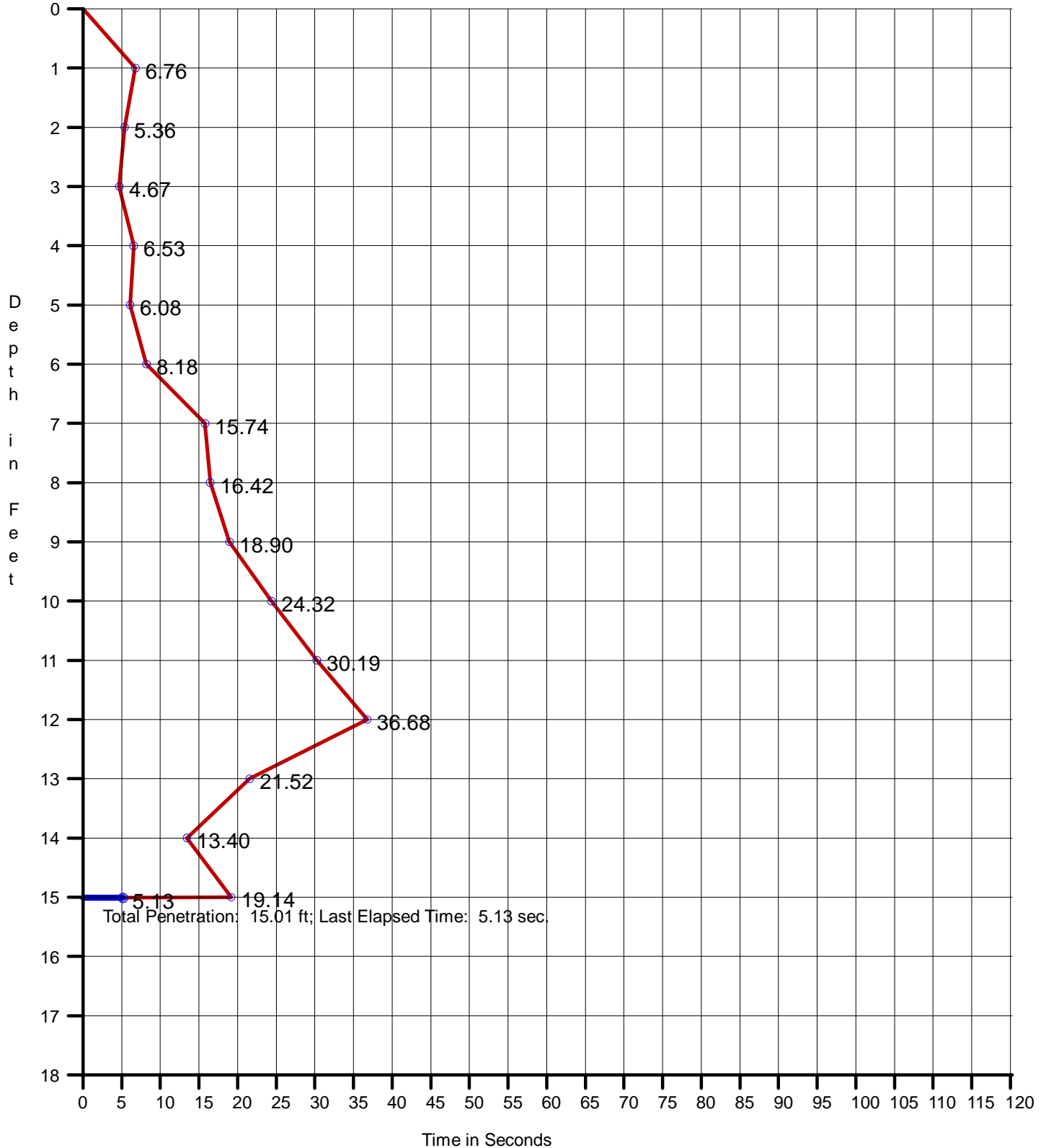
Date: 12/15/2011
Start Time: 8:38:07 AM
End Time: 8:43:11 AM

Penetration: 15.01 ft
Recovery: 18.20 ft
W. D. Corrected: 51.37 ft
W. D. Raw: 51.71 ft

Easting: 2584622.31
Northing: 323122.10
Coord. System: NCSPCS 83

Long: 77°03'23.9400"W
Lat: 034°37'19.5600"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y86, Run 1

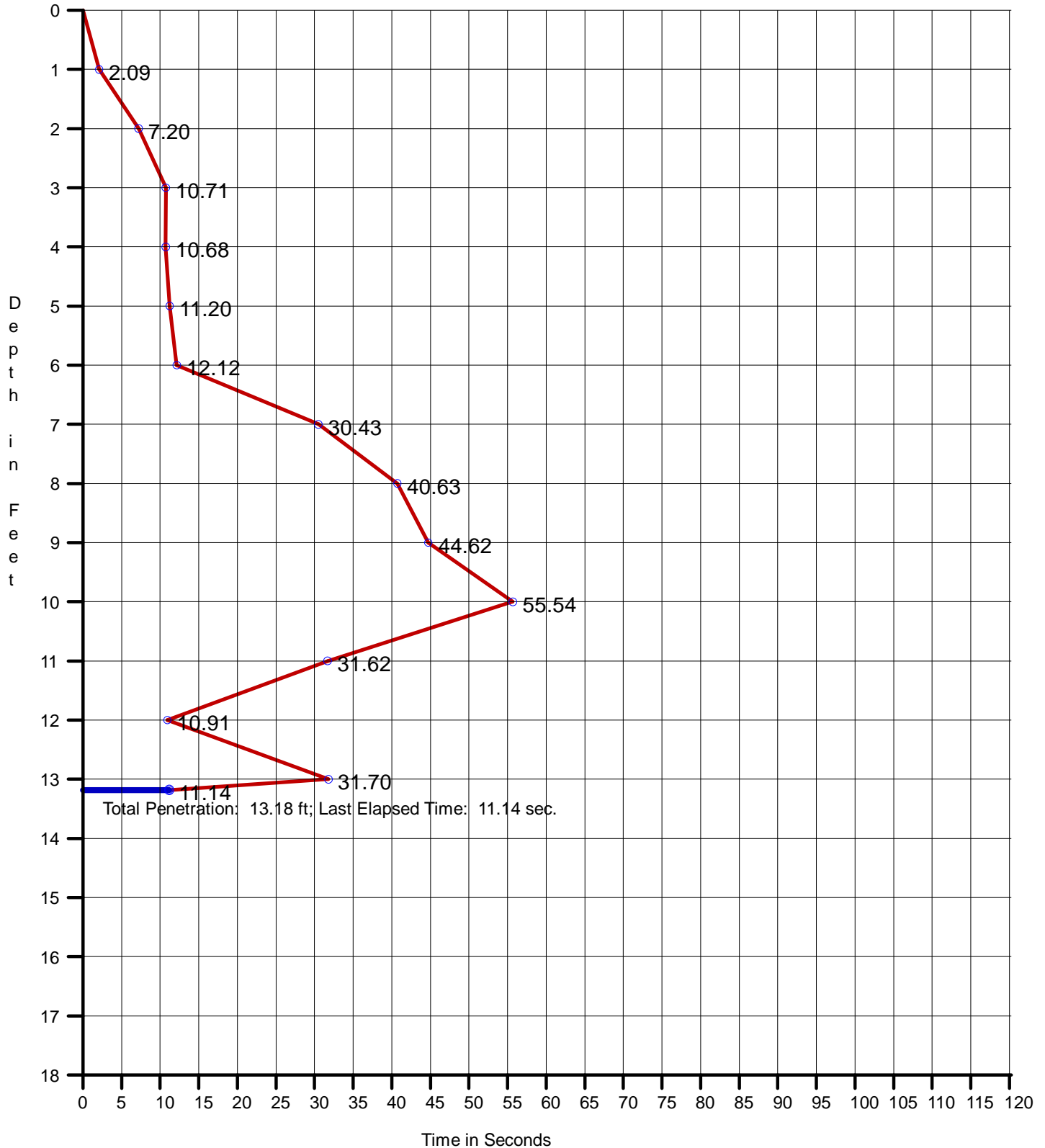
Date: 12/15/2011
Start Time: 3:08:10 PM
End Time: 3:13:20 PM

Penetration: 13.18 ft
Recovery: 18.10 ft
W. D. Corrected: 51.04 ft
W. D. Raw: 49.52 ft

Easting: 2586412.93
Northing: 324010.13
Coord. System: NCSPCS 83

Long: 77°03'02.3100"W
Lat: 034°37'27.9960"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y87, Run 1

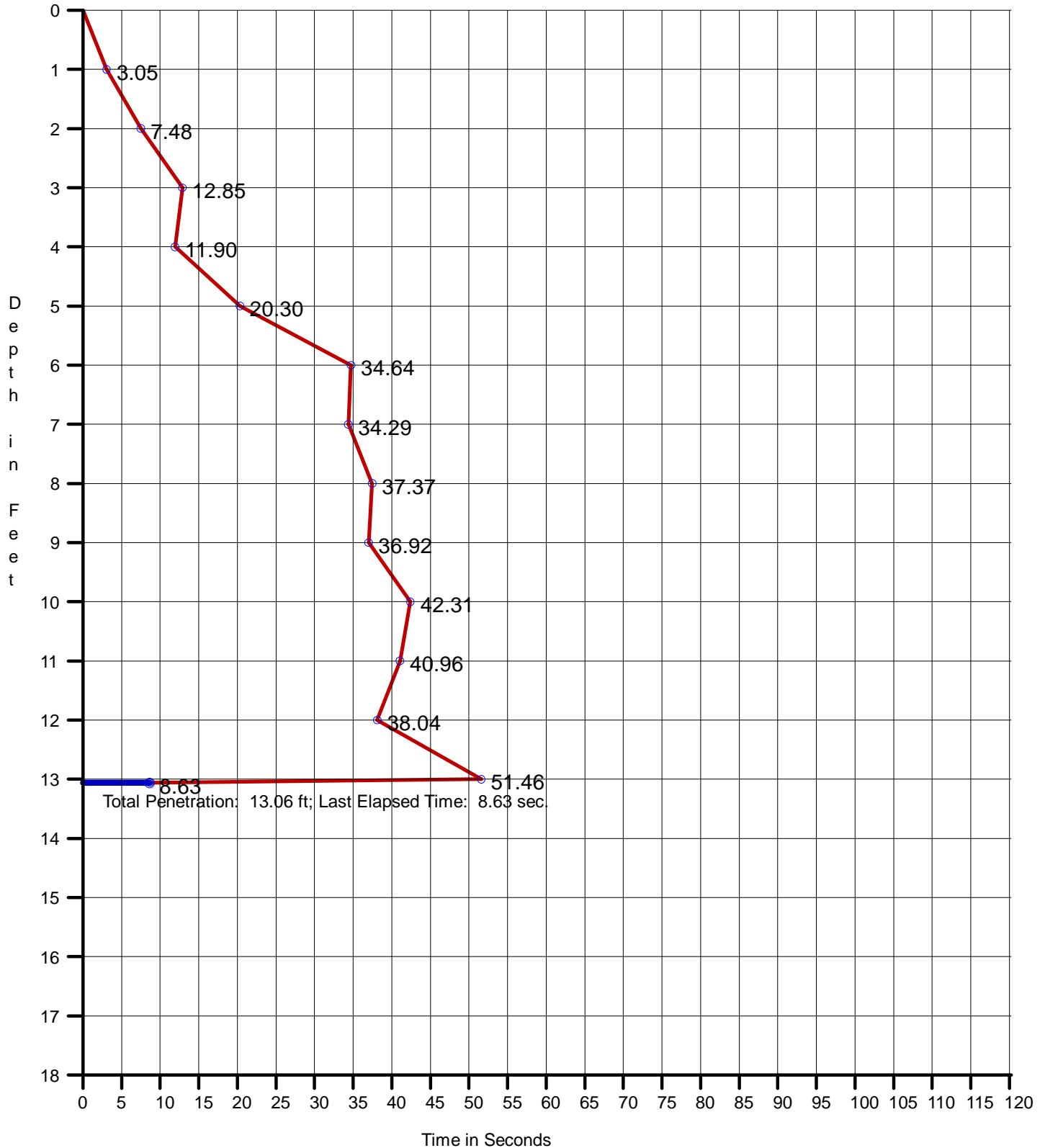
Date: 12/16/2011
Start Time: 7:11:47 AM
End Time: 7:18:07 AM

Penetration: 13.06 ft
Recovery: 18.10 ft
W. D. Corrected: 52.49 ft
W. D. Raw: 50.88 ft

Easting: 2588204.78
Northing: 324899.19
Coord. System: NCSPCS 83

Long: 77°02'40.6620"W
Lat: 034°37'36.4380"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y88, Run 1

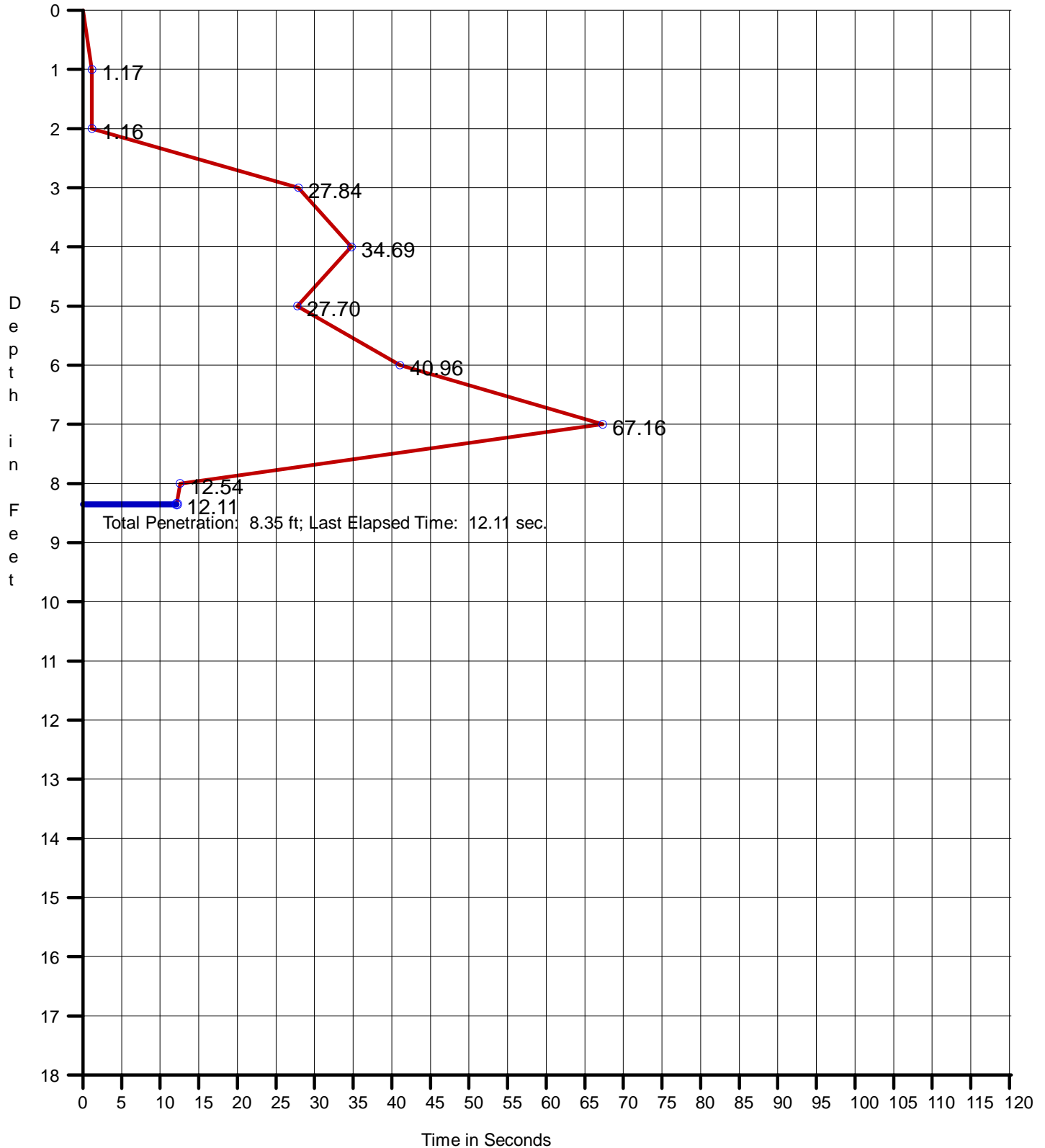
Date: 12/14/2011
Start Time: 3:22:22 PM
End Time: 3:26:56 PM

Penetration: 8.35 ft
Recovery: 12.50 ft
W. D. Corrected: 51.40 ft
W. D. Raw: 49.47 ft

Easting: 2589996.84
Northing: 325785.60
Coord. System: NCSPCS 83

Long: 77°02'19.0080"W
Lat: 034°37'44.8560"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y89, Run 1

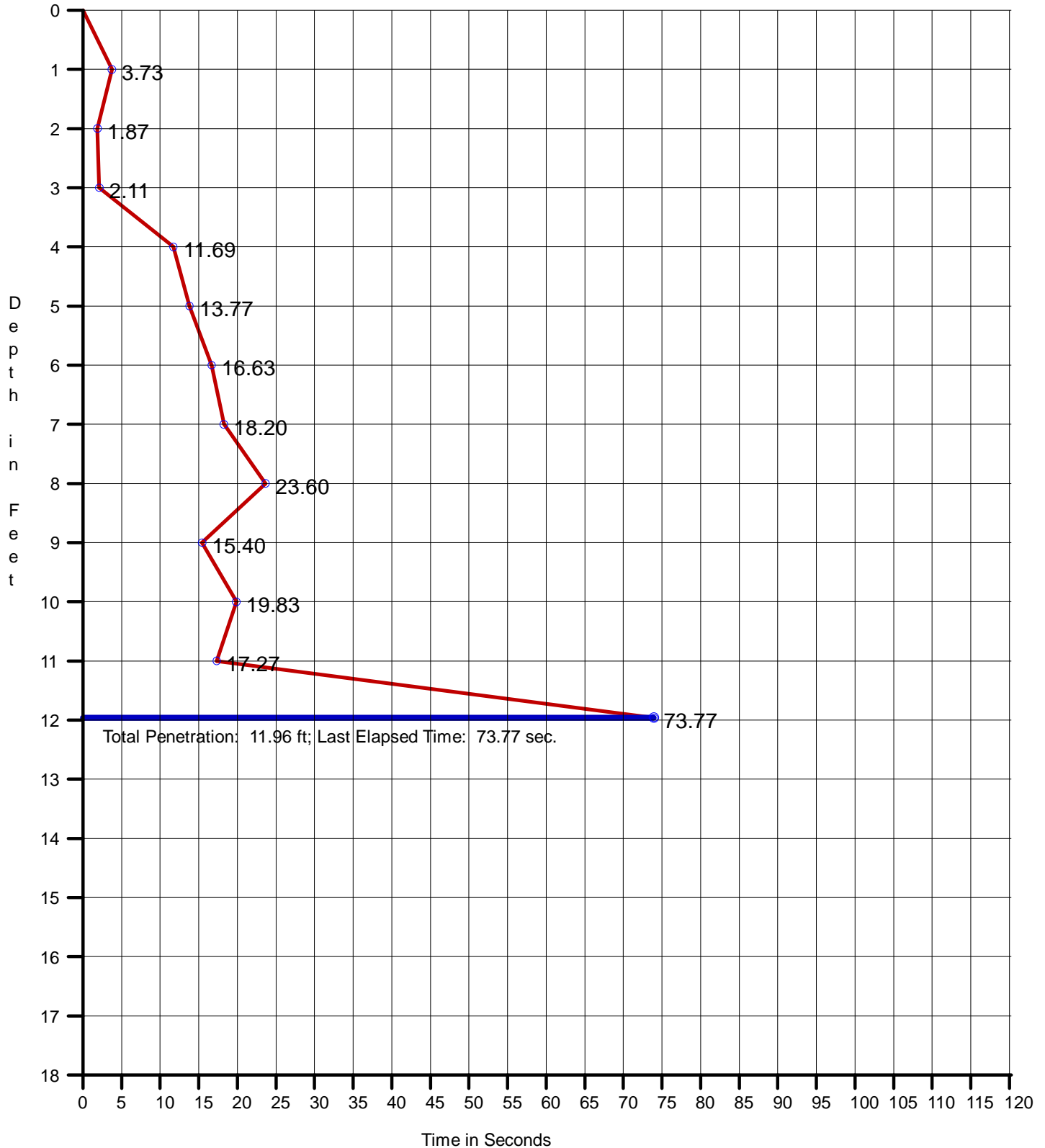
Date: 12/15/2011
Start Time: 7:58:33 AM
End Time: 8:02:11 AM

Penetration: 11.96 ft
Recovery: 16.10 ft
W. D. Corrected: 51.85 ft
W. D. Raw: 51.65 ft

Easting: 2585512.28
Northing: 321327.69
Coord. System: NCSPCS 83

Long: 77°03'13.7100"W
Lat: 034°37'01.6440"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y90, Run 1

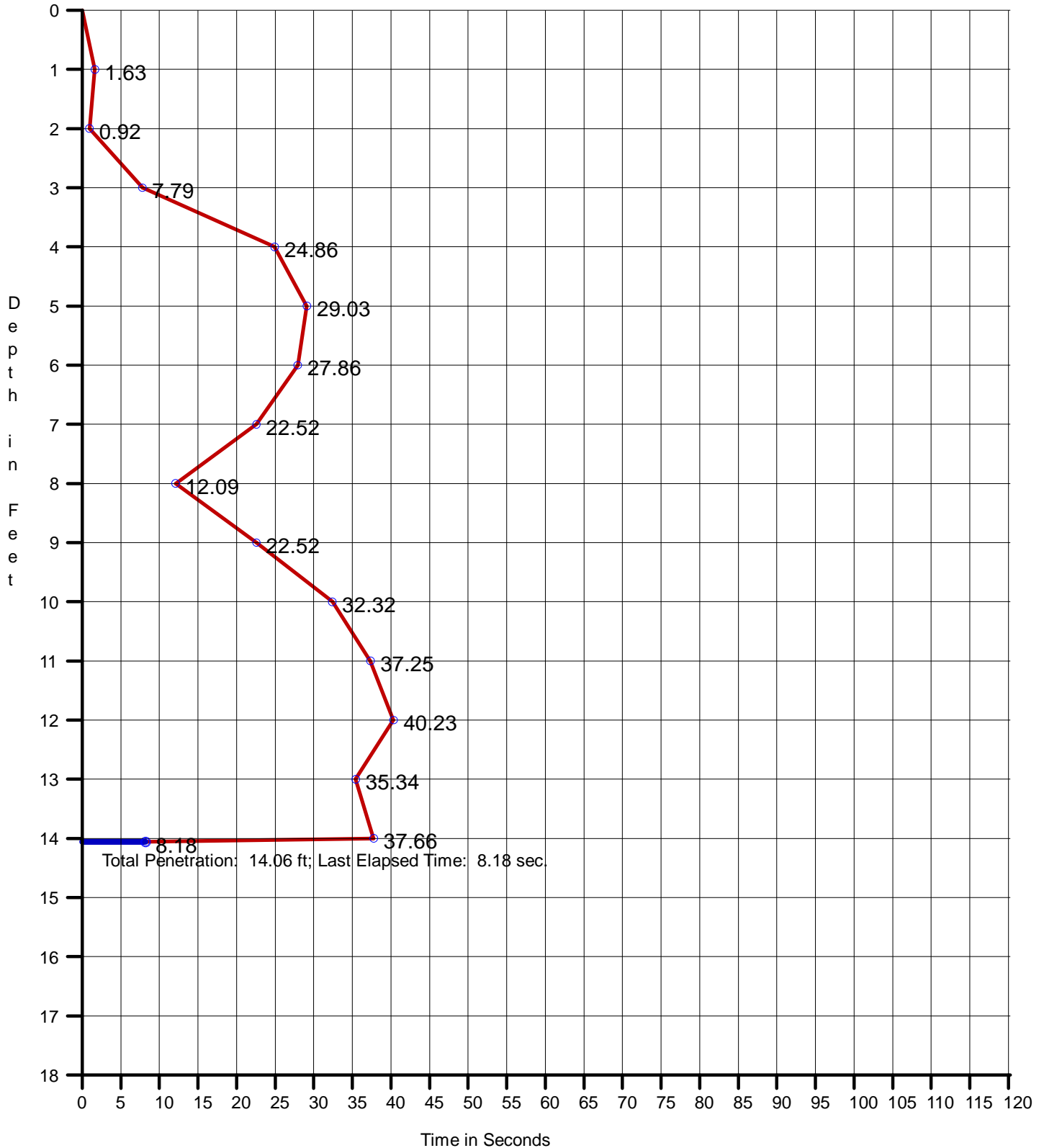
Date: 12/15/2011
Start Time: 3:31:12 PM
End Time: 3:36:52 PM

Penetration: 14.06 ft
Recovery: 19.30 ft
W. D. Corrected: 53.17 ft
W. D. Raw: 51.48 ft

Easting: 2587301.30
Northing: 322214.30
Coord. System: NCSPCS 83

Long: 77°02'52.1040"W
Lat: 034°37'10.0620"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y91, Run 1

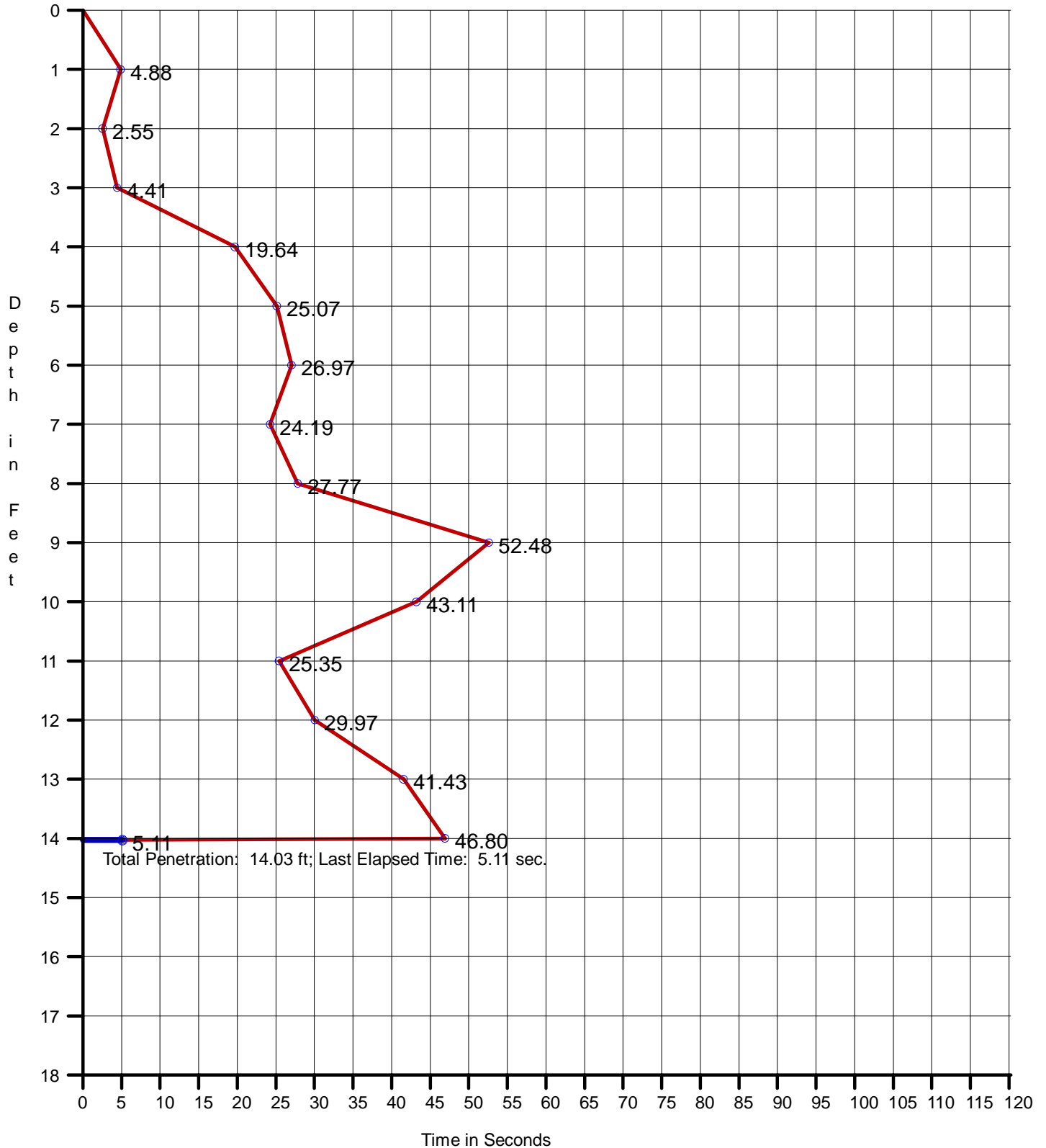
Date: 12/15/2011
Start Time: 4:27:36 PM
End Time: 4:33:56 PM

Penetration: 14.03 ft
Recovery: 20.00 ft
W. D. Corrected: 52.48 ft
W. D. Raw: 50.46 ft

Easting: 2589099.32
Northing: 323108.12
Coord. System: NCSPCS 83

Long: 77°02'30.3780"W
Lat: 034°37'18.5520"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y92, Run 1

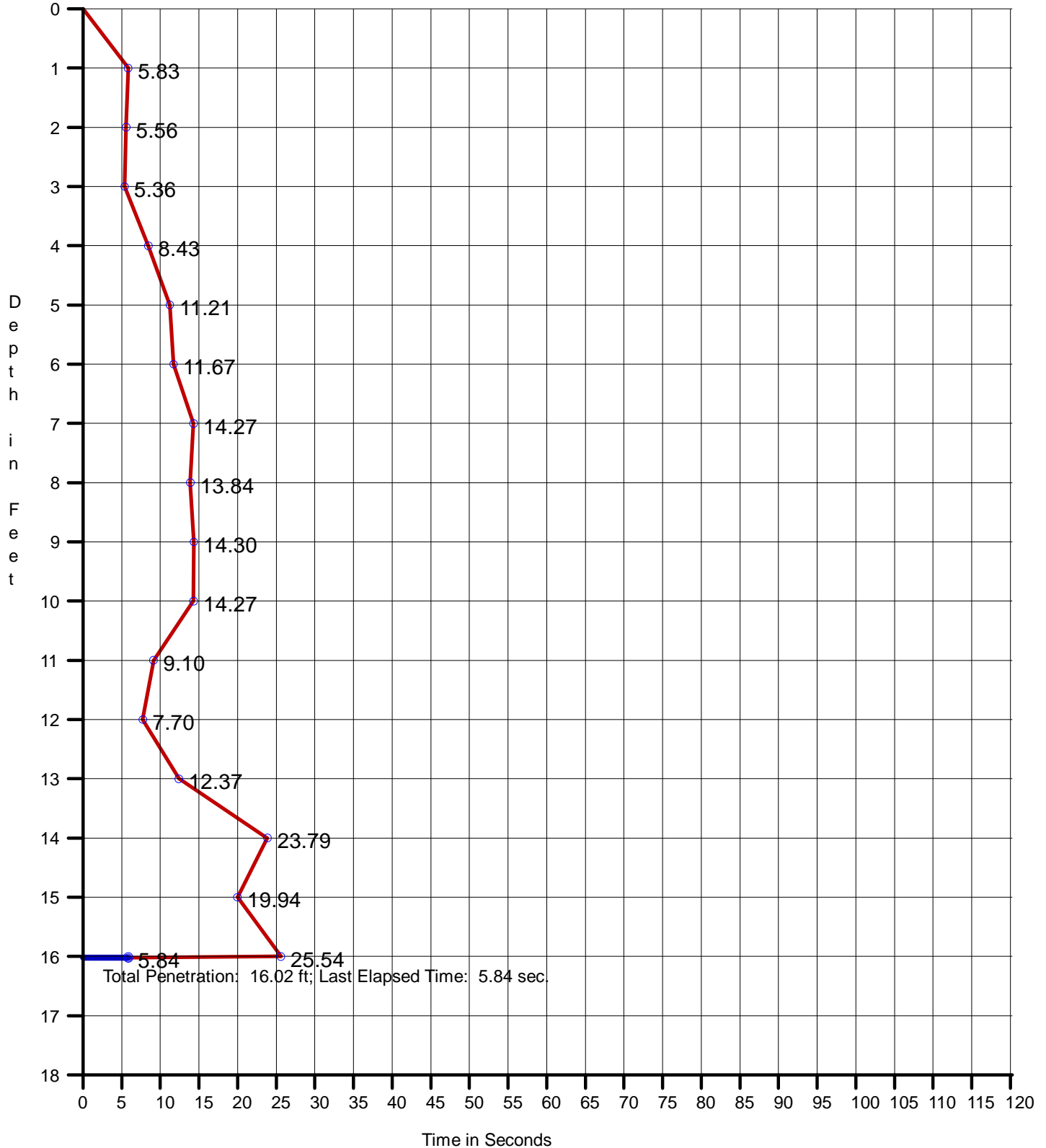
Date: 12/15/2011
Start Time: 7:20:57 AM
End Time: 7:25:26 AM

Penetration: 16.02 ft
Recovery: 20.00 ft
W. D. Corrected: 54.21 ft
W. D. Raw: 53.59 ft

Easting: 2586399.19
Northing: 319538.88
Coord. System: NCSPCS 83

Long: 77°03'03.5220"W
Lat: 034°36'43.7760"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y93, Run 1

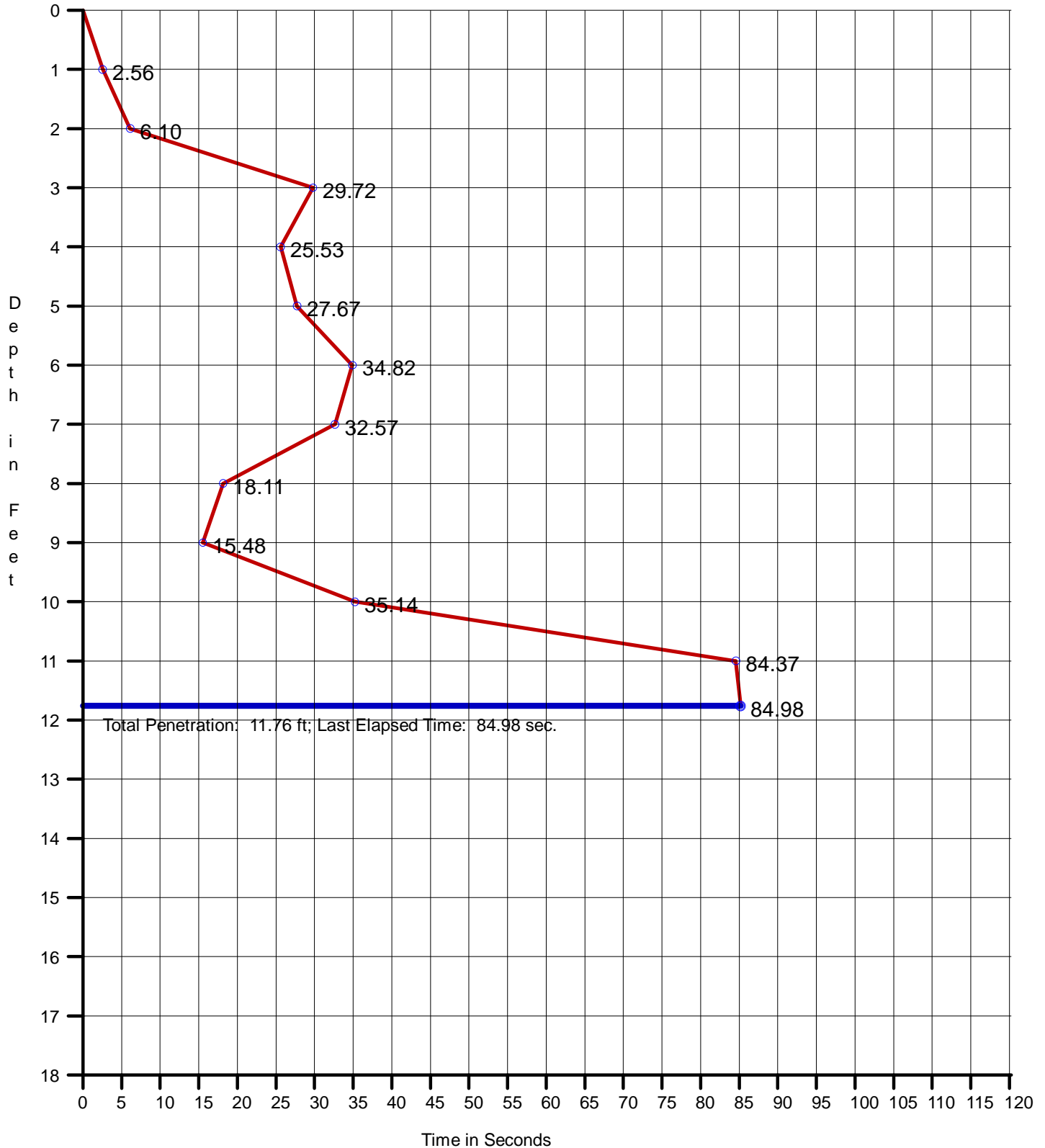
Date: 12/15/2011
Start Time: 4:02:17 PM
End Time: 4:08:55 PM

Penetration: 11.76 ft
Recovery: 15.70 ft
W. D. Corrected: 53.52 ft
W. D. Raw: 51.59 ft

Easting: 2588189.33
Northing: 320426.88
Coord. System: NCSPCS 83

Long: 77°02'41.8980"W
Lat: 034°36'52.2120"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y94, Run 1

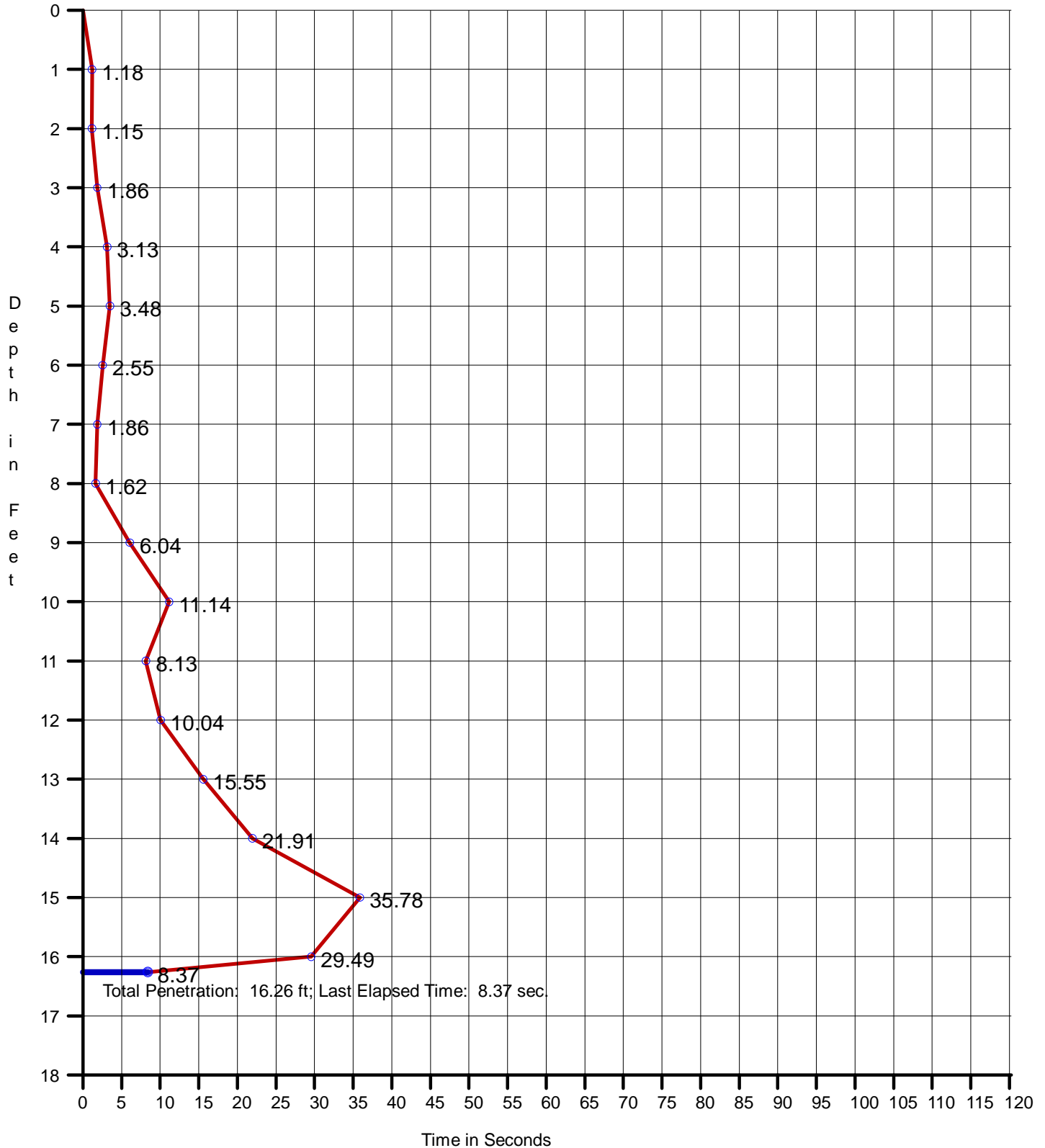
Date: 12/18/2011
Start Time: 9:43:40 AM
End Time: 9:46:23 AM

Penetration: 16.26 ft
Recovery: 16.90 ft
W. D. Corrected: 40.71 ft
W. D. Raw: 39.58 ft

Easting: 2581965.03
Northing: 330730.11
Coord. System: NCSPCS 83

Long: 77°03'53.9580"W
Lat: 034°38'35.3160"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y95, Run 1

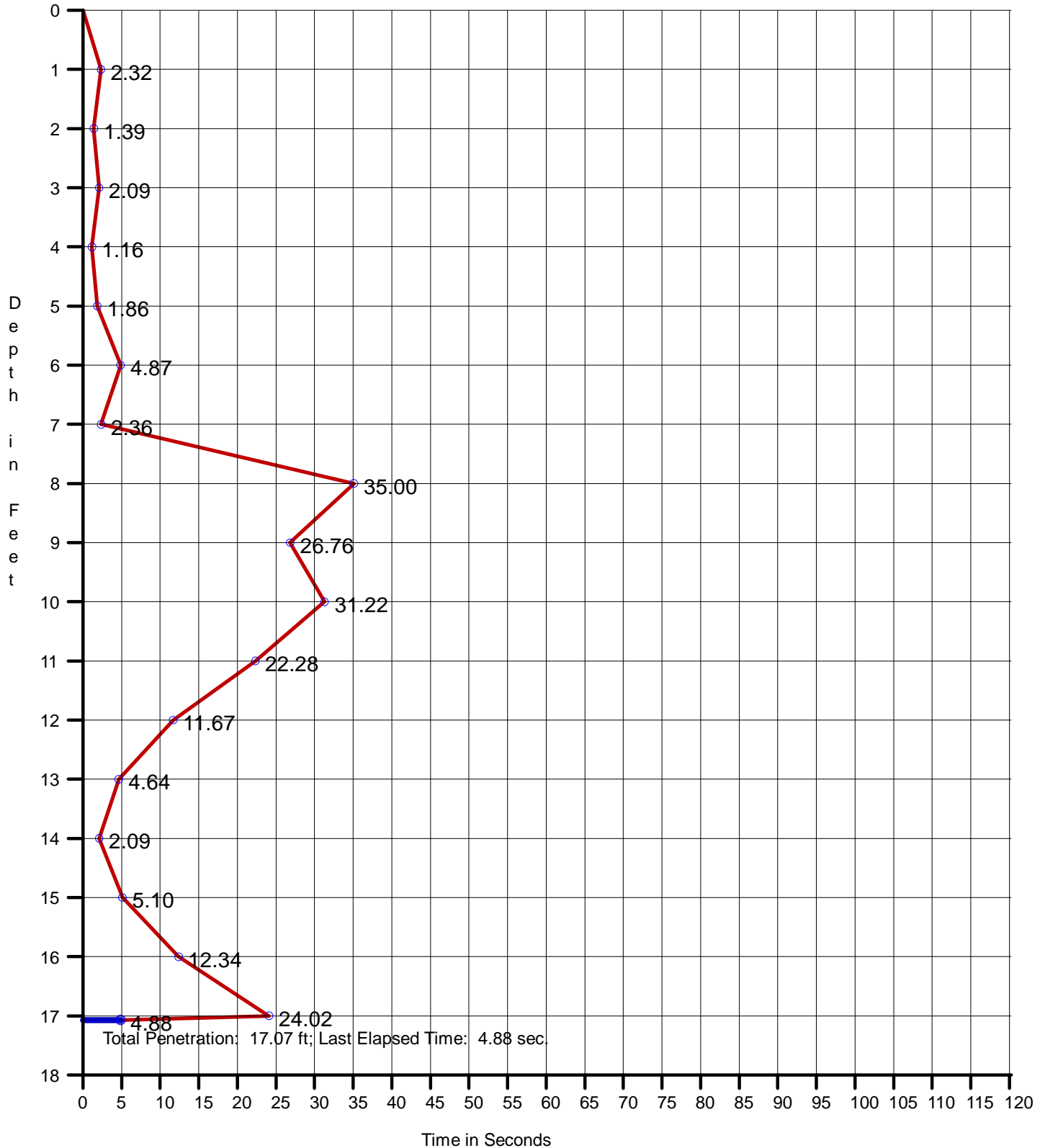
Date: 12/18/2011
Start Time: 9:21:32 AM
End Time: 9:25:15 AM

Penetration: 17.07 ft
Recovery: 17.17 ft
W. D. Corrected: 43.75 ft
W. D. Raw: 42.47 ft

Easting: 2581514.28
Northing: 329387.44
Coord. System: NCSPCS 83

Long: 77°03'59.6640"W
Lat: 034°38'22.1280"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y96, Run 1

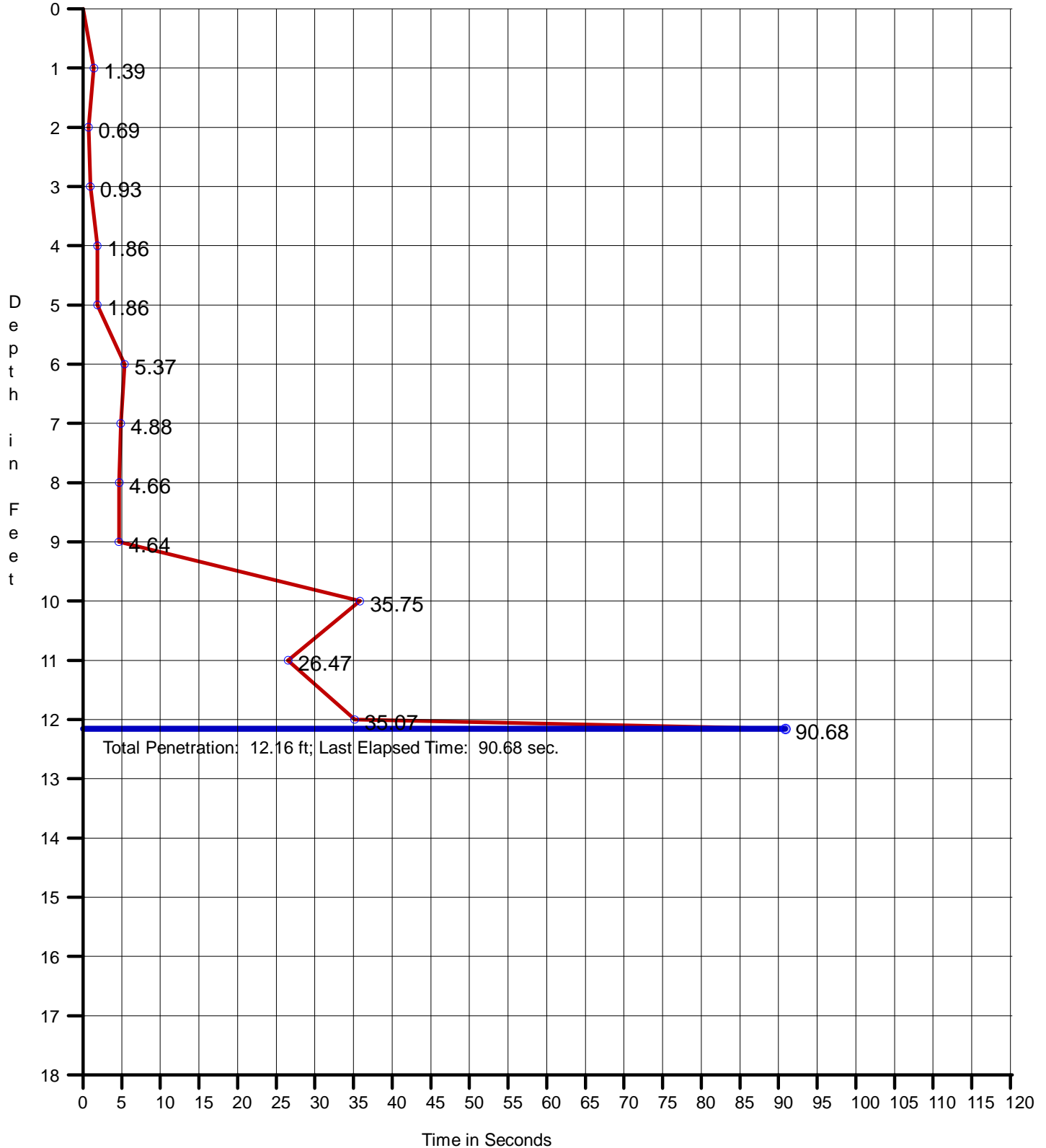
Date: 12/18/2011
Start Time: 10:00:40 AM
End Time: 10:04:14 AM

Penetration: 12.16 ft
Recovery: 13.00 ft
W. D. Corrected: 43.73 ft
W. D. Raw: 42.81 ft

Easting: 2582408.38
Northing: 329835.79
Coord. System: NCSPCS 83

Long: 77°03'48.8580"W
Lat: 034°38'26.3880"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y97, Run 1

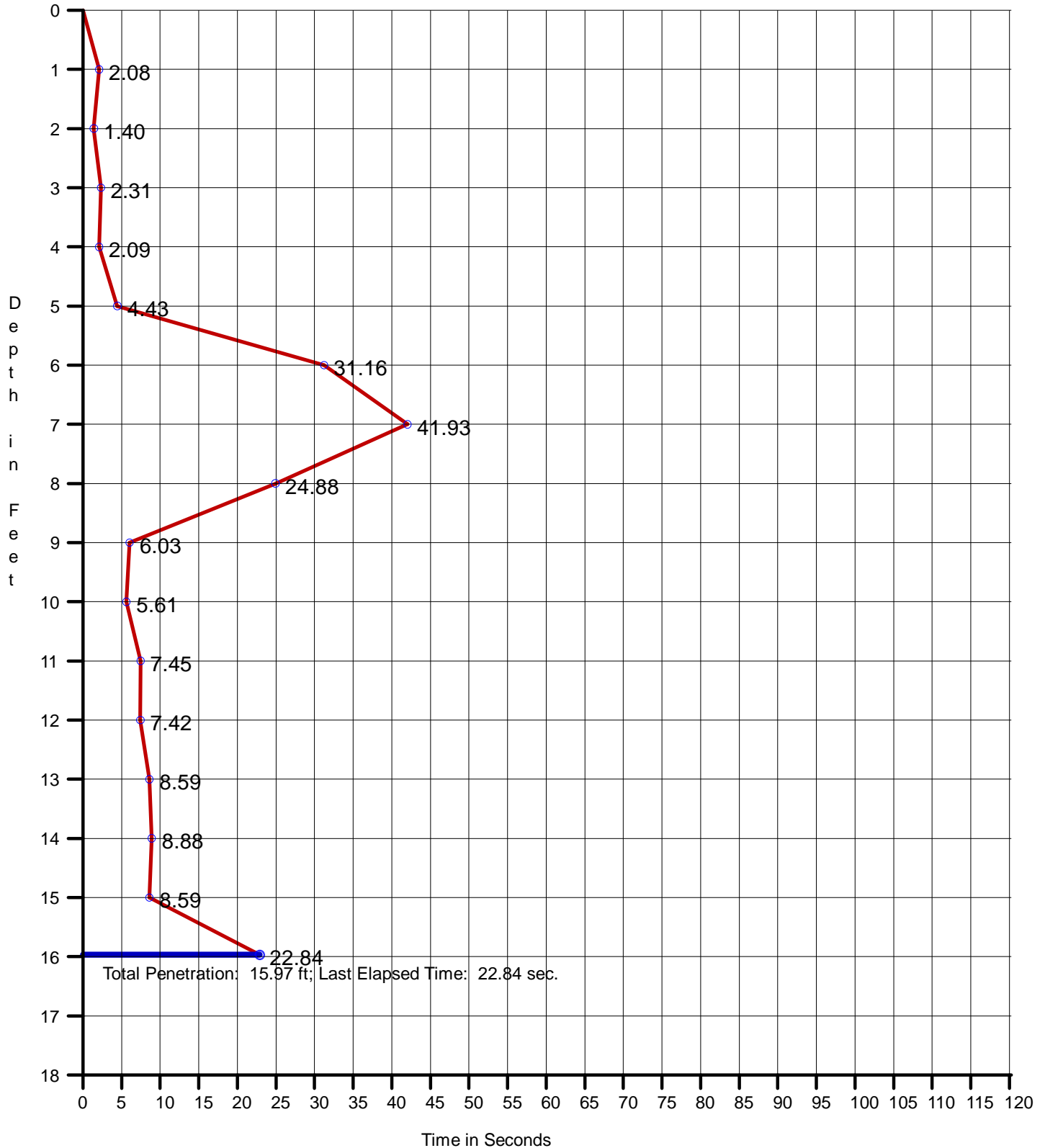
Date: 12/18/2011
Start Time: 10:17:53 AM
End Time: 10:20:58 AM

Penetration: 15.97 ft
Recovery: 17.90 ft
W. D. Corrected: 49.07 ft
W. D. Raw: 48.30 ft

Easting: 2583302.62
Northing: 330281.57
Coord. System: NCSPCS 83

Long: 77°03'38.0520"W
Lat: 034°38'30.6240"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y98, Run 1

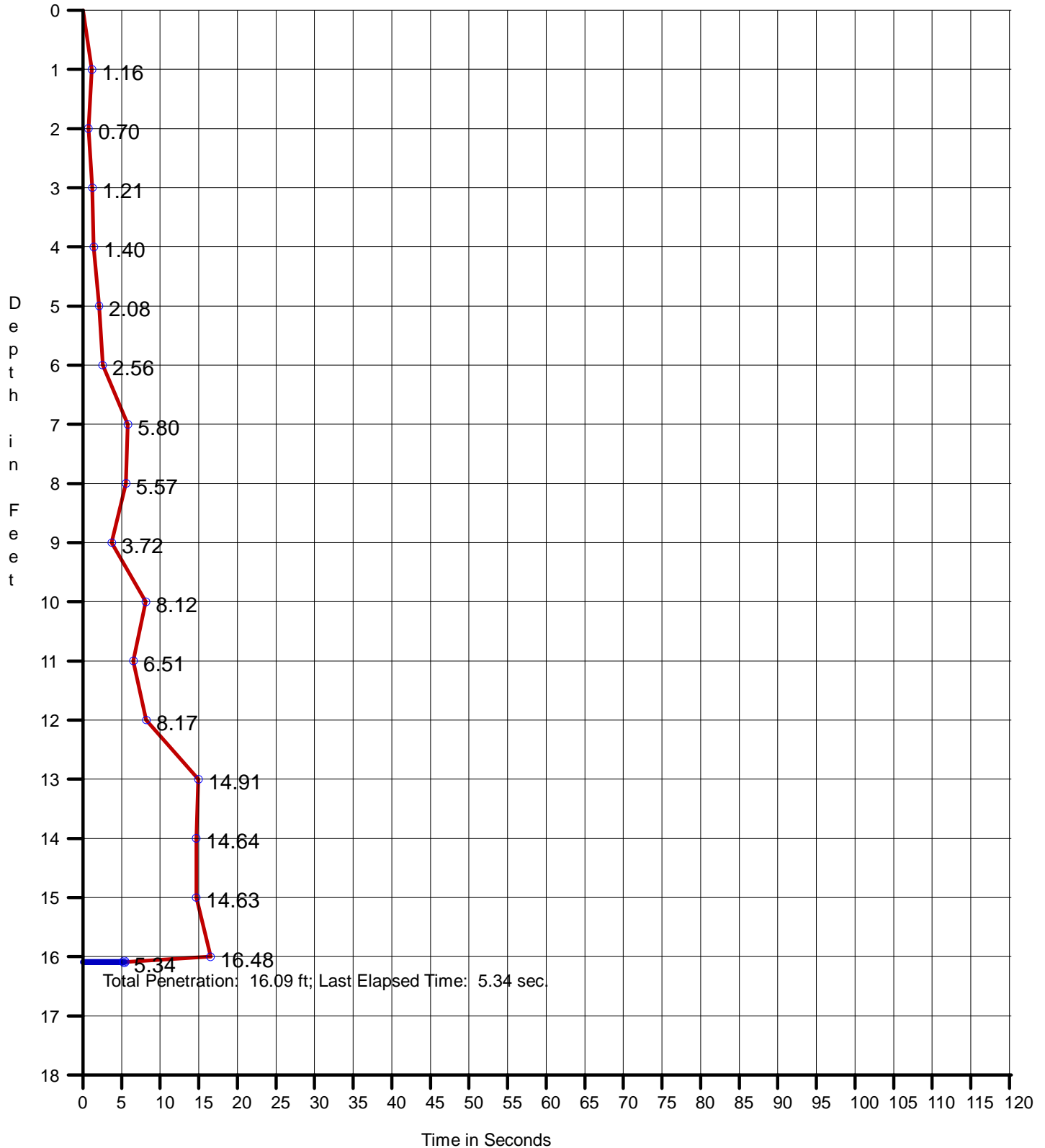
Date: 12/18/2011
Start Time: 12:23:17 PM
End Time: 12:25:10 PM

Penetration: 16.09 ft
Recovery: 19.10 ft
W. D. Corrected: 45.34 ft
W. D. Raw: 45.80 ft

Easting: 2582849.48
Northing: 328940.55
Coord. System: NCSPCS 83

Long: 77°03'43.7880"W
Lat: 034°38'17.4480"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y101, Run 1

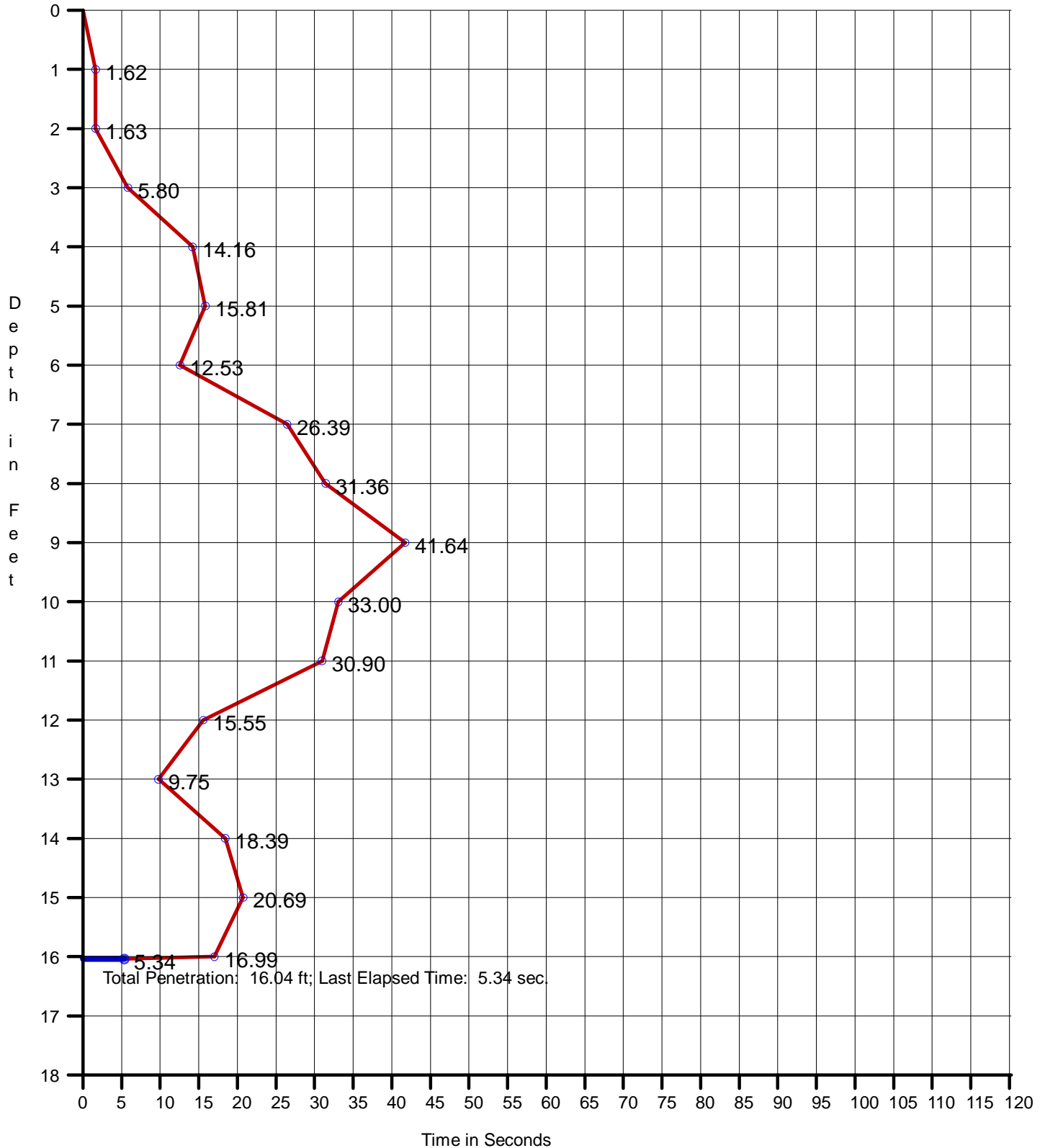
Date: 12/18/2011
Start Time: 11:59:25 AM
End Time: 12:04:26 PM

Penetration: 16.04 ft
Recovery: 18.20 ft
W. D. Corrected: 49.89 ft
W. D. Raw: 50.16 ft

Easting: 2584195.49
Northing: 328487.11
Coord. System: NCSPCS 83

Long: 77°03'27.7920"W
Lat: 034°38'12.7020"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y103, Run 1

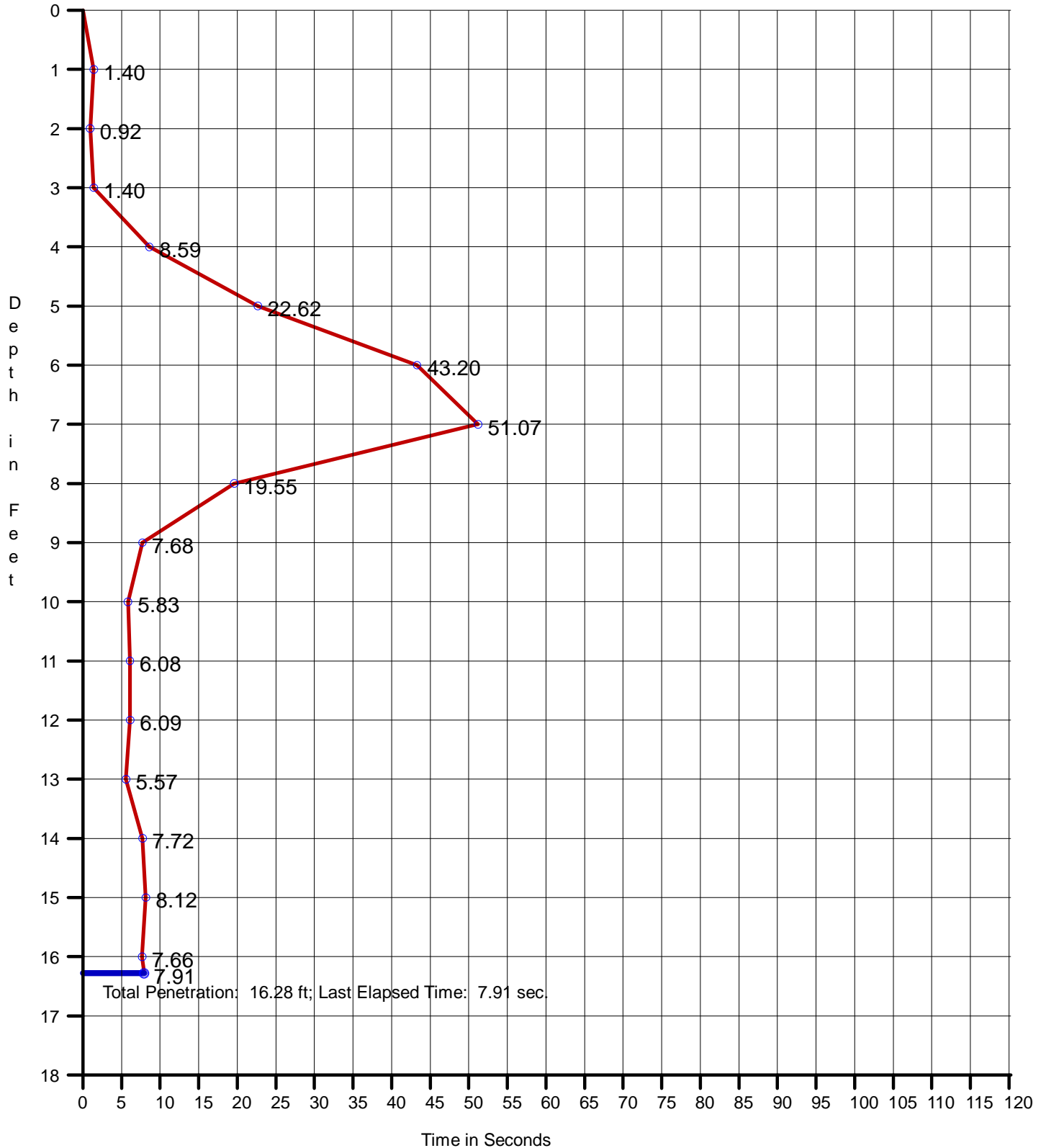
Date: 12/19/2011
Start Time: 11:56:42 AM
End Time: 12:00:13 PM

Penetration: 16.28 ft
Recovery: 20.00 ft
W. D. Corrected: 48.63 ft
W. D. Raw: 48.45 ft

Easting: 2585532.68
Northing: 328038.13
Coord. System: NCSPCS 83

Long: 77°03'11.8920"W
Lat: 034°38'08.0040"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y107, Run 1

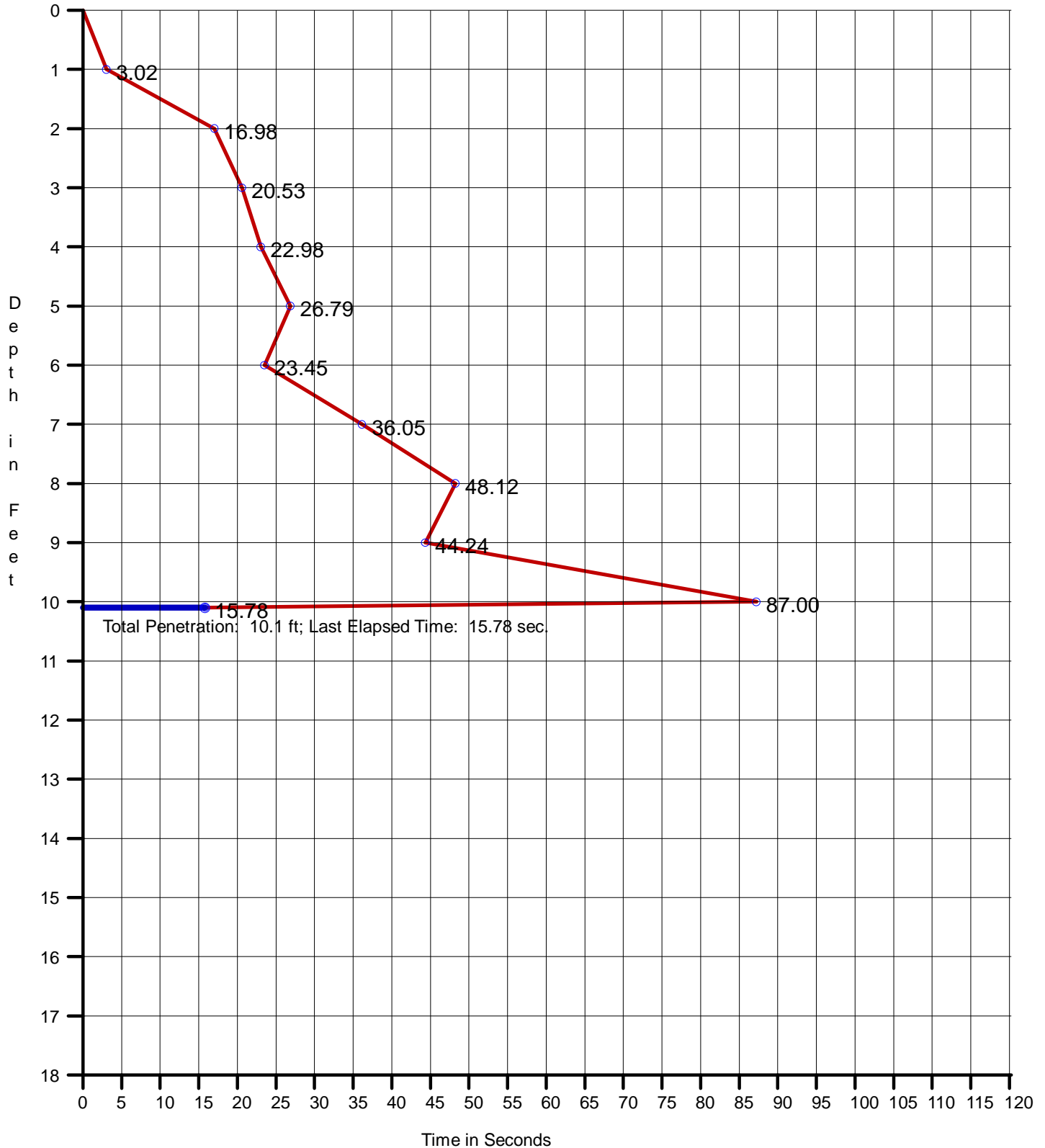
Date: 12/19/2011
Start Time: 12:19:47 PM
End Time: 12:25:31 PM

Penetration: 10.10 ft
Recovery: 15.00 ft
W. D. Corrected: 51.06 ft
W. D. Raw: 51.16 ft

Easting: 2585977.33
Northing: 327138.35
Coord. System: NCSPCS 83

Long: 77°03'06.7860"W
Lat: 034°37'59.0220"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y110, Run 1

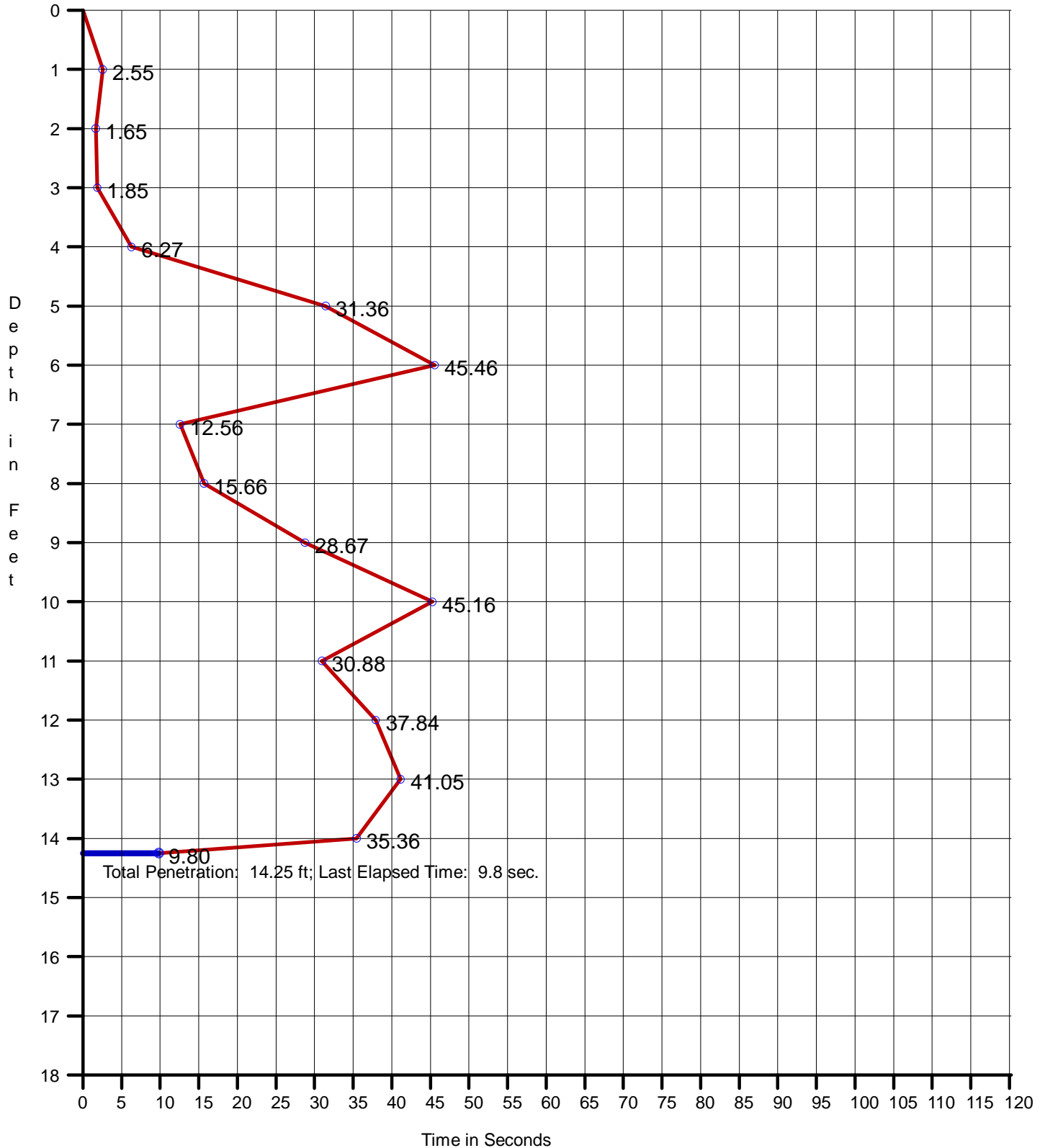
Date: 12/19/2011
Start Time: 12:41:16 PM
End Time: 12:47:02 PM

Penetration: 14.25 ft
Recovery: 18.50 ft
W. D. Corrected: 51.24 ft
W. D. Raw: 51.58 ft

Easting: 2586423.00
Northing: 326244.54
Coord. System: NCSPCS 83

Long: 77°03'01.6620"W
Lat: 034°37'50.0940"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y114, Run 1

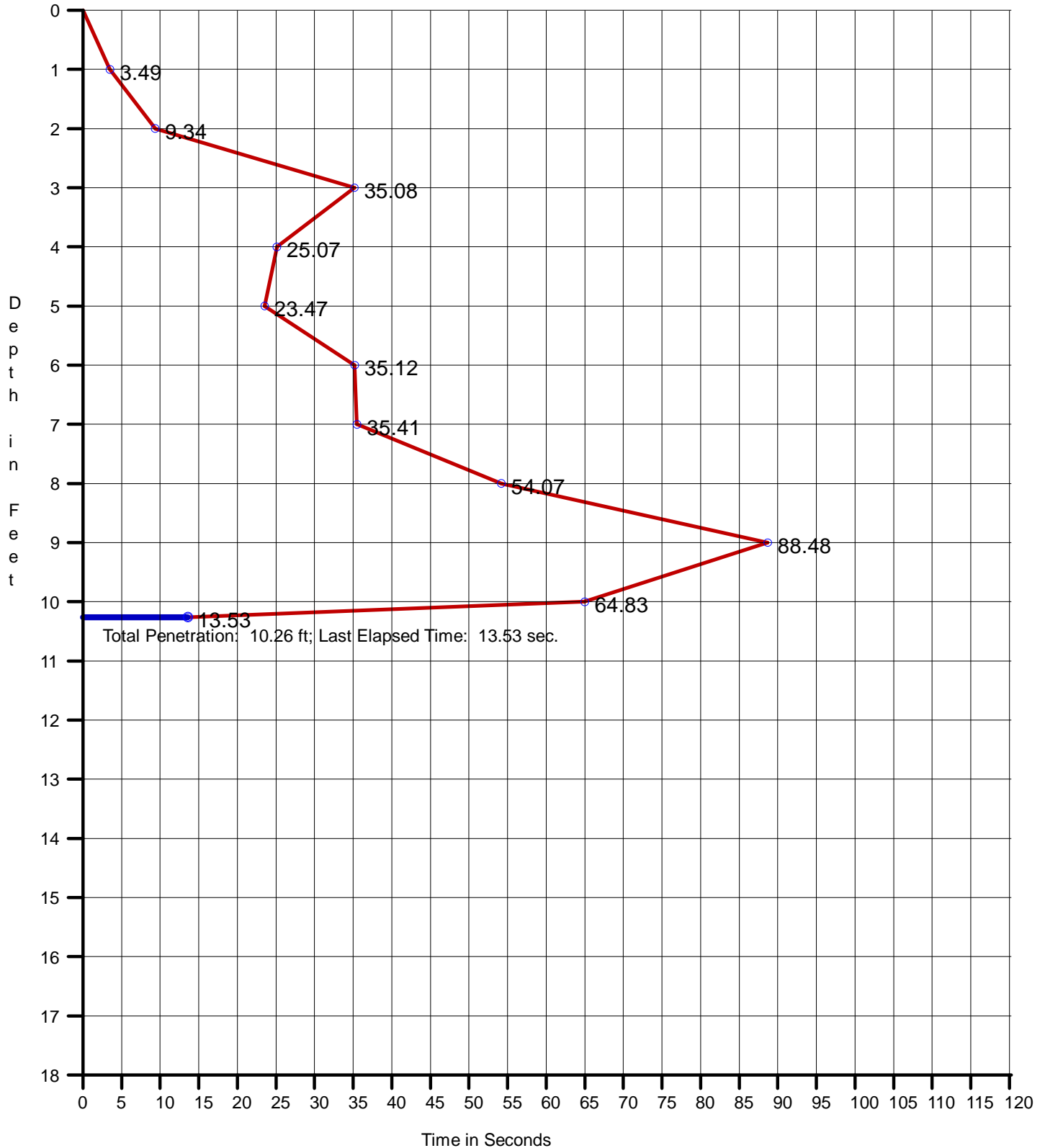
Date: 12/19/2011
Start Time: 1:07:42 PM
End Time: 1:14:10 PM

Penetration: 10.26 ft
Recovery: 14.00 ft
W. D. Corrected: 52.10 ft
W. D. Raw: 52.6 ft

Easting: 2586864.04
Northing: 325349.21
Coord. System: NCSPCS 83

Long: 77°02'56.5980"W
Lat: 034°37'41.1540"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y115, Run 1

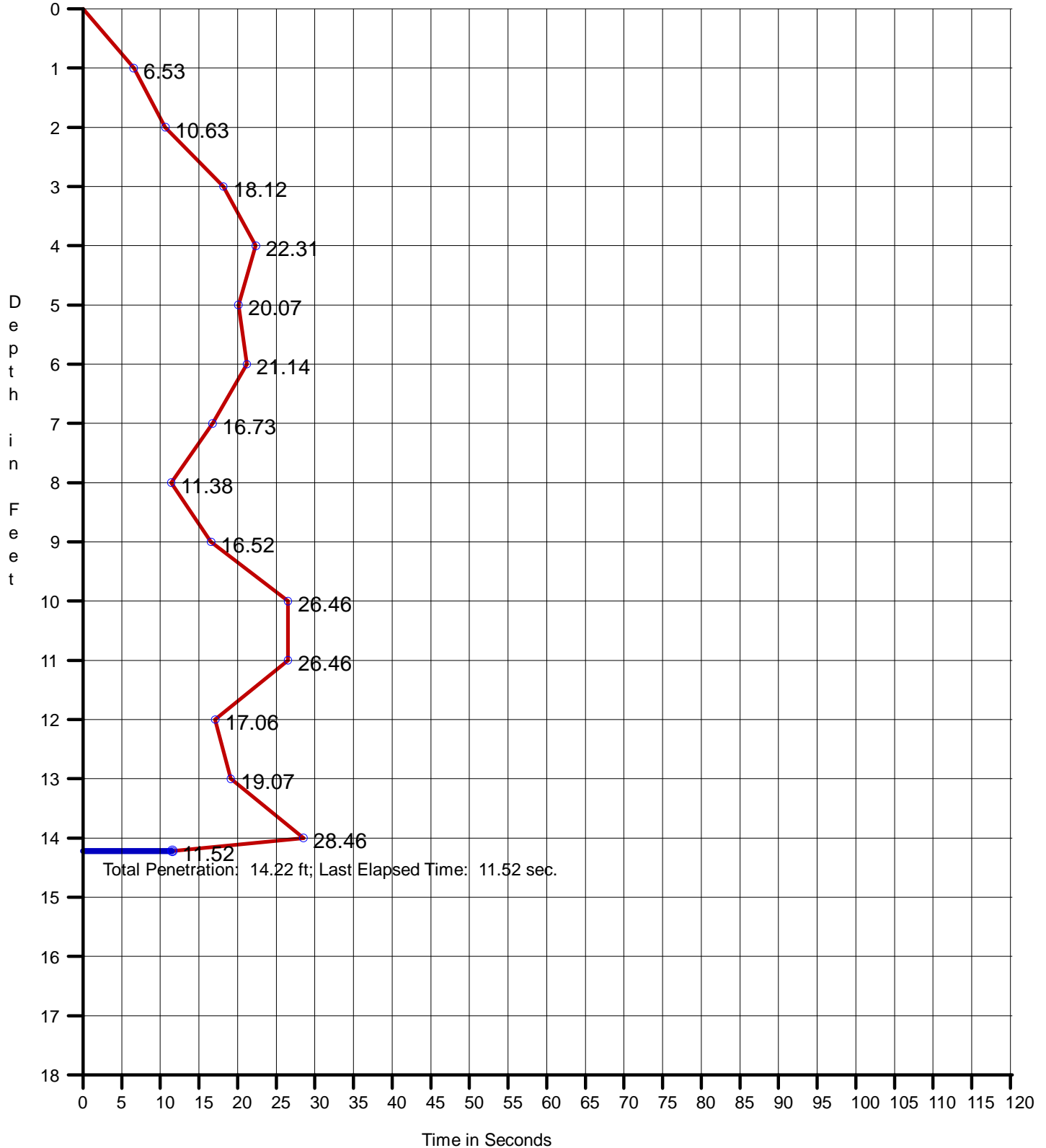
Date: 12/19/2011
Start Time: 1:30:58 PM
End Time: 1:35:31 PM

Penetration: 14.22 ft
Recovery: 18.30 ft
W. D. Corrected: 52.25 ft
W. D. Raw: 52.87 ft

Easting: 2587760.81
Northing: 325794.71
Coord. System: NCSPCS 83

Long: 77°02'45.7620"W
Lat: 034°37'45.3840"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y119, Run 1

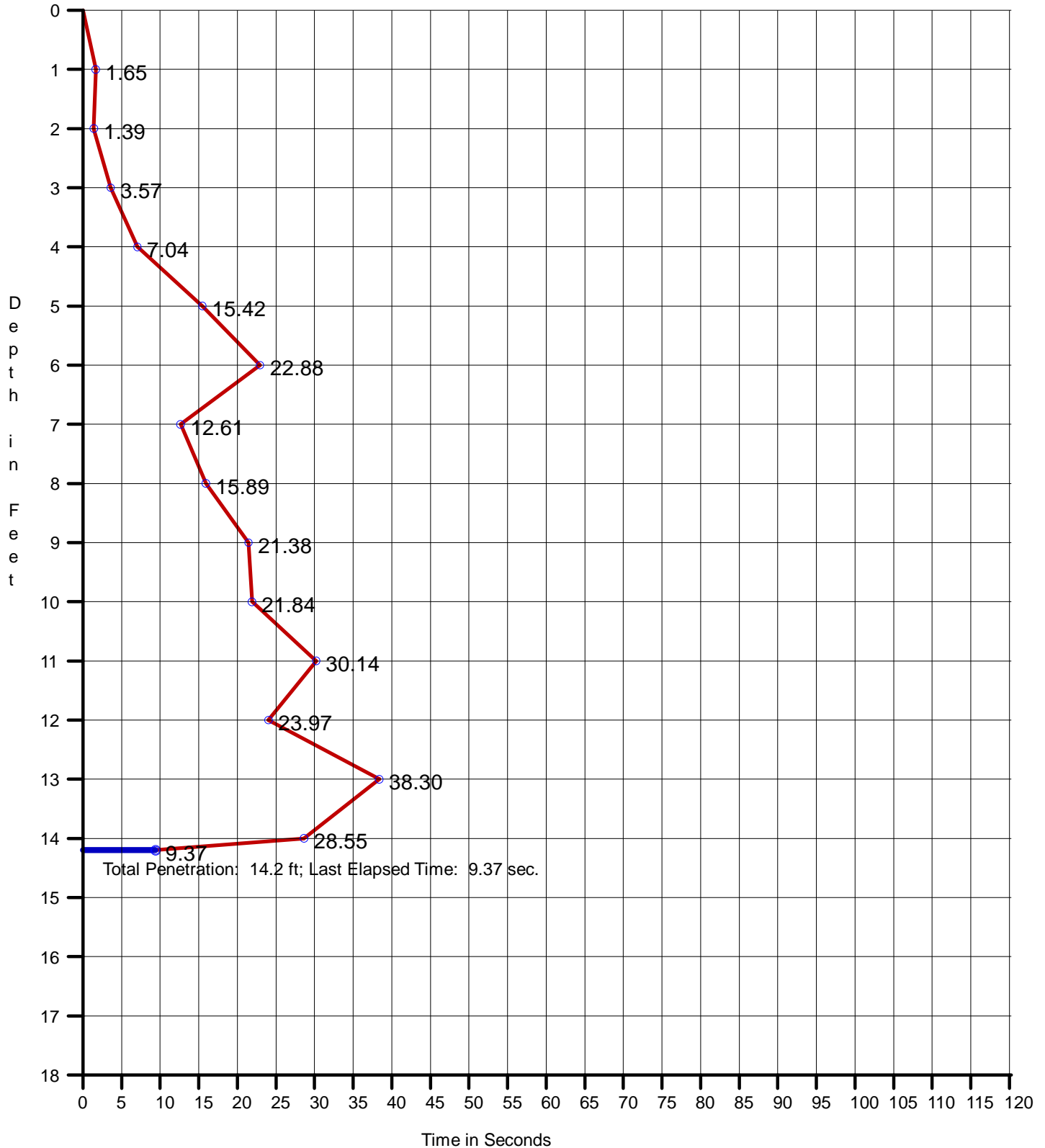
Date: 12/19/2011
Start Time: 8:30:11 AM
End Time: 8:34:25 AM

Penetration: 14.20 ft
Recovery: 18.30 ft
W. D. Corrected: 51.85 ft
W. D. Raw: 49.96 ft

Easting: 2585964.90
Northing: 322670.23
Coord. System: NCSPCS 83

Long: 77°03'07.9800"W
Lat: 034°37'14.8320"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y120, Run 1

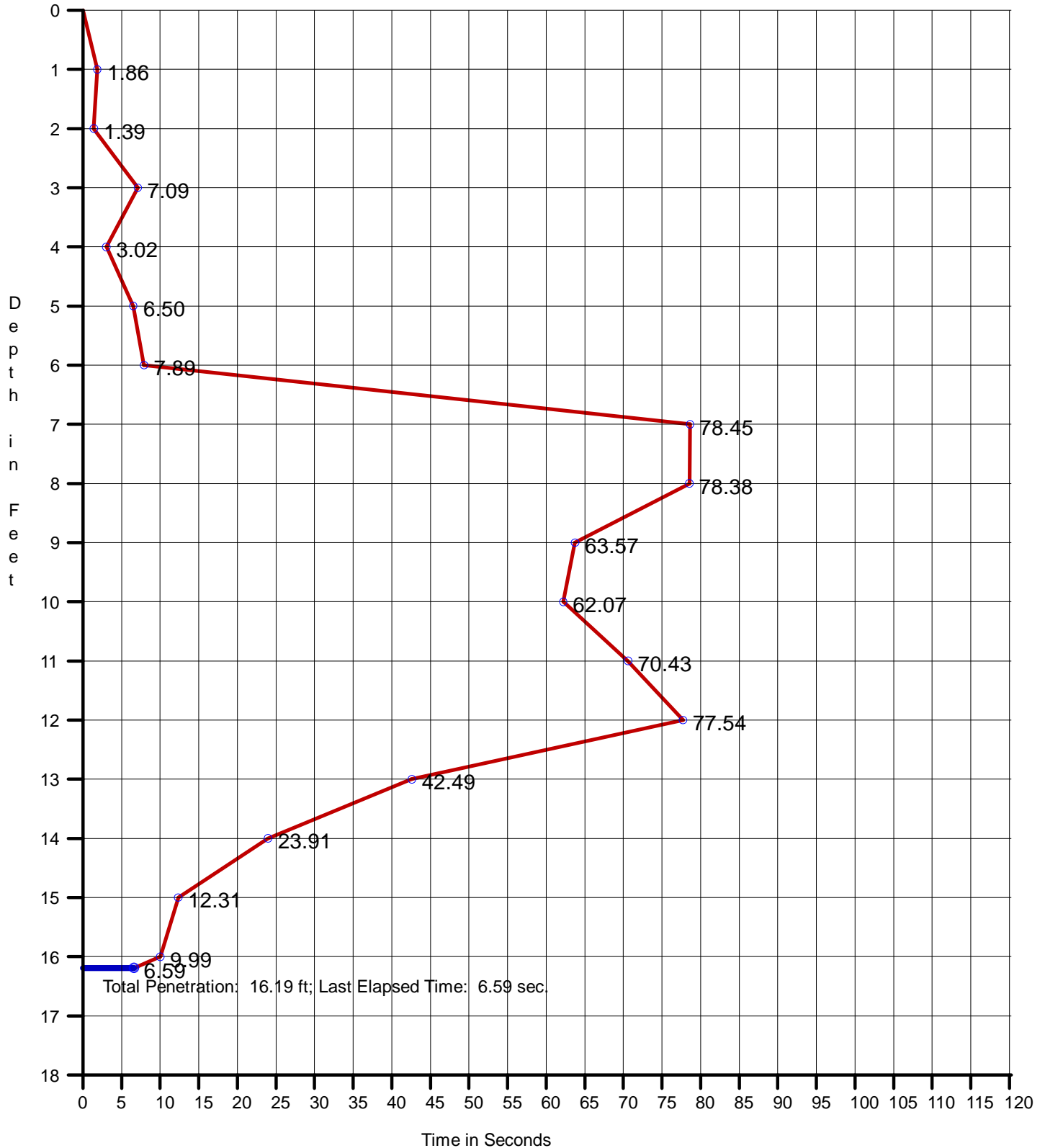
Date: 12/18/2011
Start Time: 1:10:00 PM
End Time: 1:19:13 PM

Penetration: 16.19 ft
Recovery: 18.00 ft
W. D. Corrected: 51.76 ft
W. D. Raw: 52.26 ft

Easting: 2586858.40
Northing: 323115.08
Coord. System: NCSPCS 83

Long: 77°02'57.1860"W
Lat: 034°37'19.0560"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y121, Run 1

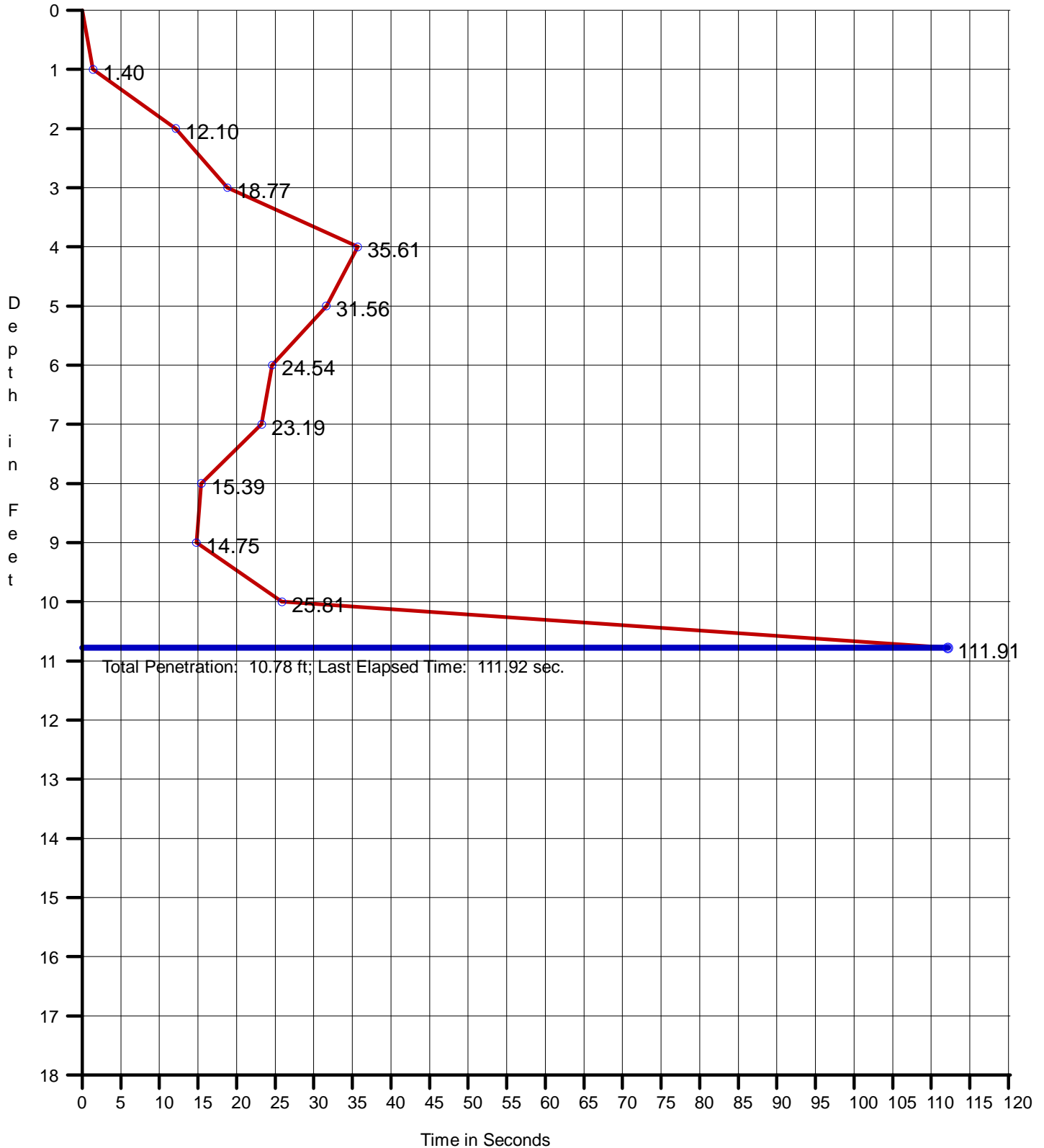
Date: 12/19/2011
Start Time: 8:08:24 AM
End Time: 8:13:39 AM

Penetration: 10.78 ft
Recovery: 13.10 ft
W. D. Corrected: 51.44 ft
W. D. Raw: 49.58 ft

Easting: 2587755.54
Northing: 323559.53
Coord. System: NCSPCS 83

Long: 77°02'46.3500"W
Lat: 034°37'23.2800"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y122, Run 1

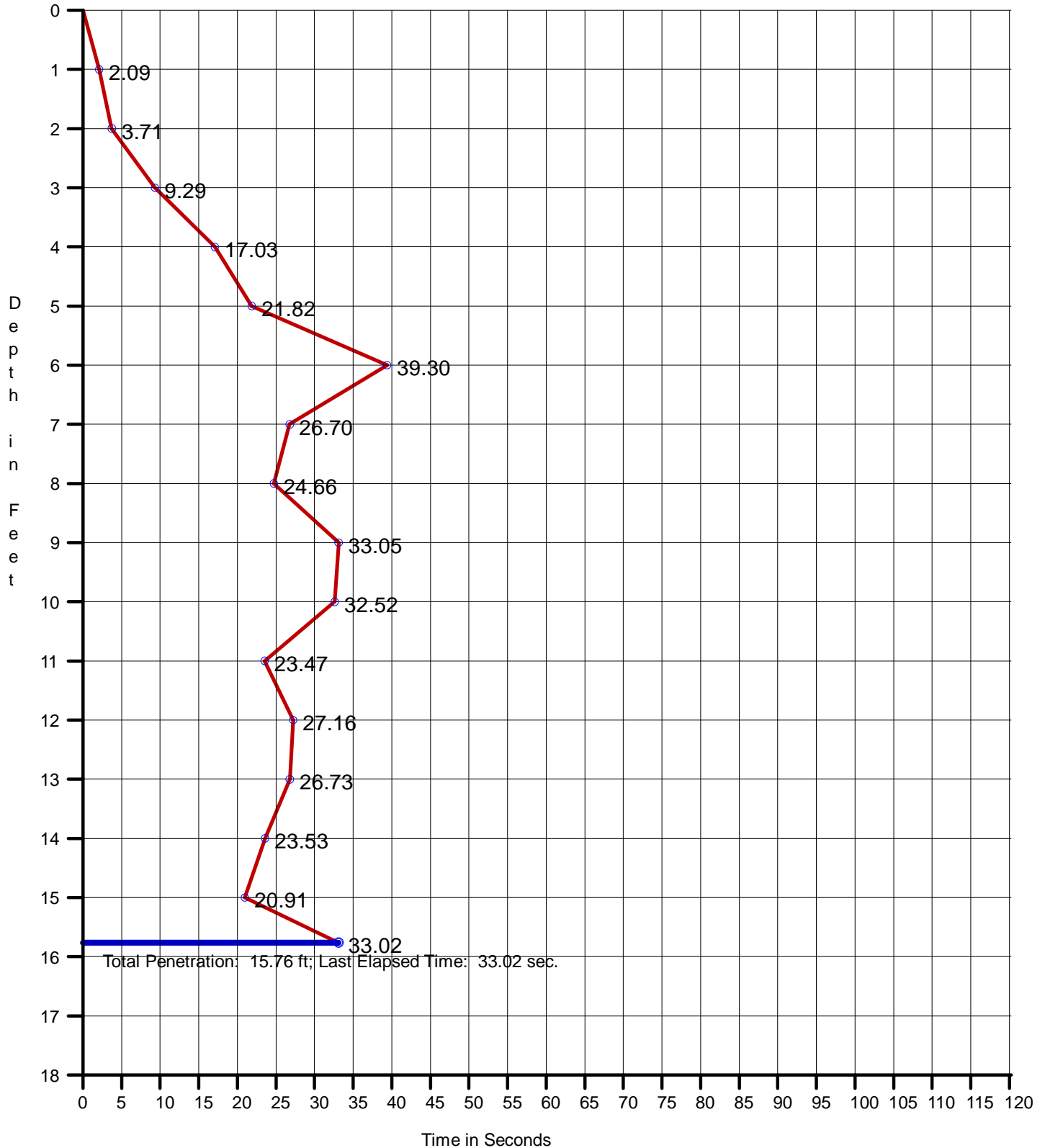
Date: 12/18/2011
Start Time: 1:41:57 PM
End Time: 1:48:02 PM

Penetration: 15.76 ft
Recovery: 18.50 ft
W. D. Corrected: 51.55 ft
W. D. Raw: 52.00 ft

Easting: 2586406.35
Northing: 321774.22
Coord. System: NCSPCS 83

Long: 77°03'02.9100"W
Lat: 034°37'05.8860"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y126, Run 1

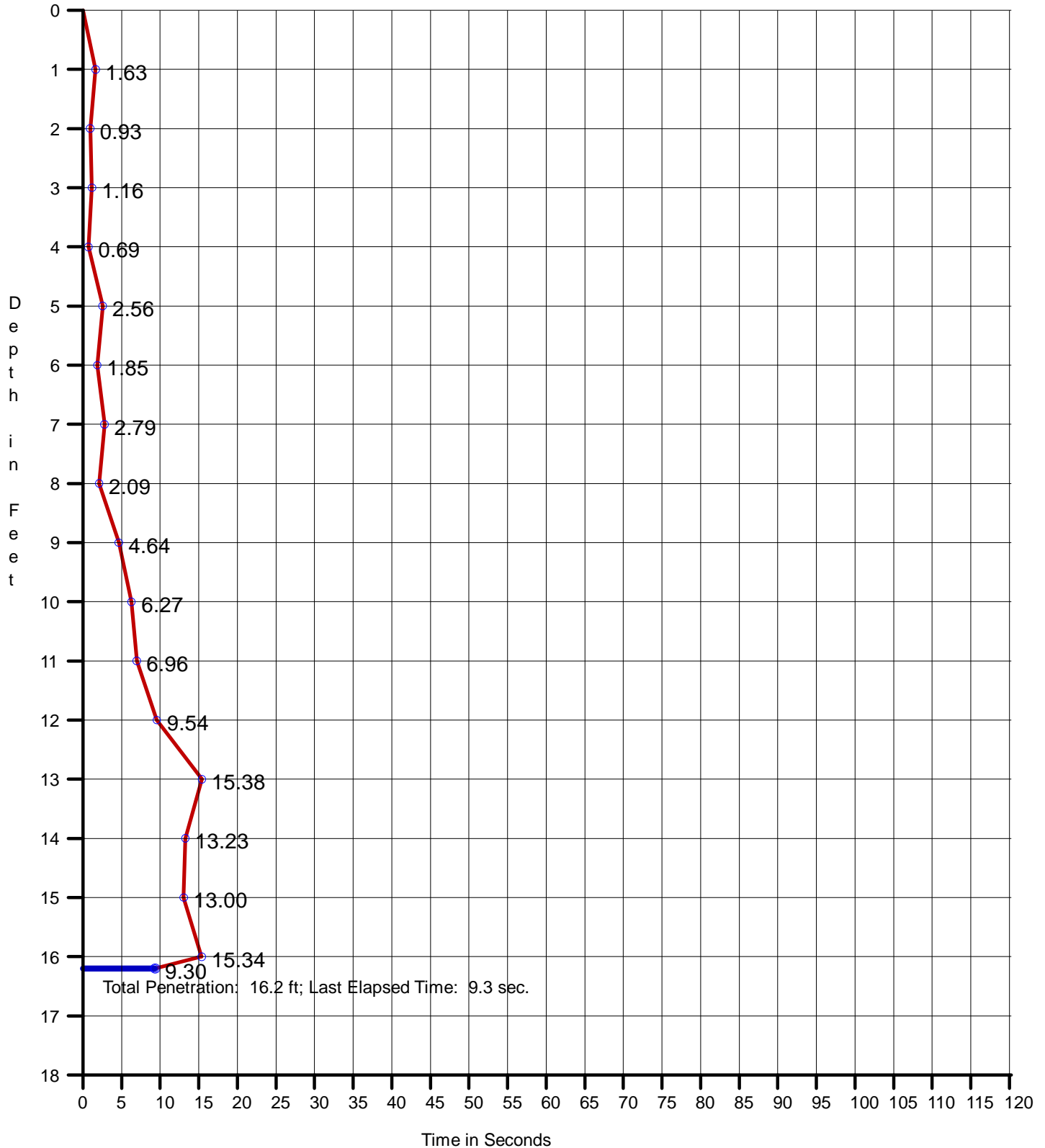
Date: 12/18/2011
Start Time: 10:46:01 AM
End Time: 10:47:49 AM

Penetration: 16.20 ft
Recovery: 18.2 ft
W. D. Corrected: 41.12 ft
W. D. Raw: 40.73 ft

Easting: 2583757.23
Northing: 331622.84
Coord. System: NCSPCS 83

Long: 77°03'32.2980"W
Lat: 034°38'43.8000"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y129, Run 1

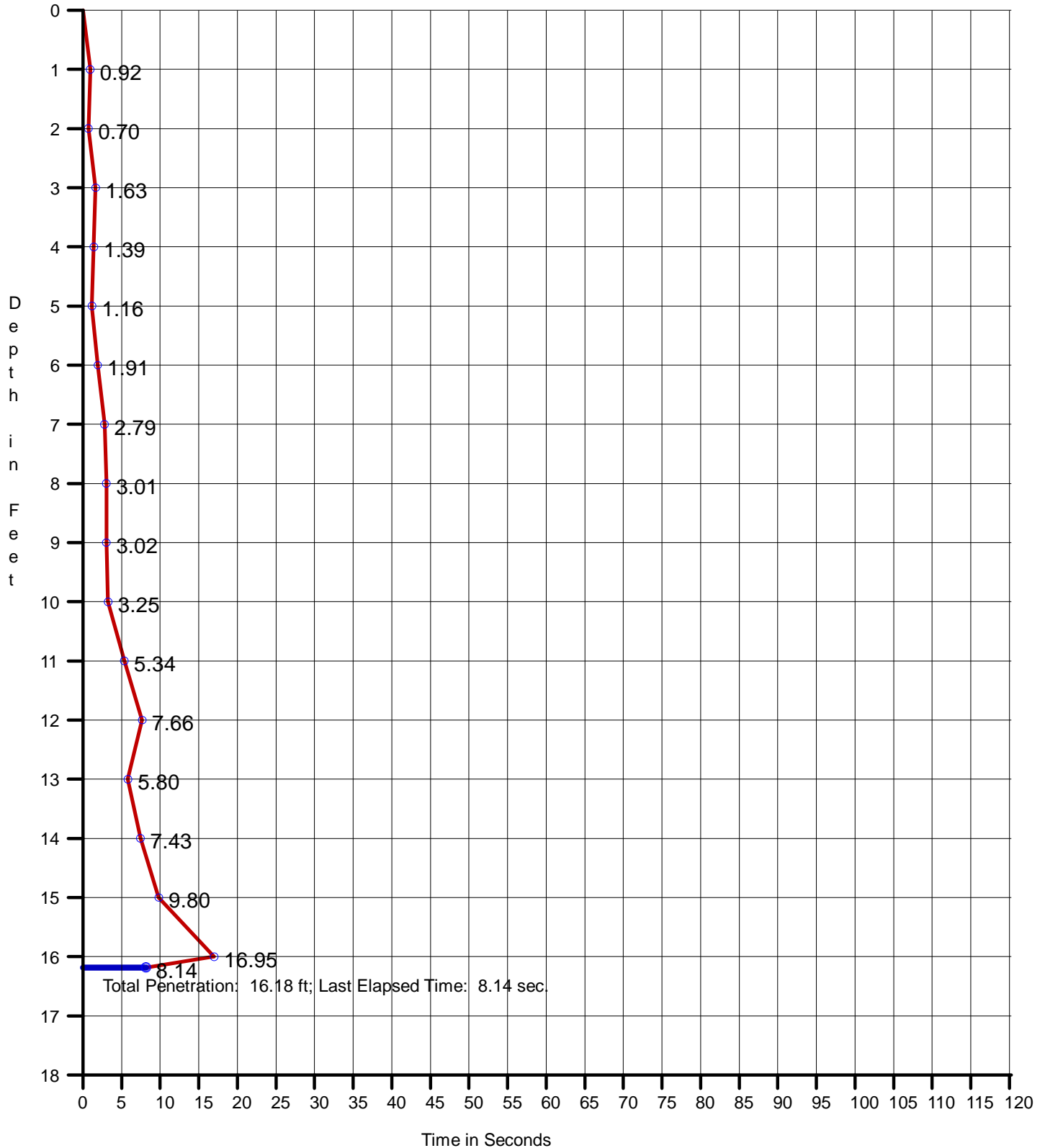
Date: 12/18/2011
Start Time: 11:06:01 AM
End Time: 11:07:22 AM

Penetration: 16.18 ft
Recovery: 10.50 ft
W. D. Corrected: 44.67 ft
W. D. Raw: 44.50 ft

Easting: 2584198.90
Northing: 330723.77
Coord. System: NCSPCS 83

Long: 77°03'27.2220"W
Lat: 034°38'34.8240"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y132, Run 2

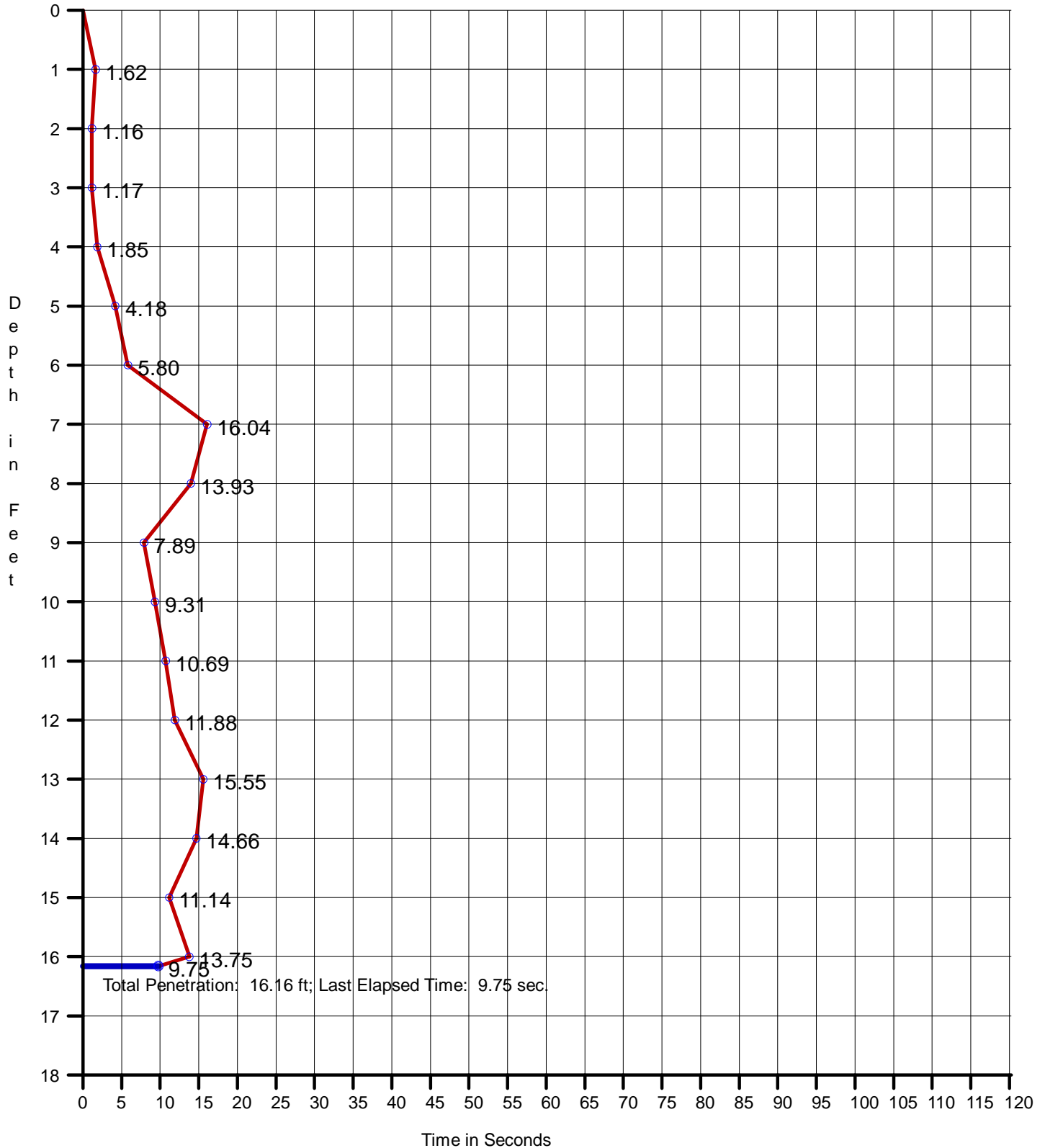
Date: 12/19/2011
Start Time: 11:35:47 AM
End Time: 11:38:17 AM

Penetration: 16.16 ft
Recovery: 17.50 ft
W. D. Corrected: 44.69 ft
W. D. Raw: 44.30 ft

Easting: 2586887.78
Northing: 332058.37
Coord. System: NCSPCS 83

Long: 77°02'54.7320"W
Lat: 034°38'47.5020"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y135, Run 1

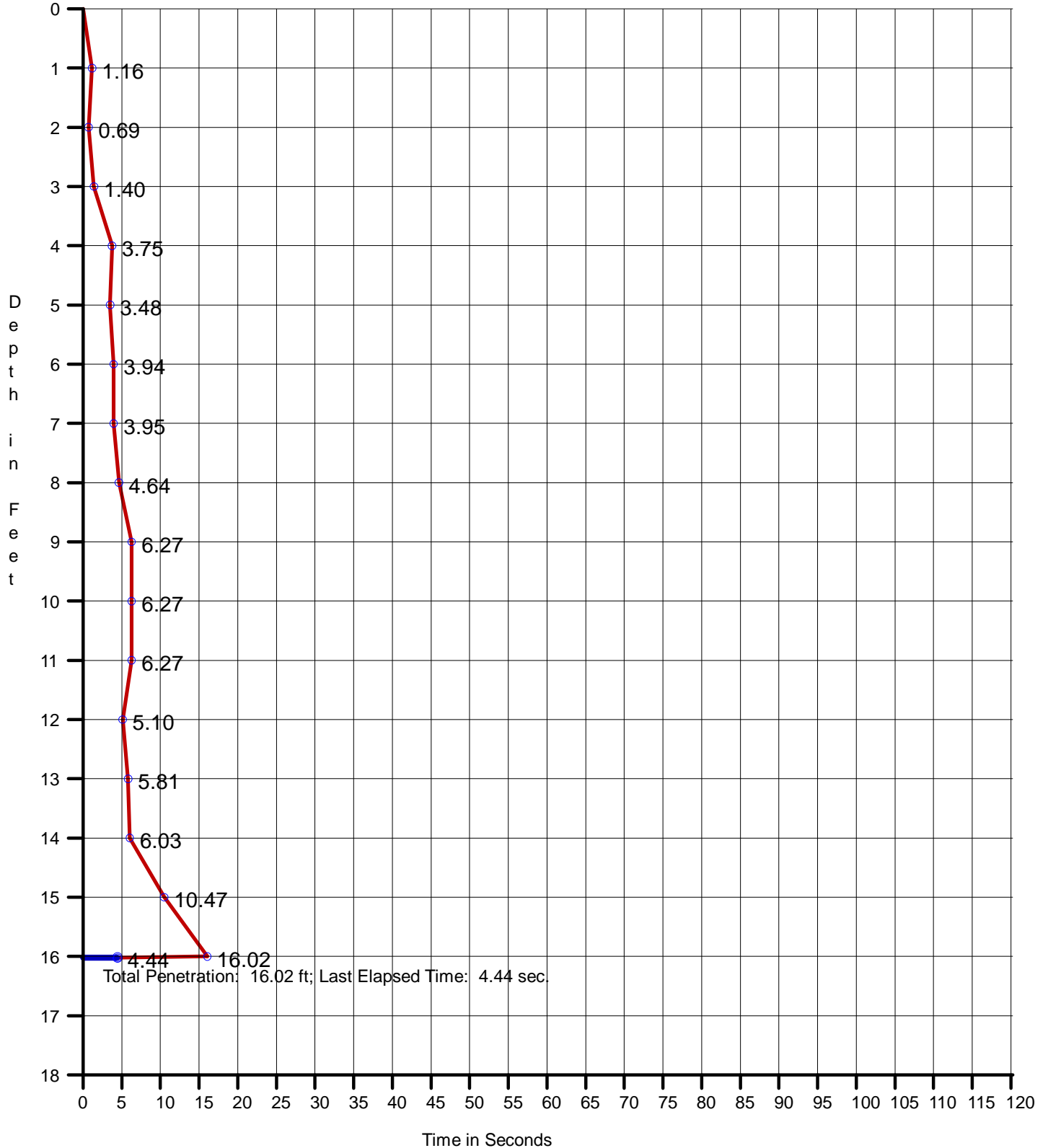
Date: 12/18/2011
Start Time: 11:39:39 AM
End Time: 11:41:08 AM

Penetration: 16.02 ft
Recovery: 17.00 ft
W. D. Corrected: 47.22 ft
W. D. Raw: 47.30 ft

Easting: 2584643.45
Northing: 329827.03
Coord. System: NCSPCS 83

Long: 77°03'22.1160"W
Lat: 034°38'25.8720"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y136, Run 1

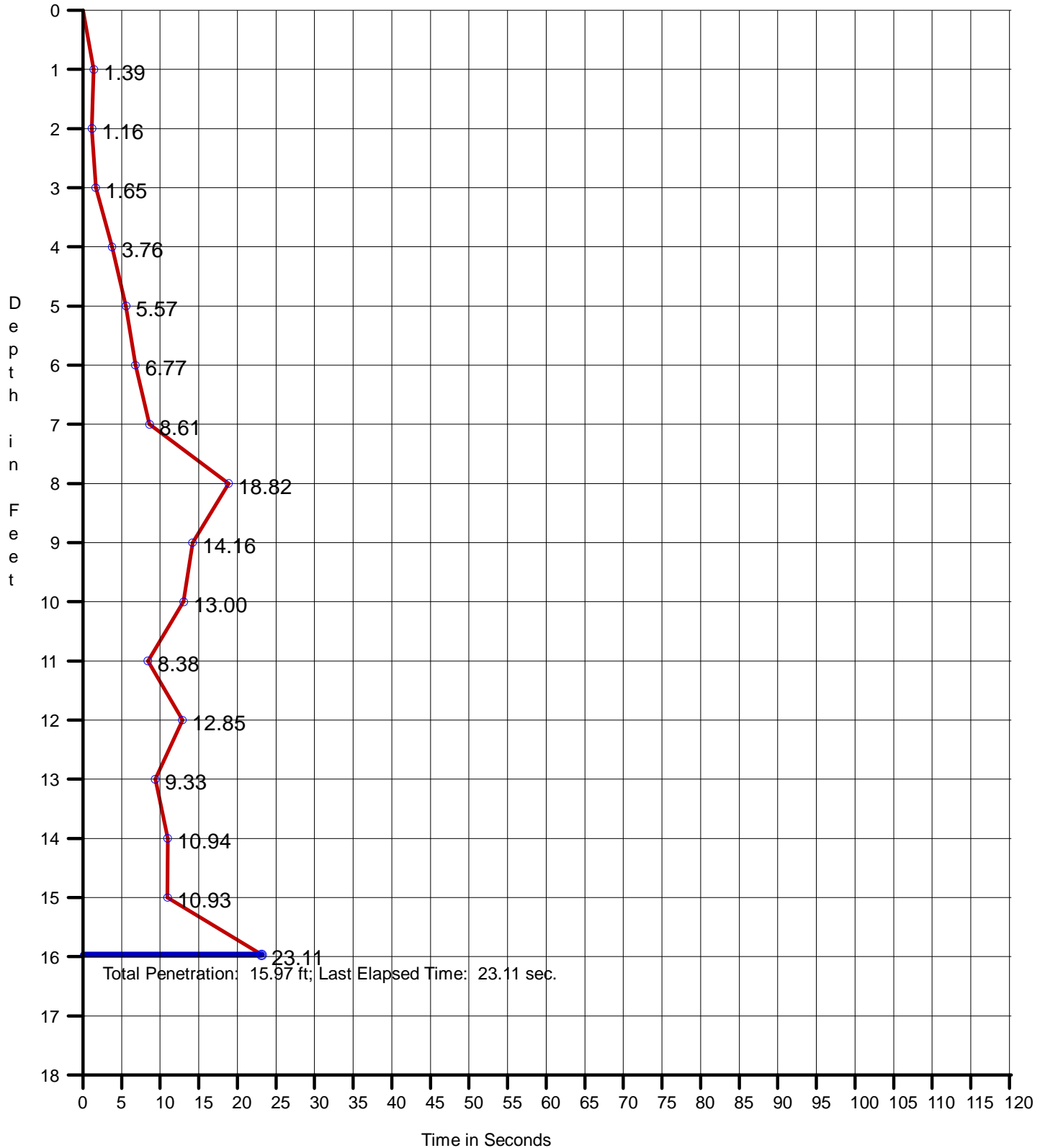
Date: 12/19/2011
Start Time: 11:00:44 AM
End Time: 11:03:14 AM

Penetration: 15.97 ft
Recovery: 18.00 ft
W. D. Corrected: 47.59 ft
W. D. Raw: 46.82 ft

Easting: 2586437.92
Northing: 330719.80
Coord. System: NCSPCS 83

Long: 77°03'00.4320"W
Lat: 034°38'34.3500"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y141, Run 1

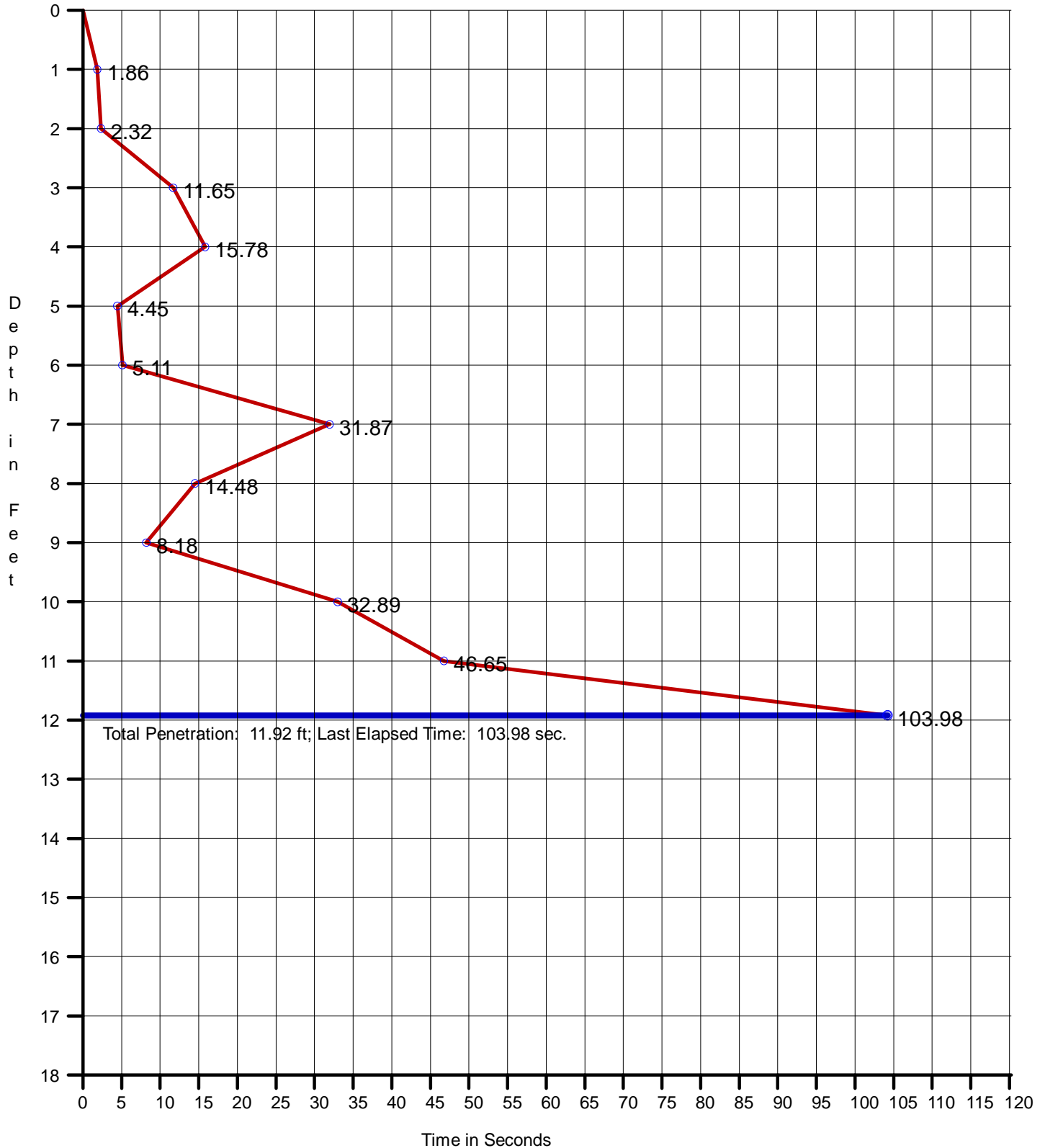
Date: 12/19/2011
Start Time: 9:55:38 AM
End Time: 10:00:18 AM

Penetration: 11.92 ft
Recovery: 12.70 ft
W. D. Corrected: 48.36 ft
W. D. Raw: 46.84 ft

Easting: 2587775.24
Northing: 330265.08
Coord. System: NCSPCS 83

Long: 77°02'44.5380"W
Lat: 034°38'29.5920"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y153, Run 1

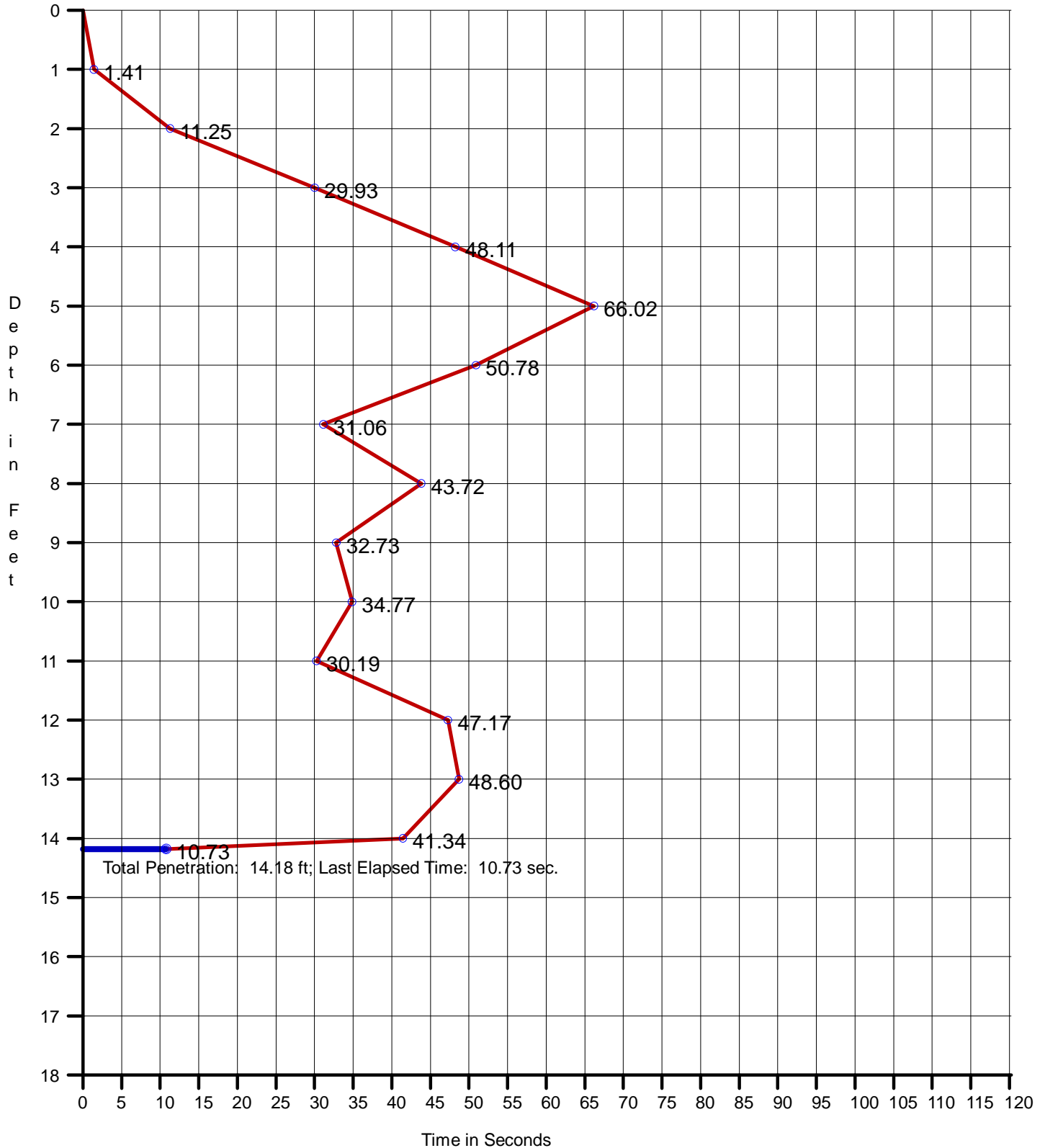
Date: 12/19/2011
Start Time: 7:26:20 AM
End Time: 7:35:08 AM

Penetration: 14.18 ft
Recovery: 17.00 ft
W. D. Corrected: 51.85 ft
W. D. Raw: 50.17 ft

Easting: 2588649.74
Northing: 324001.20
Coord. System: NCSPCS 83

Long: 77°02'35.5500"W
Lat: 034°37'27.4740"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y154, Run 1

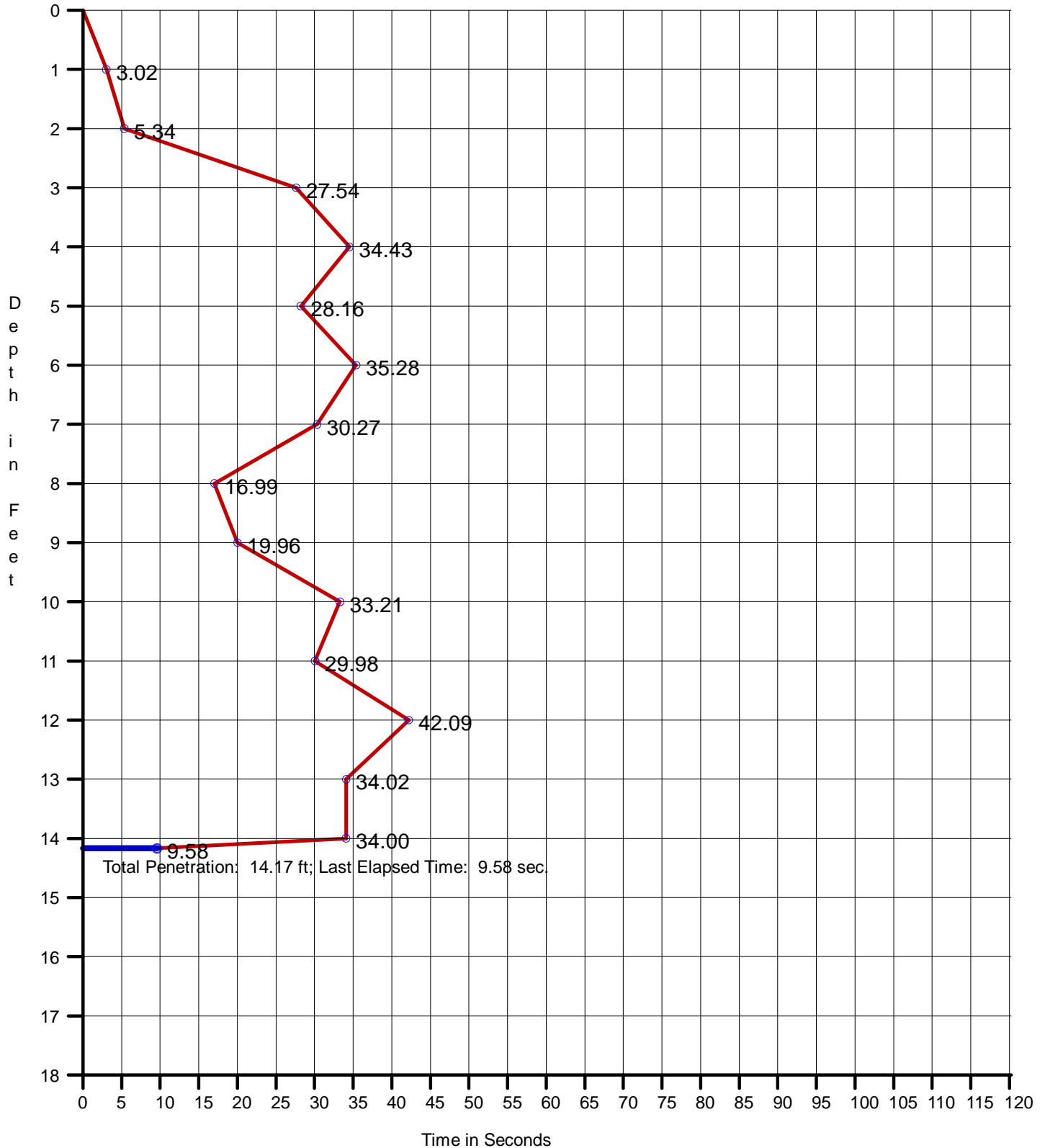
Date: 12/19/2011
Start Time: 9:21:23 AM
End Time: 9:27:47 AM

Penetration: 14.17 ft
Recovery: 16.50 ft
W. D. Corrected: 51.33 ft
W. D. Raw: 49.65 ft

Easting: 2589546.48
Northing: 324444.93
Coord. System: NCSPCS 83

Long: 77°02'24.7140"W
Lat: 034°37'31.6860"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y156, Run 2

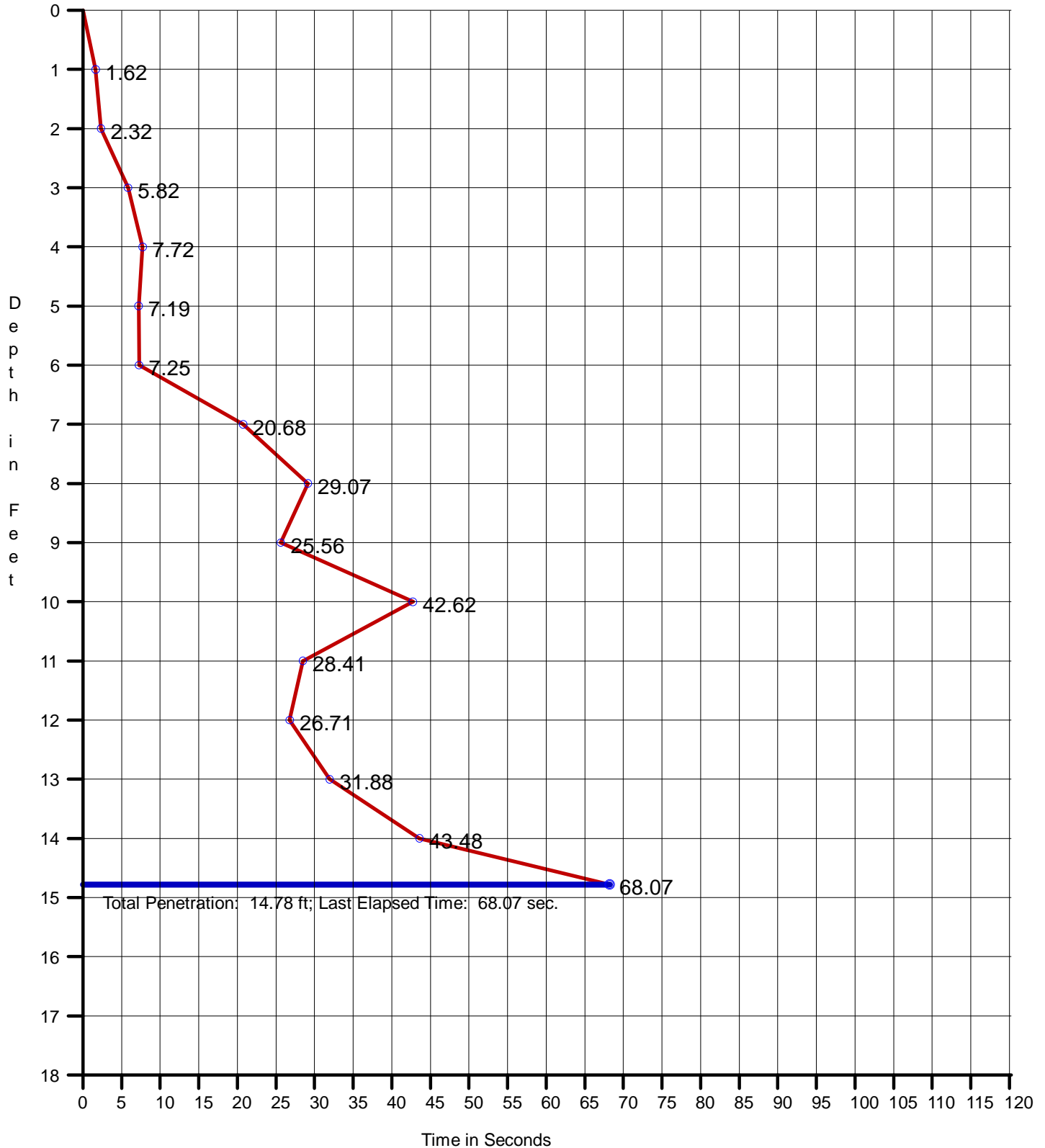
Date: 12/18/2011
Start Time: 3:41:05 PM
End Time: 3:46:53 PM

Penetration: 14.78 ft
Recovery: 17.50 ft
W. D. Corrected: 52.05 ft
W. D. Raw: 51.65 ft

Easting: 2588204.18
Northing: 322660.91
Coord. System: NCSPCS 83

Long: 77°02'41.1960"W
Lat: 034°37'14.3040"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y157, Run 1

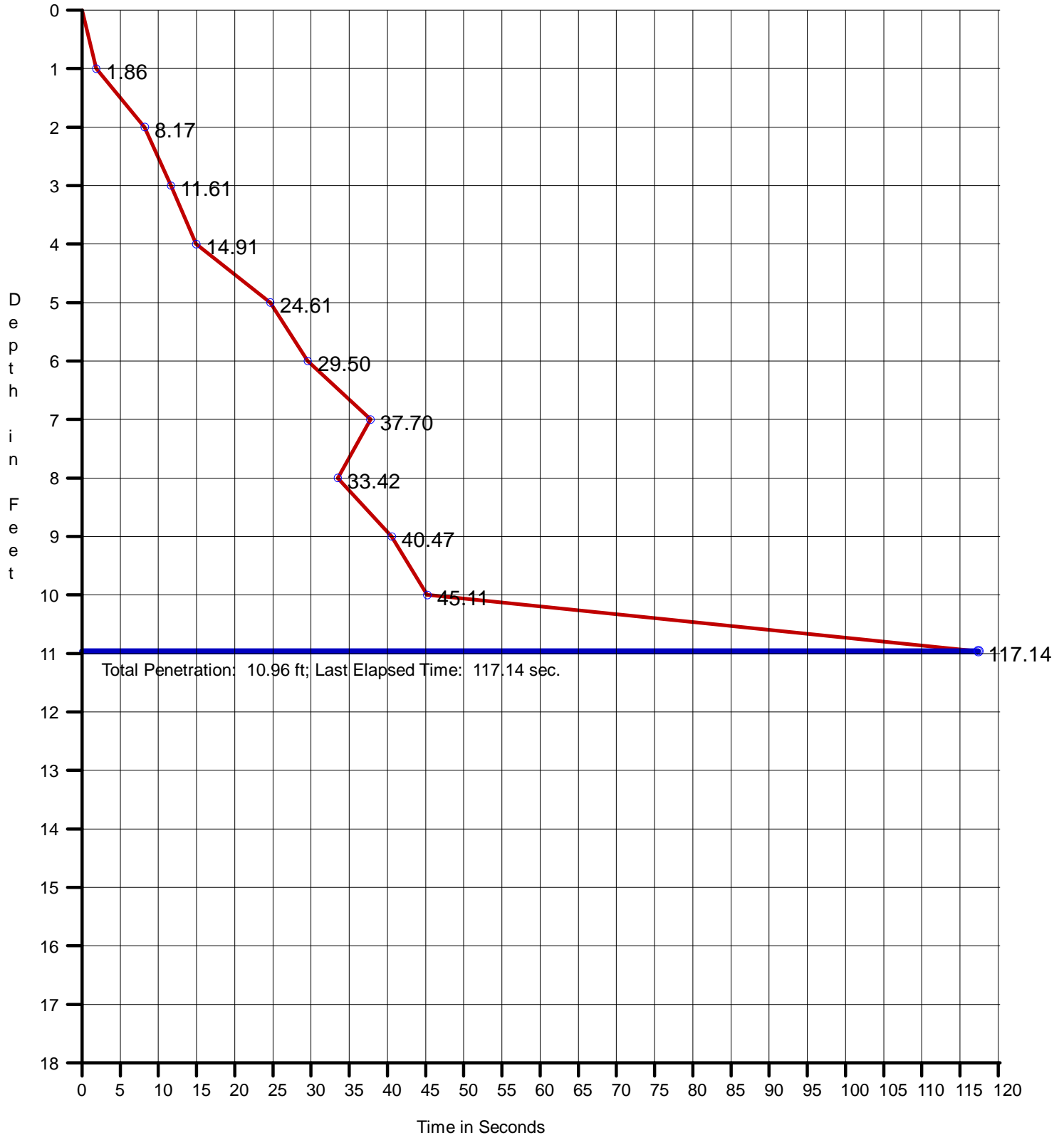
Date: 12/18/2011
Start Time: 5:00:25 PM
End Time: 5:06:30 PM

Penetration: 10.96 ft
Recovery: 13.20 ft
W. D. Corrected: 52.80 ft
W. D. Raw: 51.59 ft

Easting: 2589989.21
Northing: 323550.81
Coord. System: NCSPCS 83

Long: 77°02'19.6320"W
Lat: 034°37'22.7580"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y158, Run 1

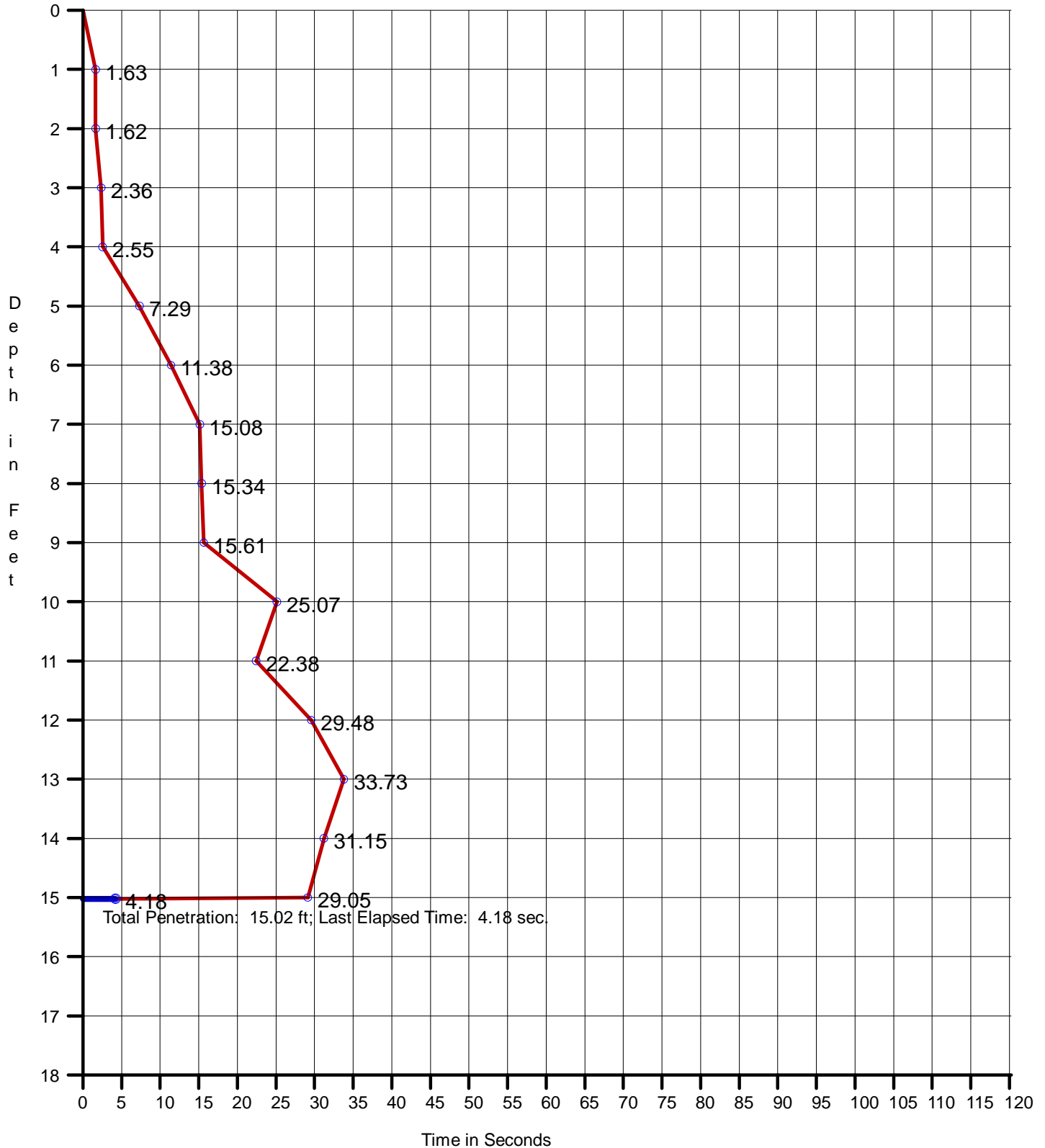
Date: 12/18/2011
Start Time: 2:22:41 PM
End Time: 2:26:48 PM

Penetration: 15.02 ft
Recovery: 18.50 ft
W. D. Corrected: 52.85 ft
W. D. Raw: 53.12 ft

Easting: 2587744.80
Northing: 321321.56
Coord. System: NCSPCS 83

Long: 77°02'47.0040"W
Lat: 034°37'01.1460"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Y160, Run 1

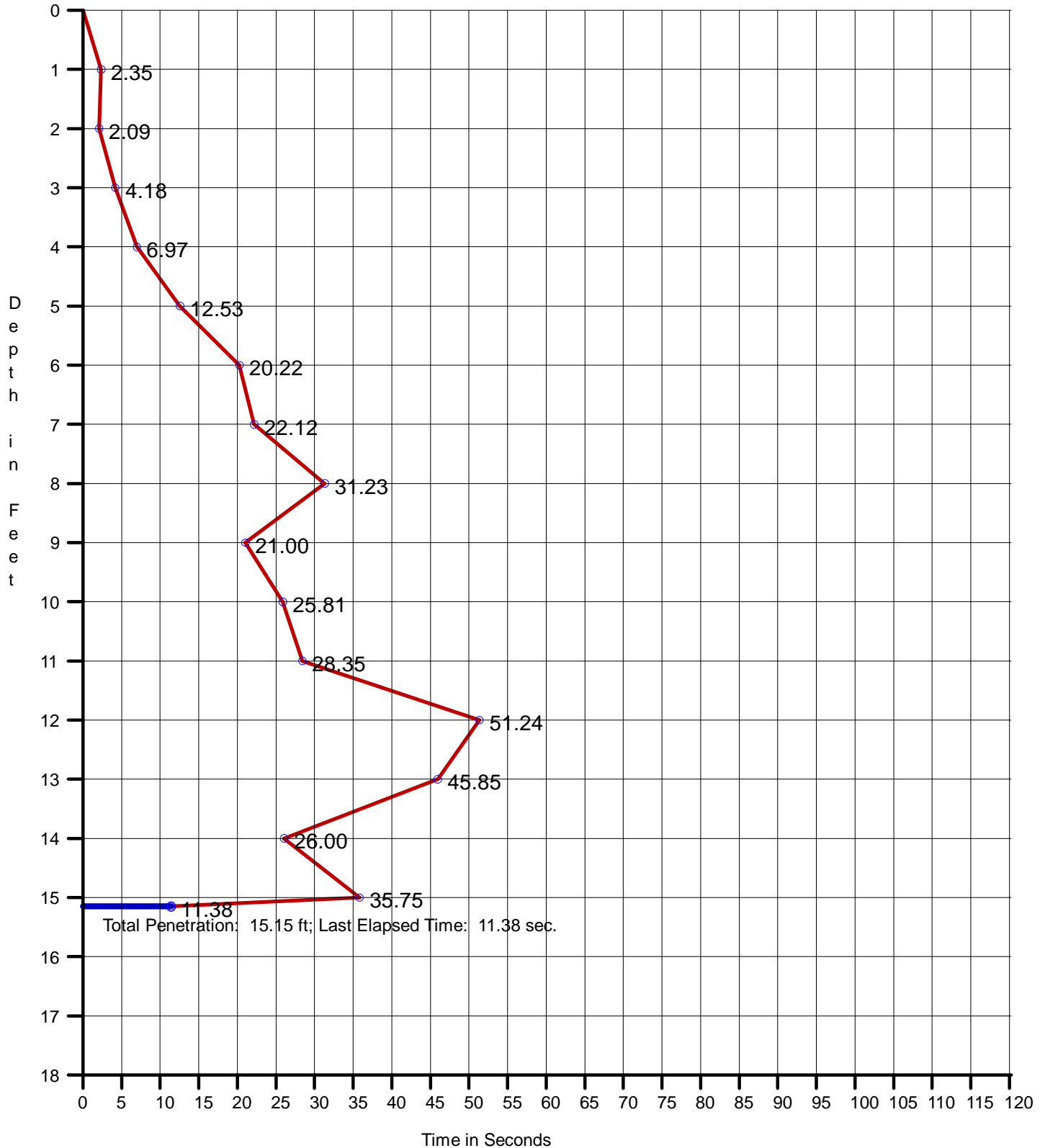
Date: 12/18/2011
Start Time: 4:12:53 PM
End Time: 4:18:40 PM

Penetration: 15.15 ft
Recovery: 17.00 ft
W. D. Corrected: 52.31 ft
W. D. Raw: 51.58 ft

Easting: 2589535.99
Northing: 322210.10
Coord. System: NCSPCS 83

Long: 77°02'25.3680"W
Lat: 034°37'09.5880"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z165, Run 1

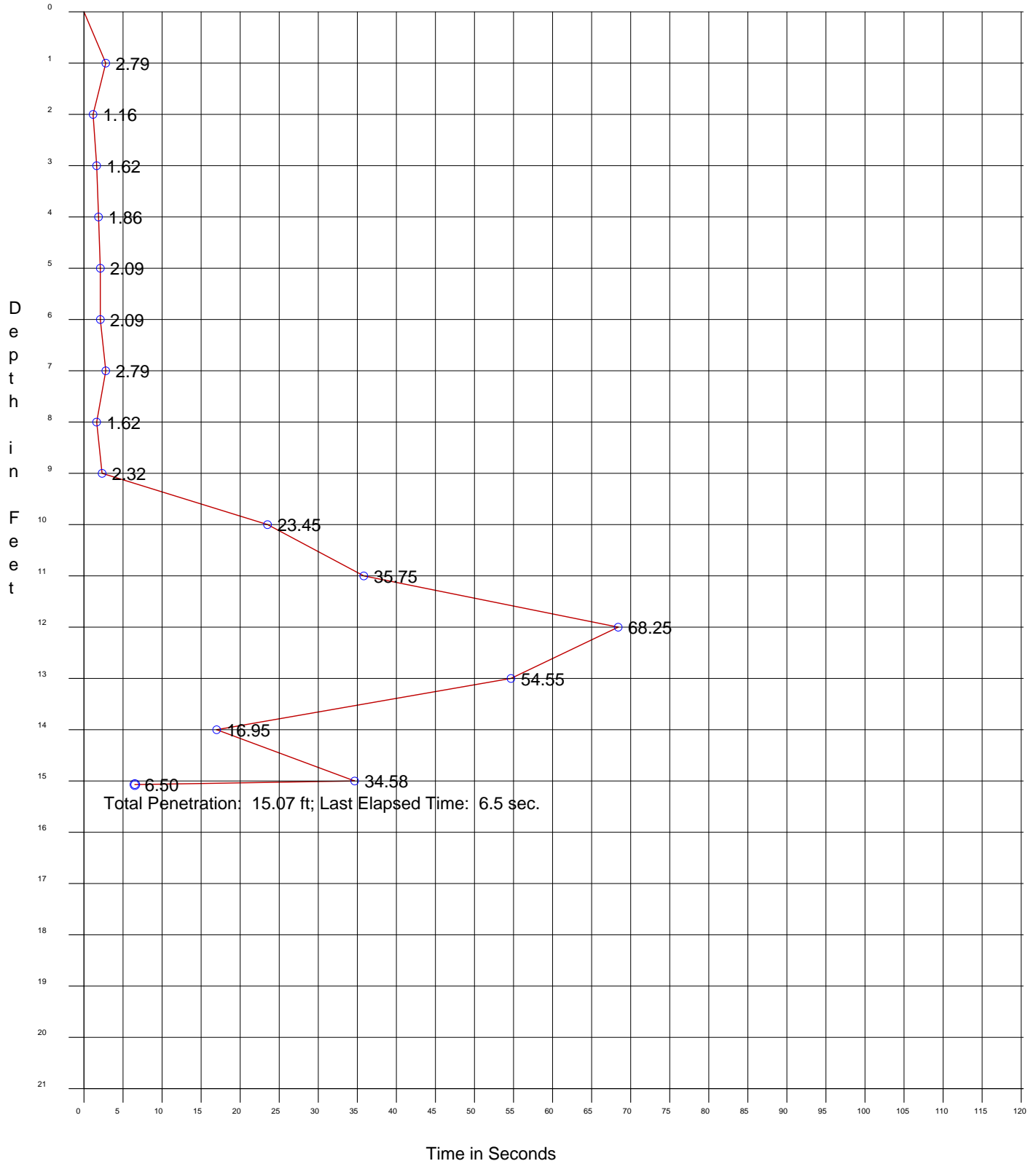
Date: 12/16/2011
Start Time: 12:48:19 PM
End Time: 12:52:37 PM

Penetration: 15.07 ft
Recovery: 14.17 ft
W. D. Corrected: 42.57 ft
W. D. Raw: 42.78 ft

Easting: 2562508.97
Northing: 321709.82
Coord. System: NCSPCS 83

Long: 77°07'48.8220" W
Lat: 034°37'09.7920" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z166, Run 1

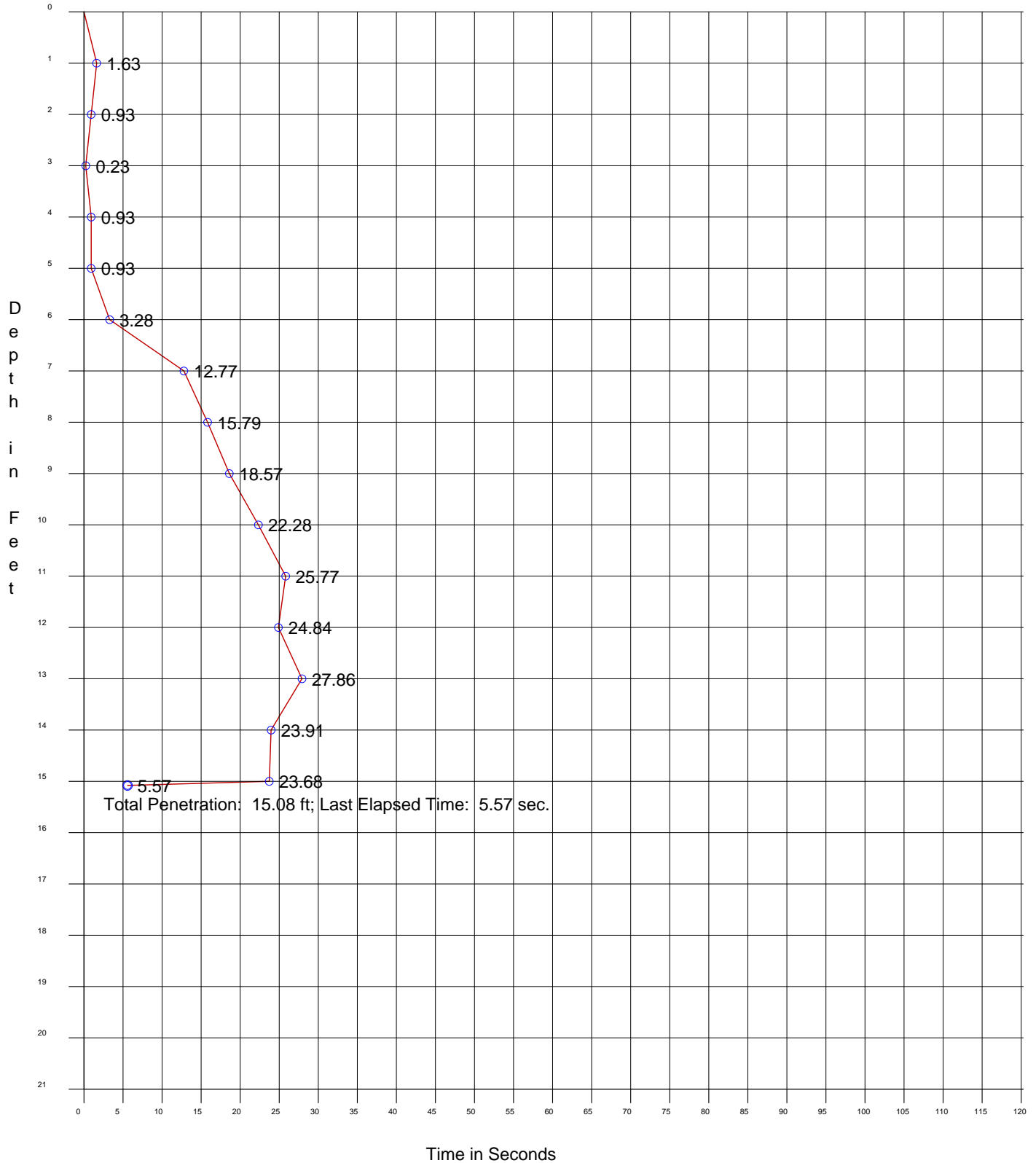
Date: 12/16/2011
Start Time: 12:19:35 PM
End Time: 12:23:04 PM

Penetration: 15.08 ft
Recovery: 17.80 ft
W. D. Corrected: 44.01 ft
W. D. Raw: 44.51 ft

Easting: 2569560.08
Northing: 323032.70
Coord. System: NCSPCS 83

Long: 77°06'24.1620" W
Lat: 034°37'21.5580" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z166, Run 1

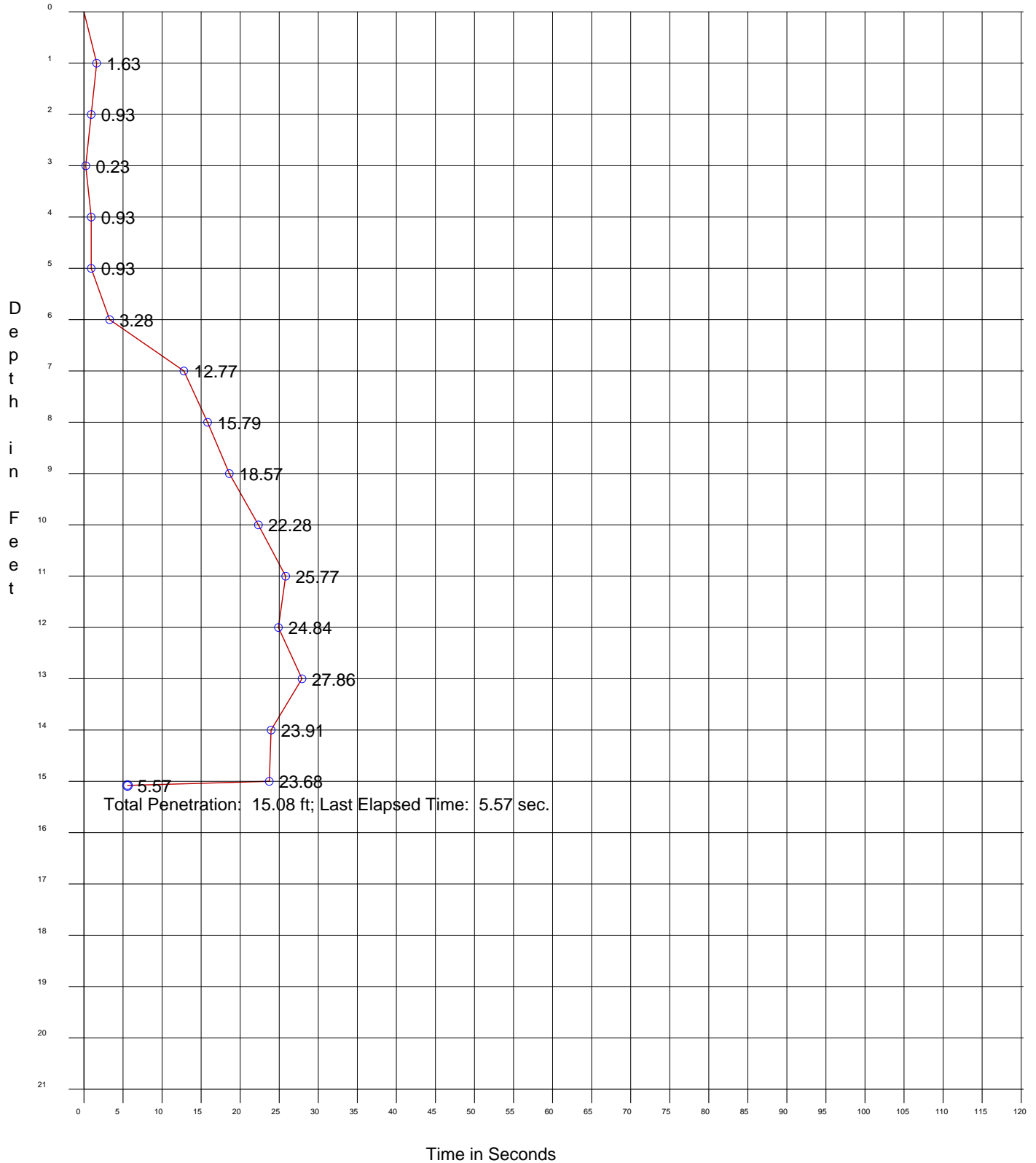
Date: 12/16/2011
Start Time: 12:19:35 PM
End Time: 12:23:04 PM

Penetration: 15.08 ft
Recovery: 17.80 ft
W. D. Corrected: 44.01 ft
W. D. Raw: 44.51 ft

Easting: 2569560.08
Northing: 323032.70
Coord. System: NCSPCS 83

Long: 77°06'24.1620" W
Lat: 034°37'21.5580" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z167, Run 1

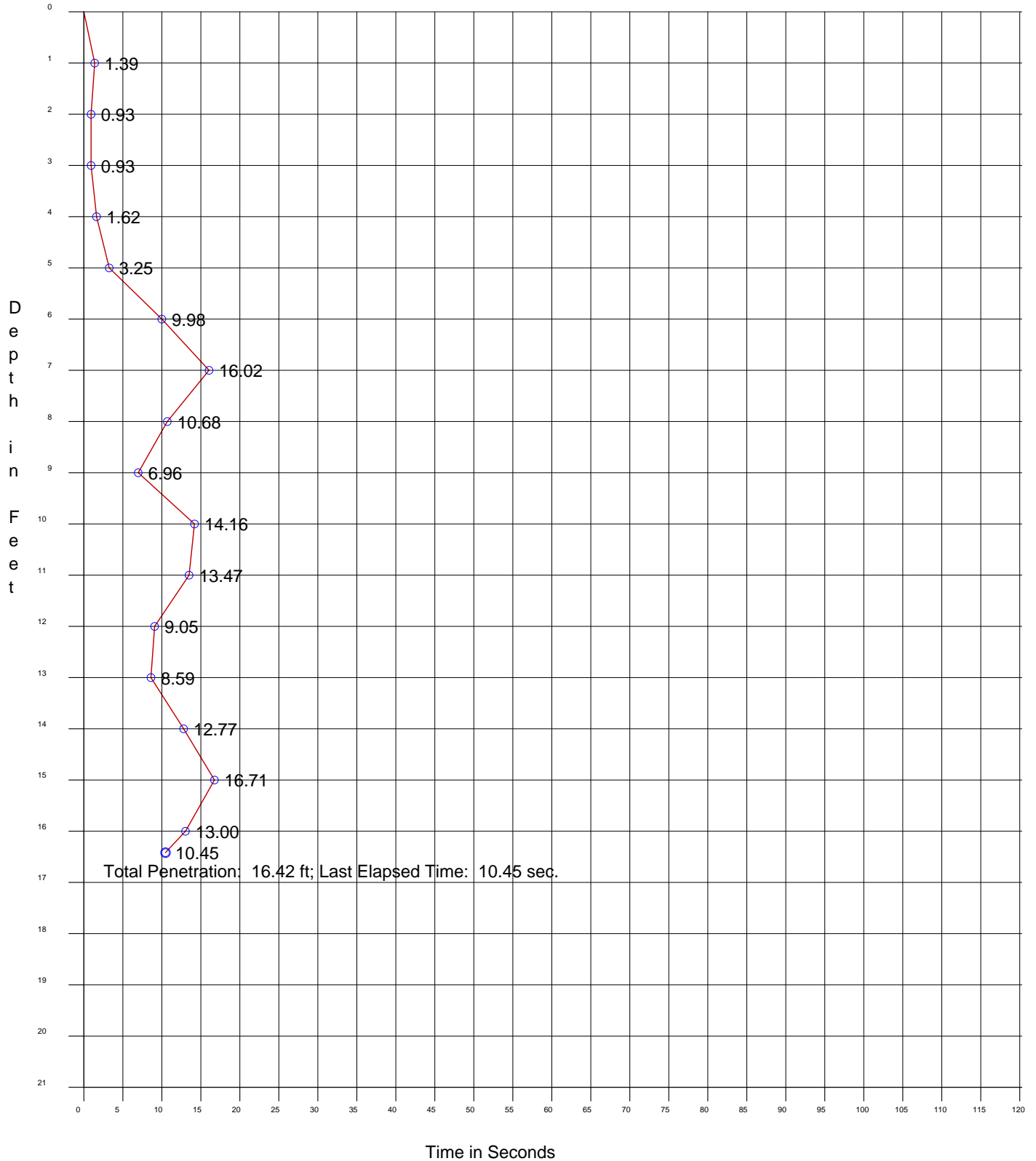
Date: 12/16/2011
Start Time: 11:52:51 AM
End Time: 11:55:21 AM

Penetration: 16.42 ft
Recovery: 15.58 ft
W. D. Corrected: 42.66 ft
W. D. Raw: 43.27 ft

Easting: 2571435.12
Northing: 323719.17
Coord. System: NCSPCS 83

Long: 77°06'01.5720"W
Lat: 034°37'27.9900"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z168, Run 1

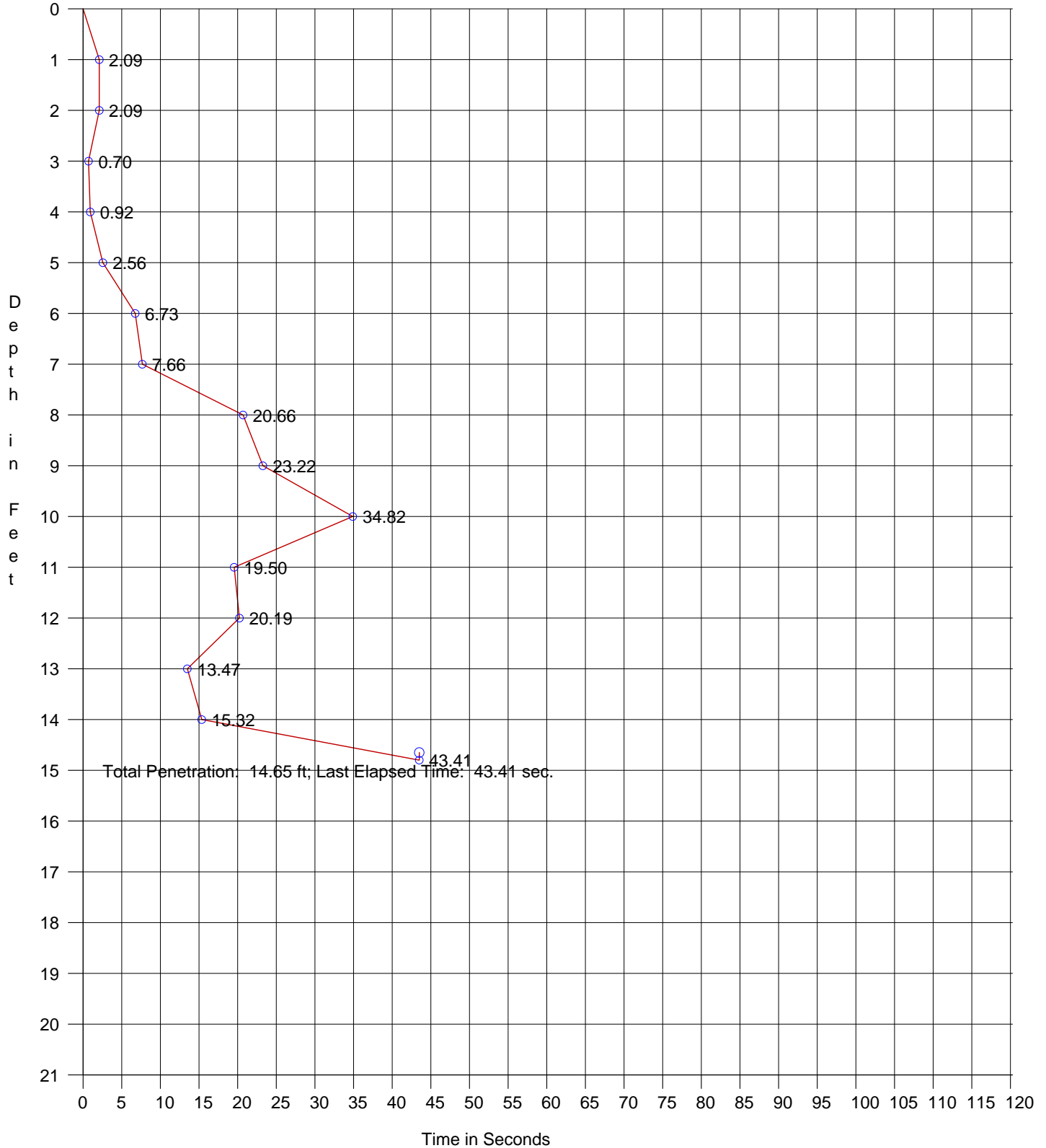
Date: 12/16/2011
Start Time: 11:29:00 AM
End Time: 11:32:33 AM

Penetration: 14.65 ft
Recovery: 16.00 ft
W. D. Corrected: 44.92 ft
W. D. Raw: 45.55 ft

Easting: 2573316.83
Northing: 324420.63
Coord. System: NCSPCS 83

Long: 77°05'38.8980" W
Lat: 034°37'34.5720" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z169, Run 1

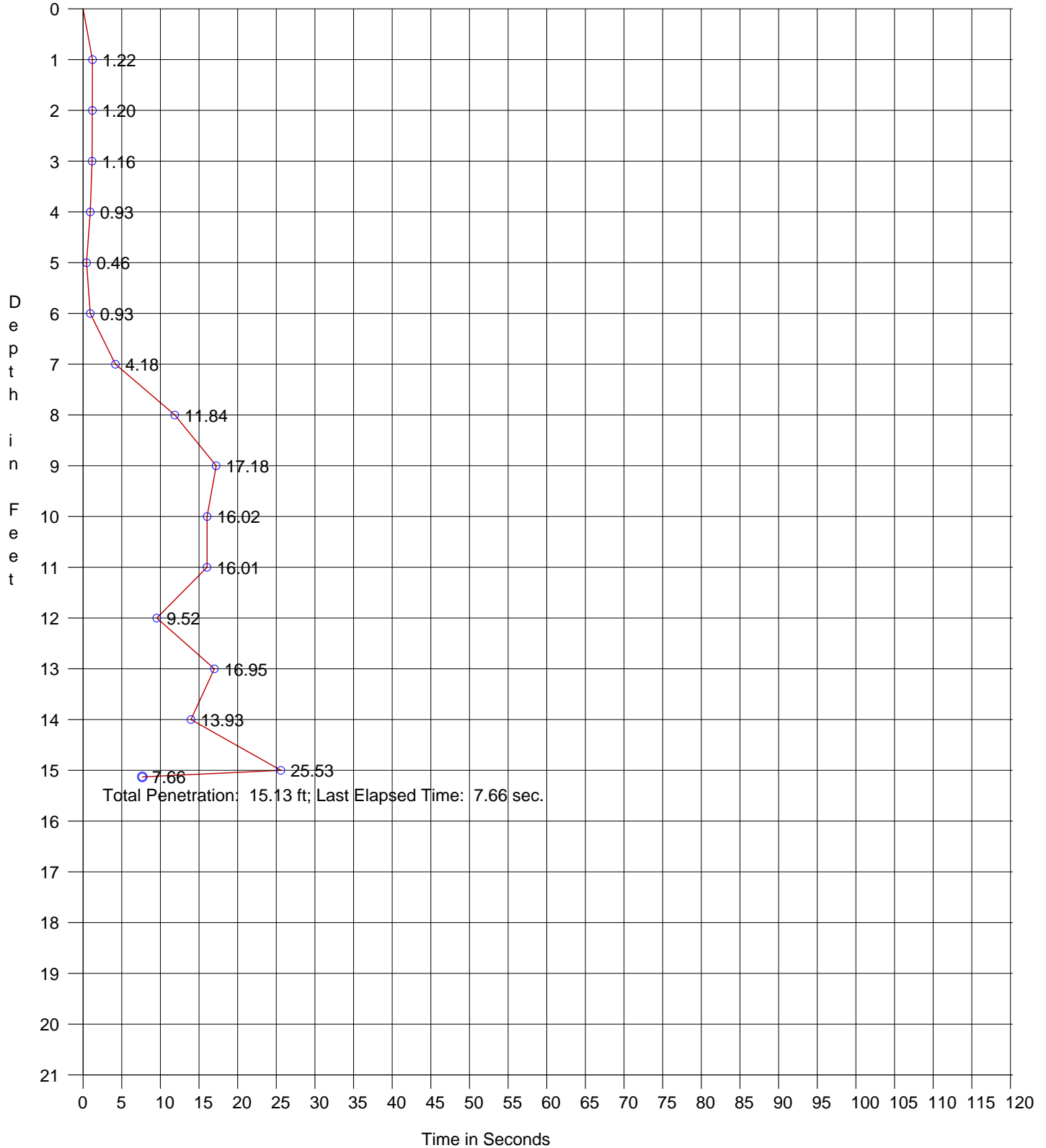
Date: 12/16/2011
Start Time: 11:03:41 AM
End Time: 11:06:08 AM

Penetration: 15.13 ft
Recovery: 17.20 ft
W. D. Corrected: 45.59 ft
W. D. Raw: 46.19 ft

Easting: 2575195.80
Northing: 325102.72
Coord. System: NCSPCS 83

Long: 77°05'16.2600" W
Lat: 034°37'40.9620" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z170, Run 1

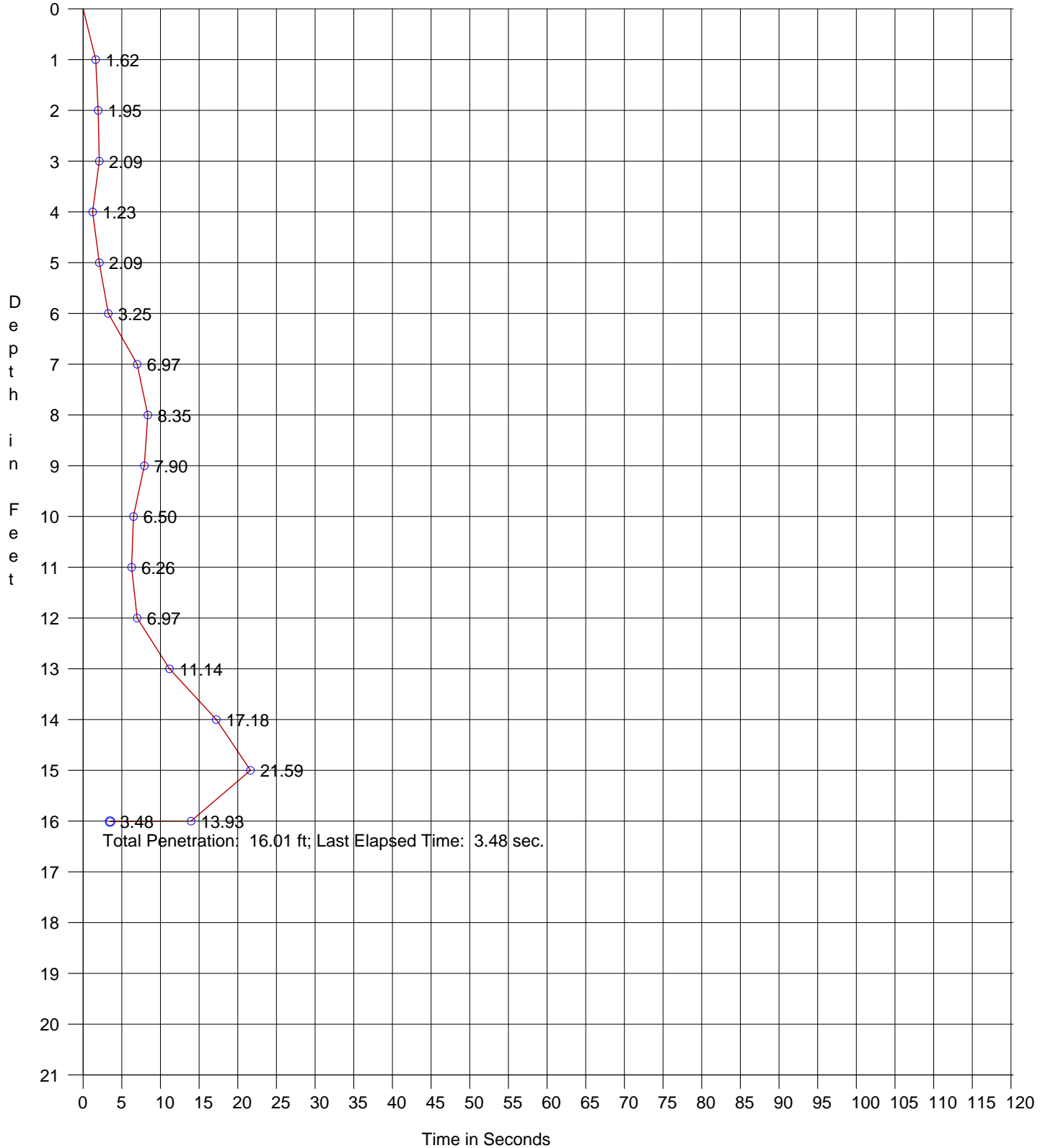
Date: 12/16/2011
Start Time: 10:42:03 AM
End Time: 10:44:07 AM

Penetration: 16.01 ft
Recovery: 17.50 ft
W. D. Corrected: 44.38 ft
W. D. Raw: 44.89 ft

Easting: 2577075.50
Northing: 325791.59
Coord. System: NCSPCS 83

Long: 77°04'53.6100"W
Lat: 034°37'47.4120"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z171, Run 1

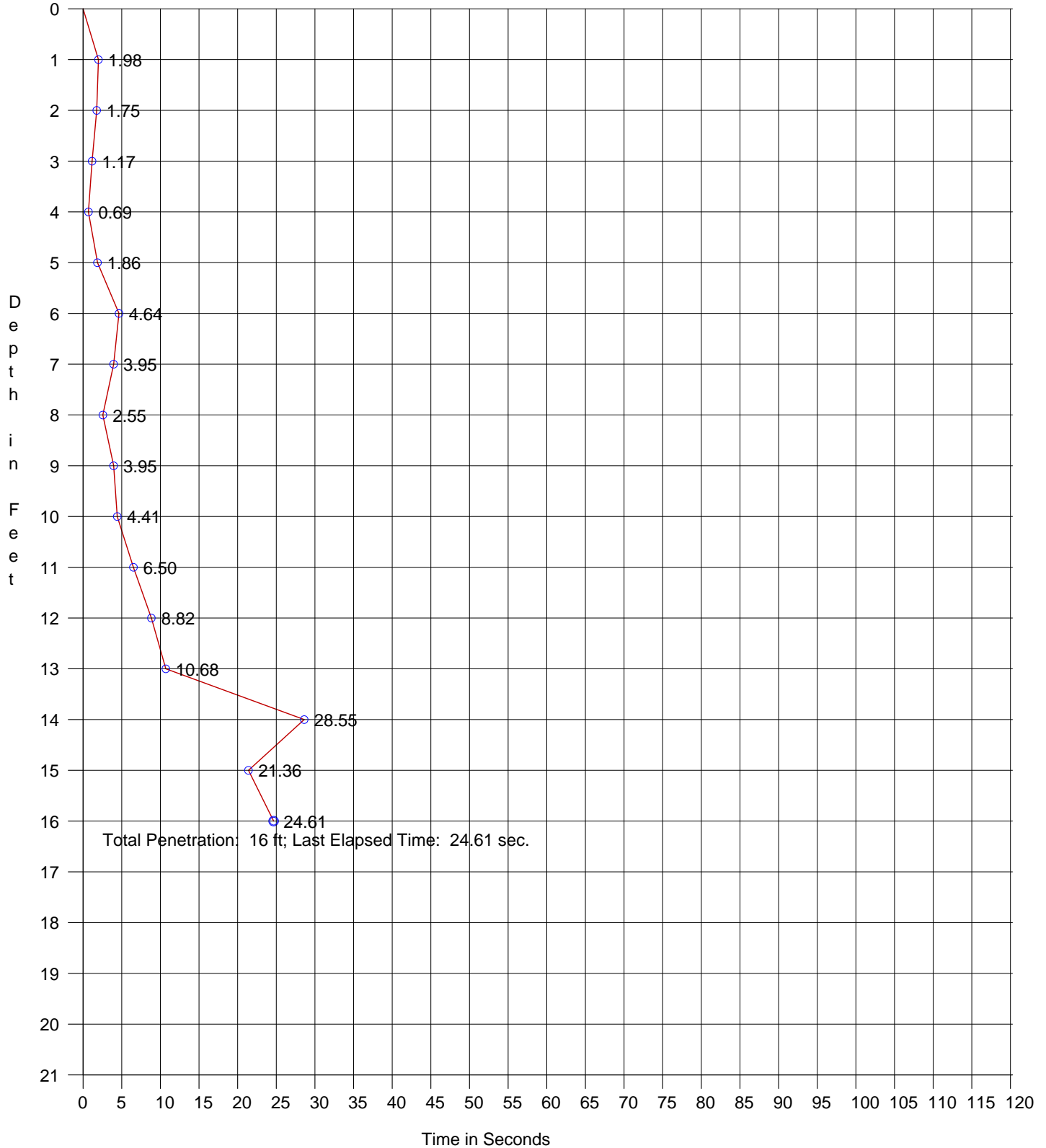
Date: 12/16/2011
Start Time: 10:23:34 AM
End Time: 10:25:48 AM

Penetration: 16.00 ft
Recovery: 17.70 ft
W. D. Corrected: 45.42 ft
W. D. Raw: 45.84 ft

Easting: 2578951.87
Northing: 326487.83
Coord. System: NCSPCS 83

Long: 77°04'30.9960" W
Lat: 034°37'53.9400" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z172, Run 1

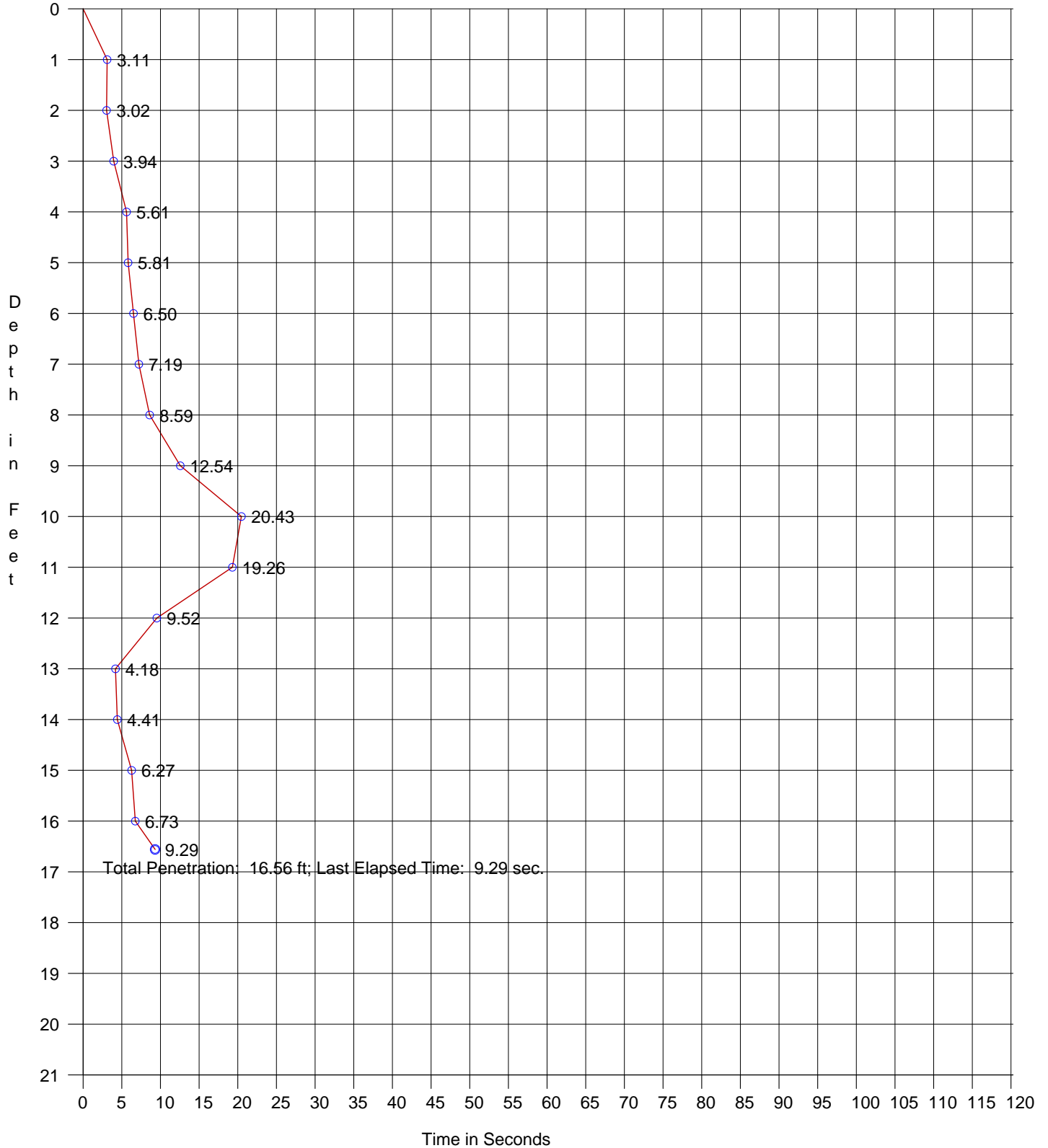
Date: 12/16/2011
Start Time: 10:00:38 AM
End Time: 10:03:03 AM

Penetration: 16.56 ft
Recovery: 19.00 ft
W. D. Corrected: 49.32 ft
W. D. Raw: 49.52 ft

Easting: 2580828.45
Northing: 327167.92
Coord. System: NCSPCS 83

Long: 77°04'08.3880"W
Lat: 034°38'00.3060"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z173, Run 1

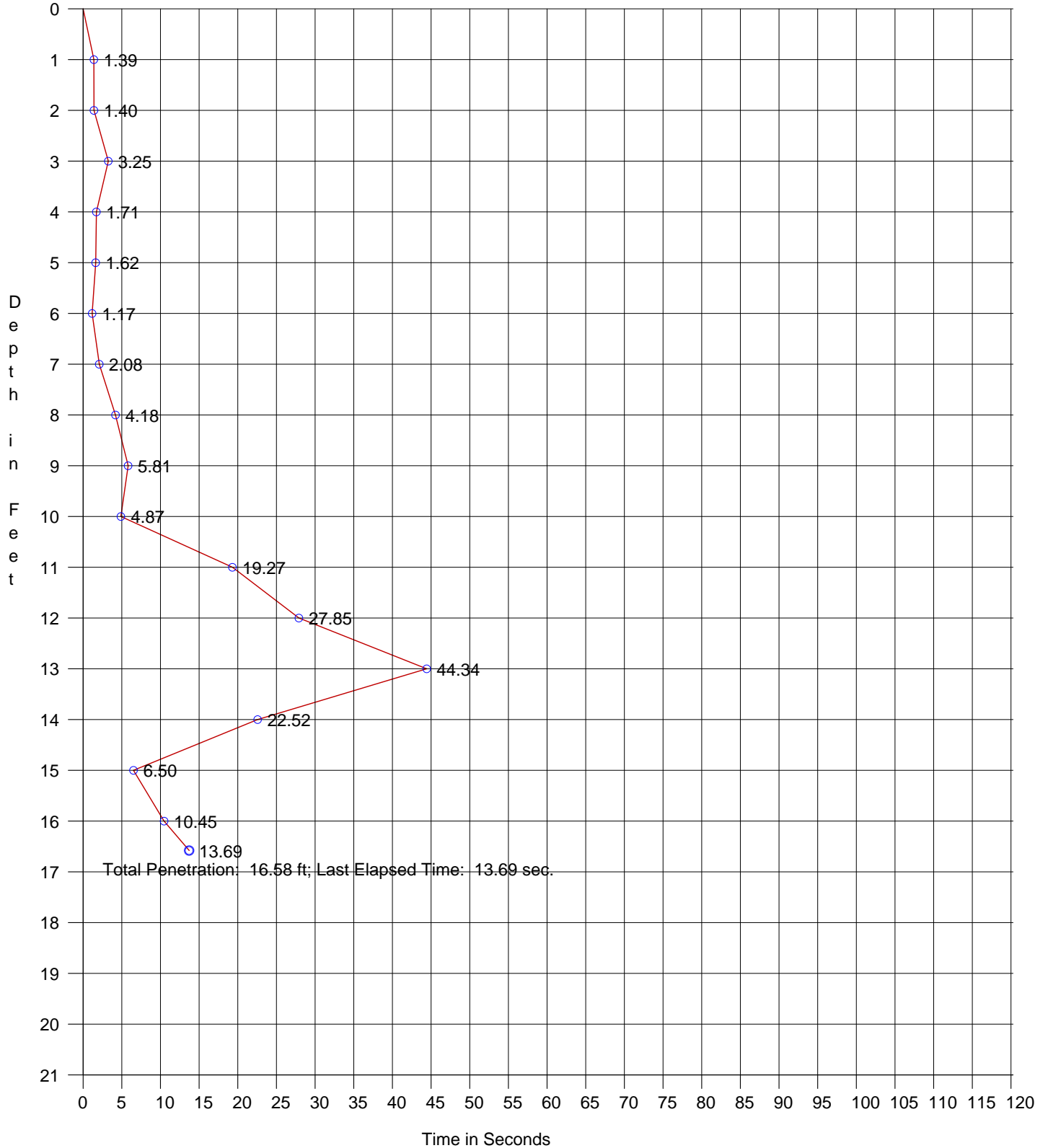
Date: 12/16/2011
Start Time: 1:39:41 PM
End Time: 1:42:33 PM

Penetration: 16.58 ft
Recovery: 17.50 ft
W. D. Corrected: 45.85 ft
W. D. Raw: 45.41 ft

Easting: 2563517.85
Northing: 321406.63
Coord. System: NCSPCS 83

Long: 77°07'36.8160"W
Lat: 034°37'06.6060"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z174, Run 1

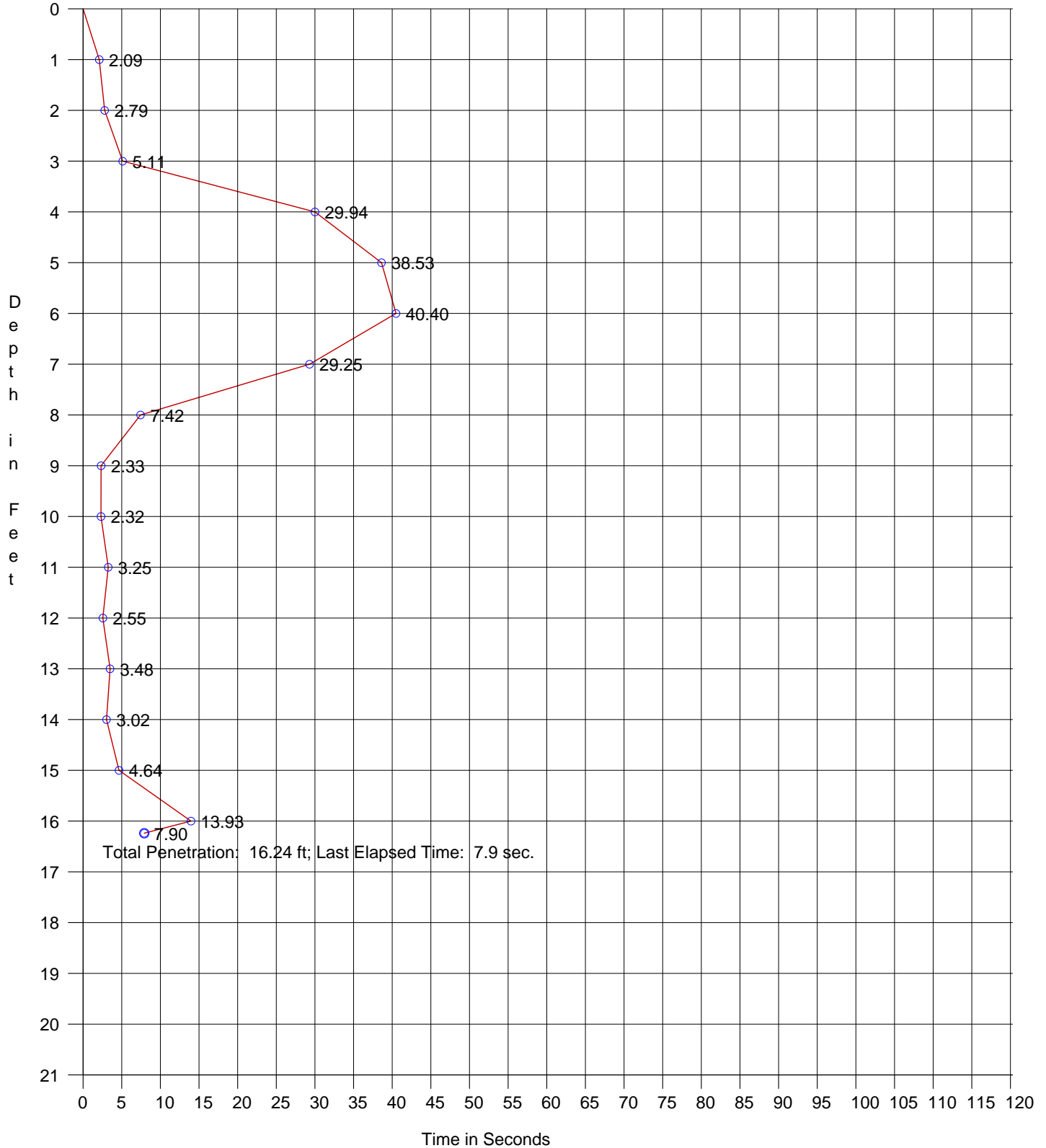
Date: 12/16/2011
Start Time: 2:03:27 PM
End Time: 2:06:46 PM

Penetration: 16.24 ft
Recovery: 18.30 ft
W. D. Corrected: 45.09 ft
W. D. Raw: 44.36 ft

Easting: 2566100.86
Northing: 321757.27
Coord. System: NCSPCS 83

Long: 77°07'05.8380" W
Lat: 034°37'09.5940" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z175, Run 1

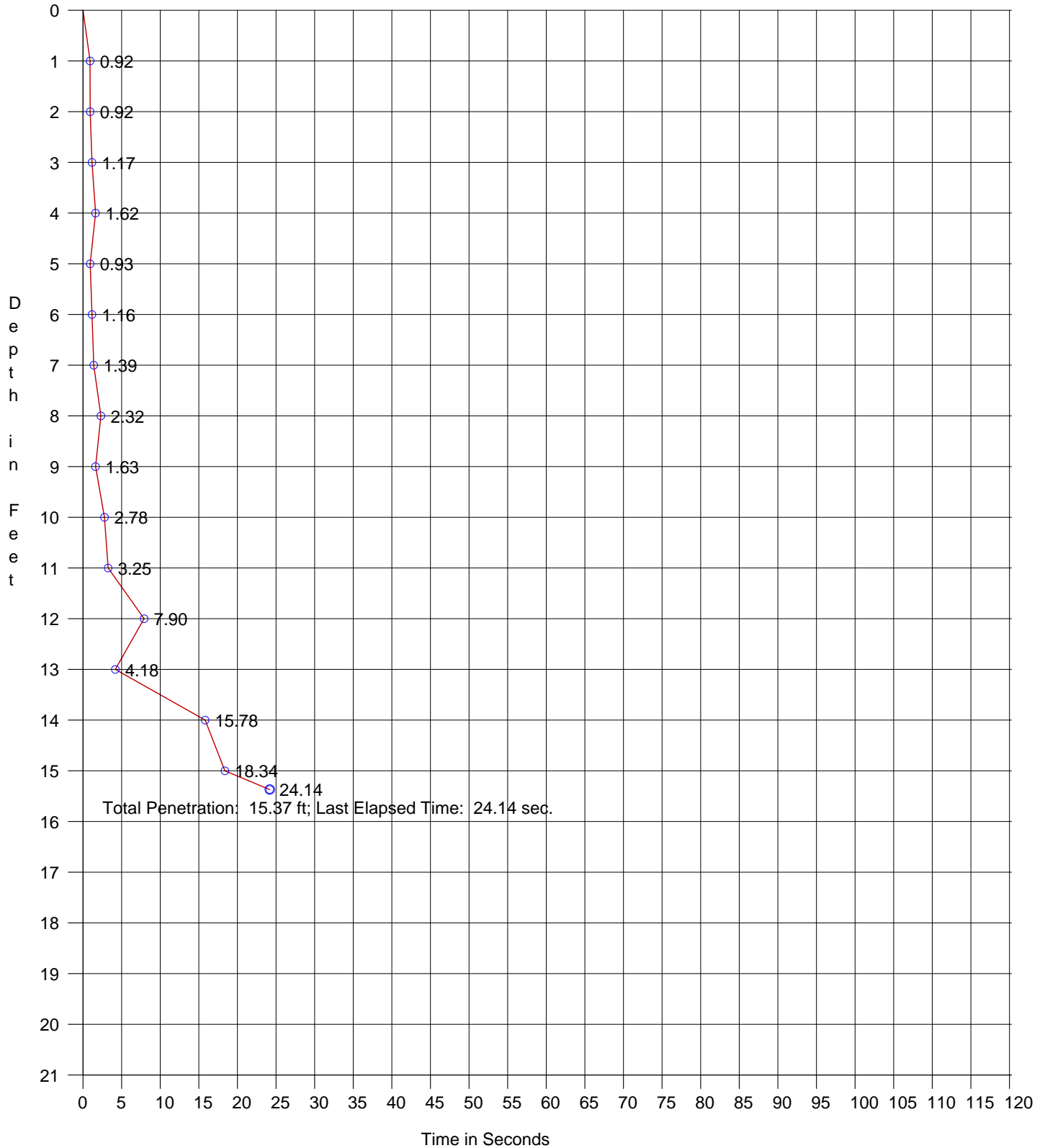
Date: 12/16/2011
Start Time: 3:12:51 PM
End Time: 3:14:21 PM

Penetration: 15.37 ft
Recovery: 13.83 ft
W. D. Corrected: 44.07 ft
W. D. Raw: 42.61 ft

Easting: 2568624.35
Northing: 322687.40
Coord. System: NCSPCS 83

Long: 77°06'35.4360" W
Lat: 034°37'18.3180" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z176, Run 1

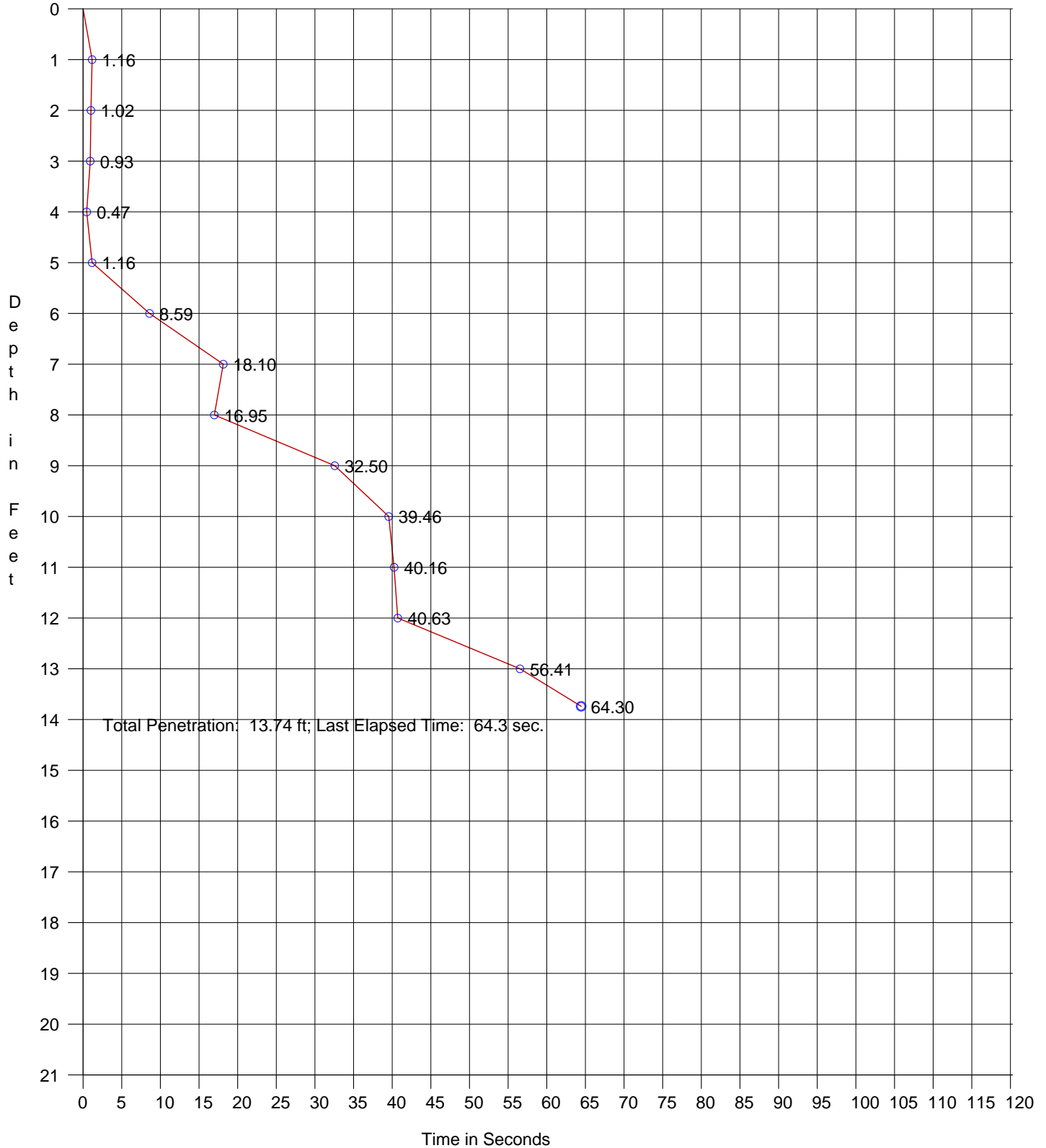
Date: 12/16/2011
Start Time: 3:31:49 PM
End Time: 3:37:12 PM

Penetration: 13.74 ft
Recovery: 18.00 ft
W. D. Corrected: 42.21 ft
W. D. Raw: 40.55 ft

Easting: 2570499.82
Northing: 323378.84
Coord. System: NCSPCS 83

Long: 77°06'12.8400" W
Lat: 034°37'24.8040" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z177, Run 1

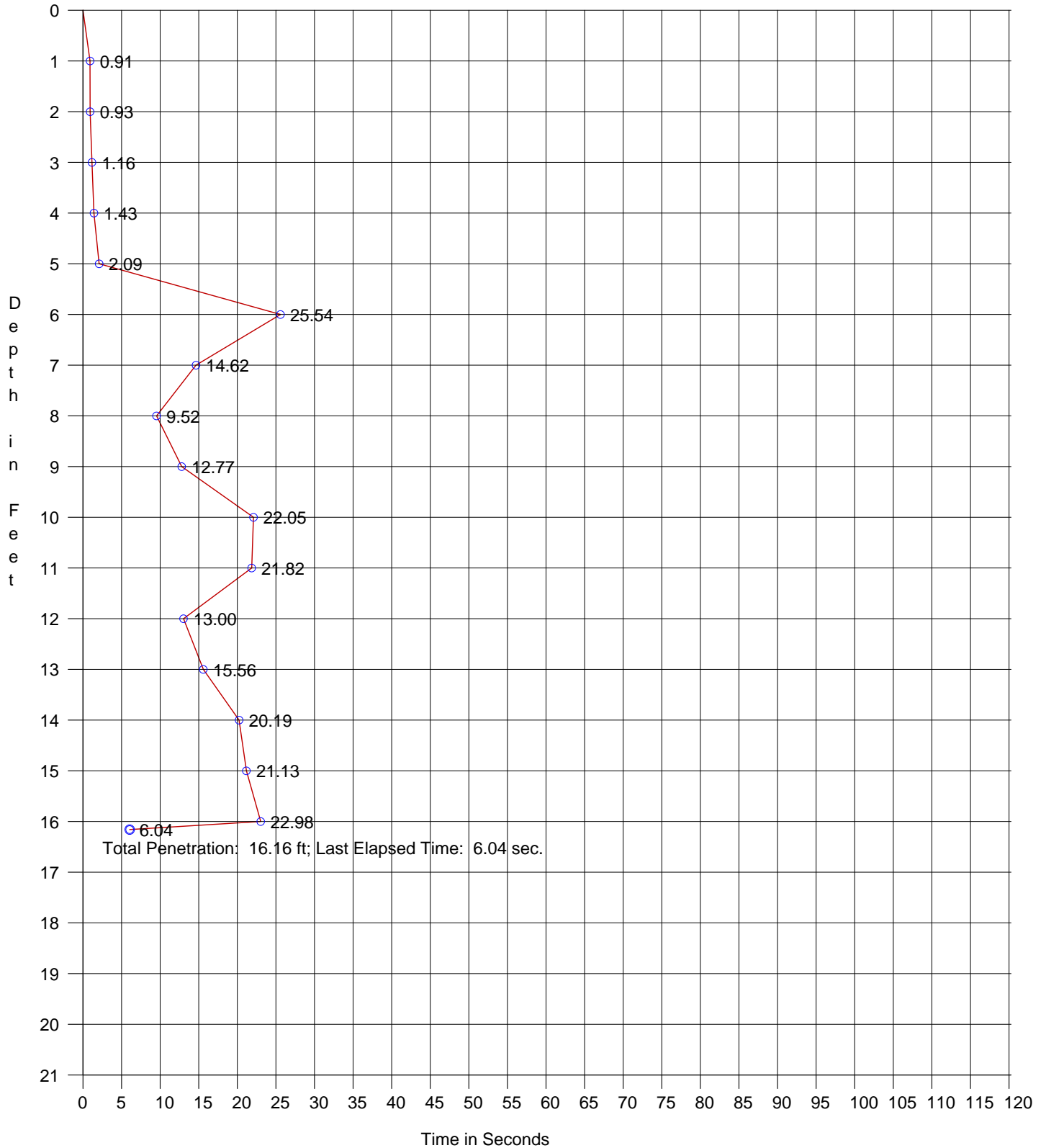
Date: 12/16/2011
Start Time: 3:57:11 PM
End Time: 4:00:44 PM

Penetration: 16.16 ft
Recovery: 20.00 ft
W. D. Corrected: 42.97 ft
W. D. Raw: 41.08 ft

Easting: 2572380.24
Northing: 324063.63
Coord. System: NCSPCS 83

Long: 77°05'50.1840" W
Lat: 034°37'31.2180" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z178, Run 1

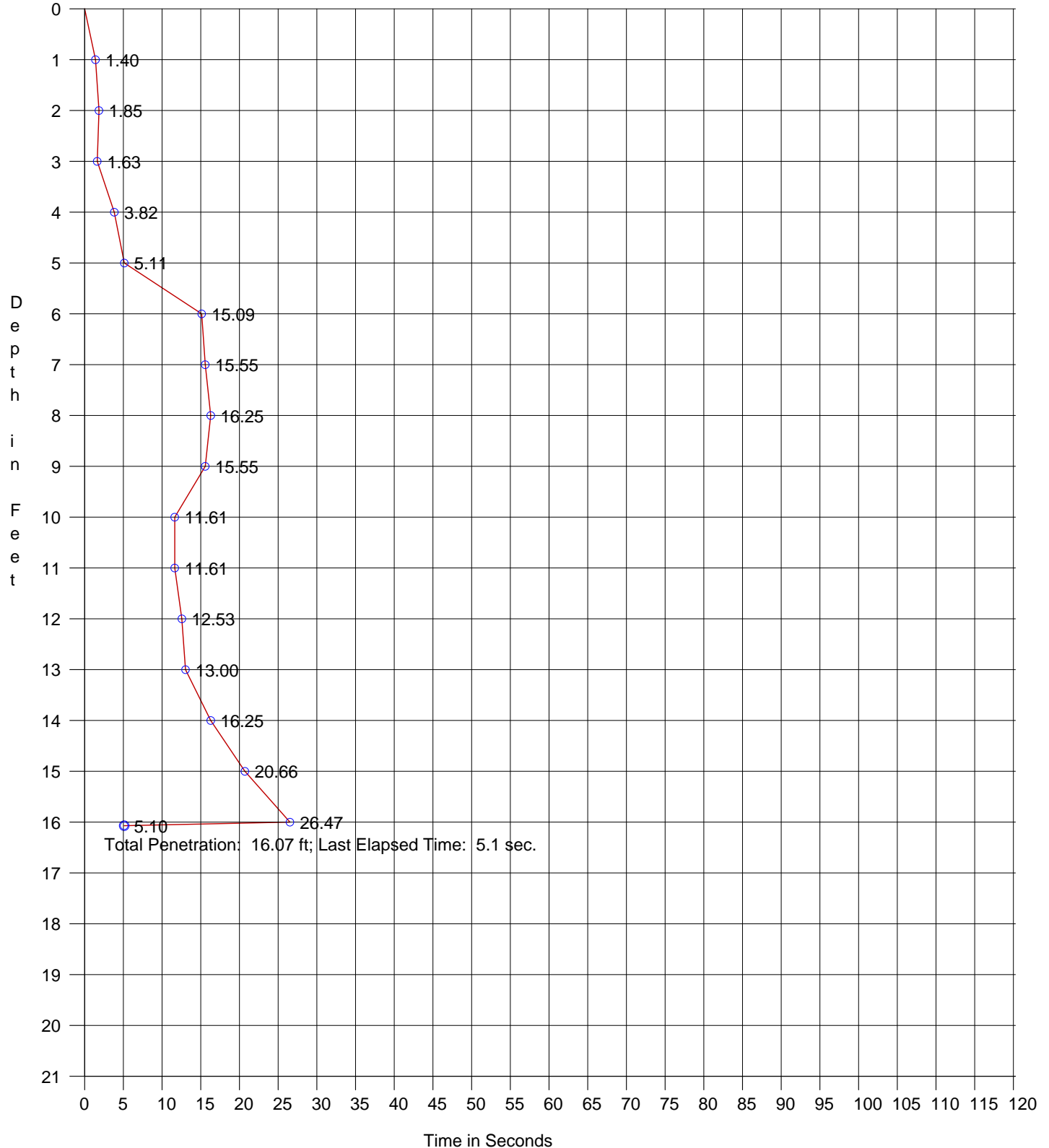
Date: 12/16/2011
Start Time: 4:21:44 PM
End Time: 4:24:57 PM

Penetration: 16.07 ft
Recovery: 20.00 ft
W. D. Corrected: 43.53 ft
W. D. Raw: 41.44 ft

Easting: 2574256.62
Northing: 324762.36
Coord. System: NCSPCS 83

Long: 77°05'27.5760" W
Lat: 034°37'37.7760" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z179, Run 1

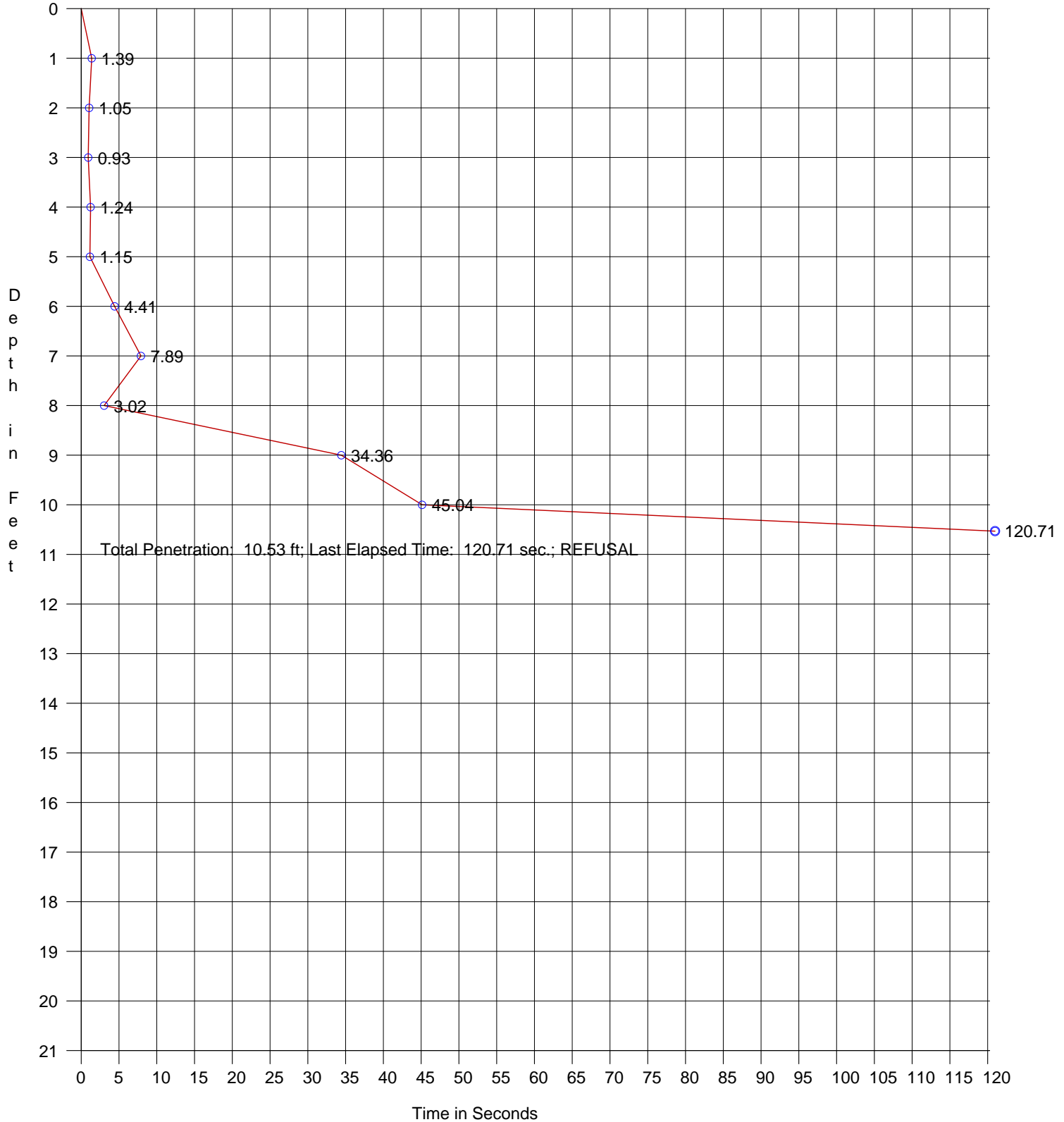
Date: 12/16/2011
Start Time: 4:38:51 PM
End Time: 4:42:33 PM

Penetration: 10.53 ft
Recovery: 10.08 ft
W. D. Corrected: 43.69 ft
W. D. Raw: 0.00 ft

Easting: 2576137.43
Northing: 325450.27
Coord. System: NCSPCS 83

Long: 77°05'04.9140" W
Lat: 034°37'44.2200" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z180, Run 1

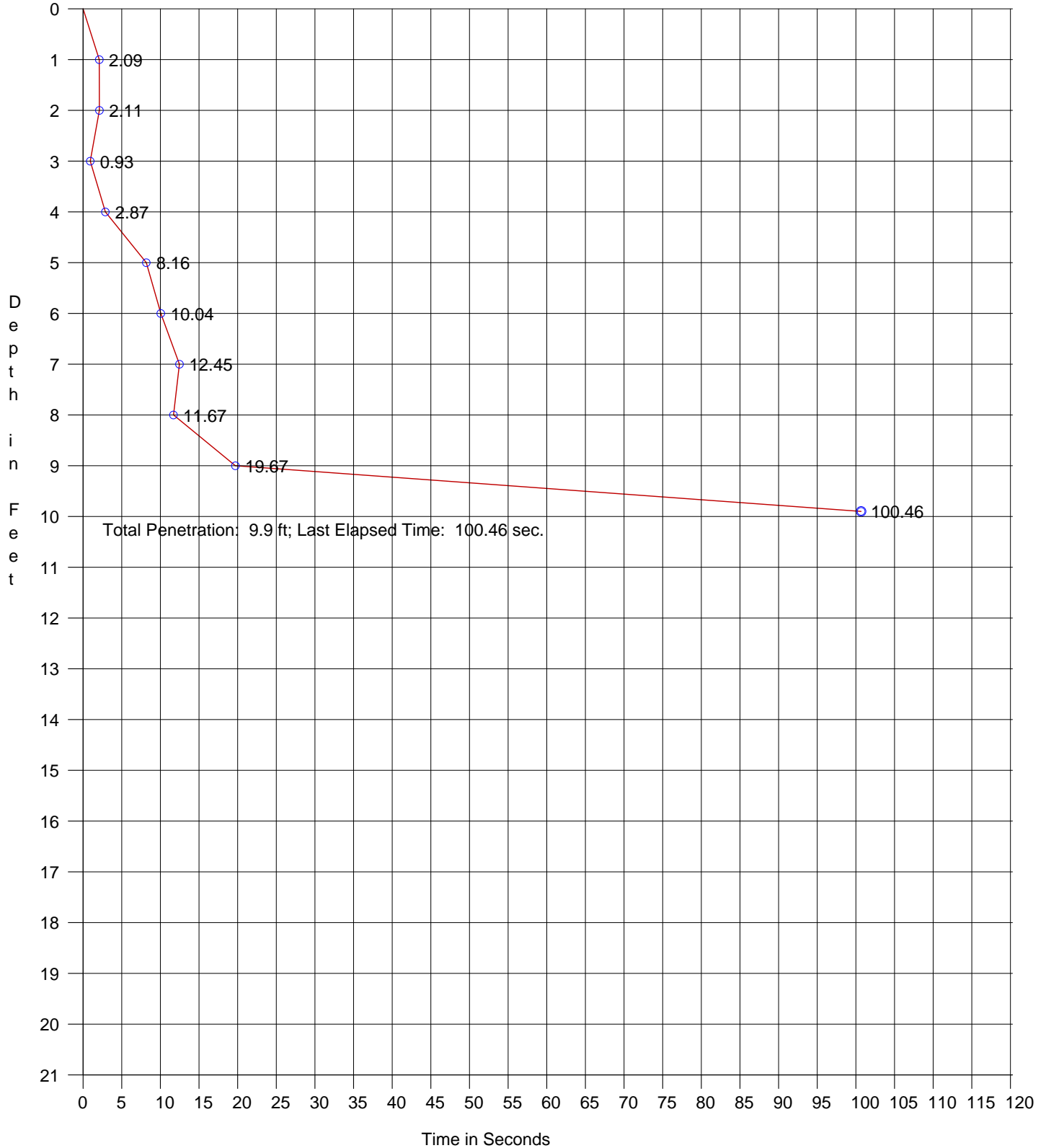
Date: 12/17/2011
Start Time: 7:30:20 AM
End Time: 7:33:10 AM

Penetration: 9.90 ft
Recovery: 9.50 ft
W. D. Corrected: 45.50 ft
W. D. Raw: 43.67 ft

Easting: 2578013.44
Northing: 326133.26
Coord. System: NCSPCS 83

Long: 77°04'42.3060" W
Lat: 034°37'50.6160" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z181, Run 1

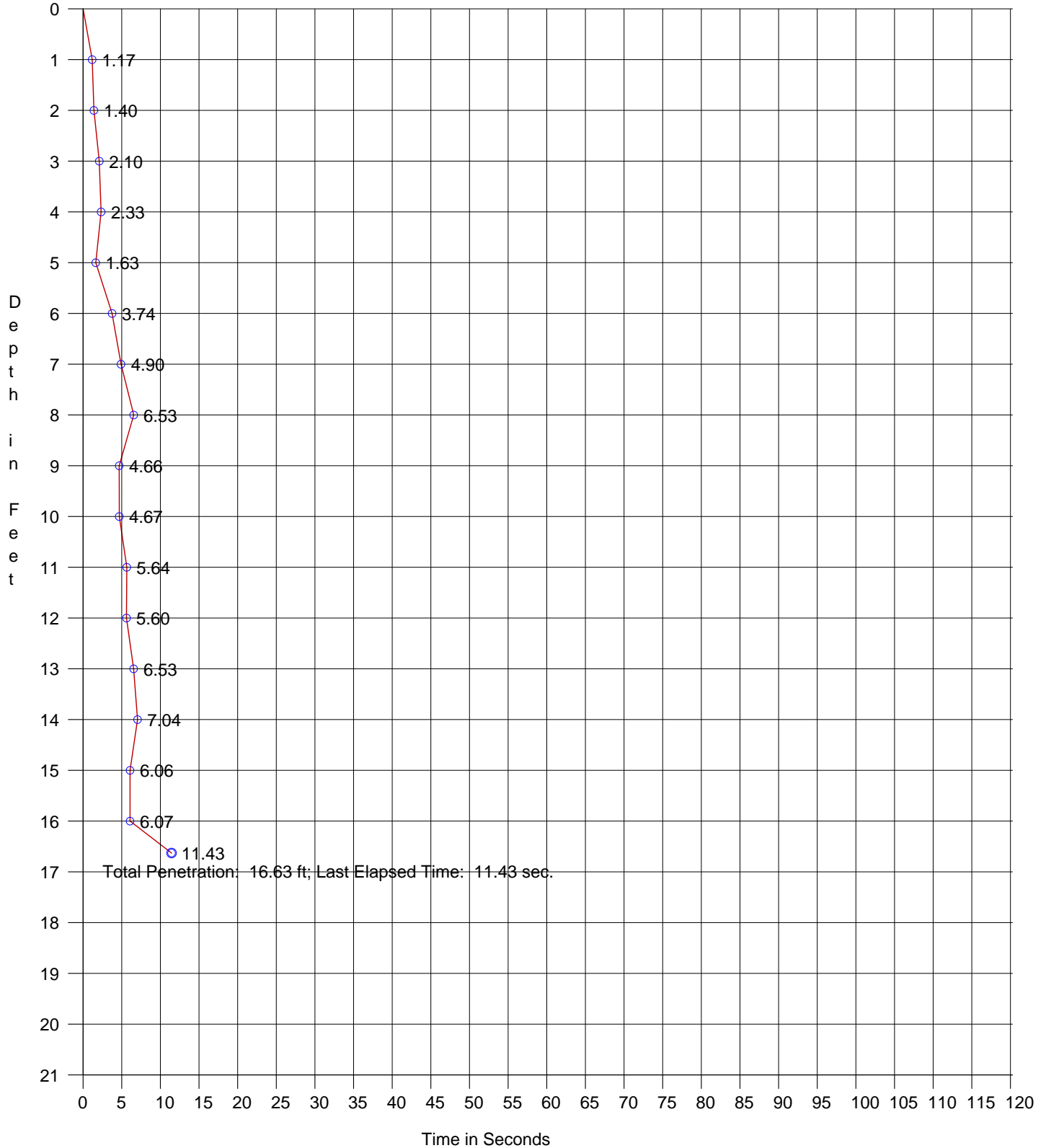
Date: 12/17/2011
Start Time: 7:50:59 AM
End Time: 7:52:20 AM

Penetration: 16.63 ft
Recovery: 16.80 ft
W. D. Corrected: 45.91 ft
W. D. Raw: 44.24 ft

Easting: 2579891.11
Northing: 326828.31
Coord. System: NCSPCS 83

Long: 77°04'19.6800" W
Lat: 034°37'57.1260" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z185, Run 1

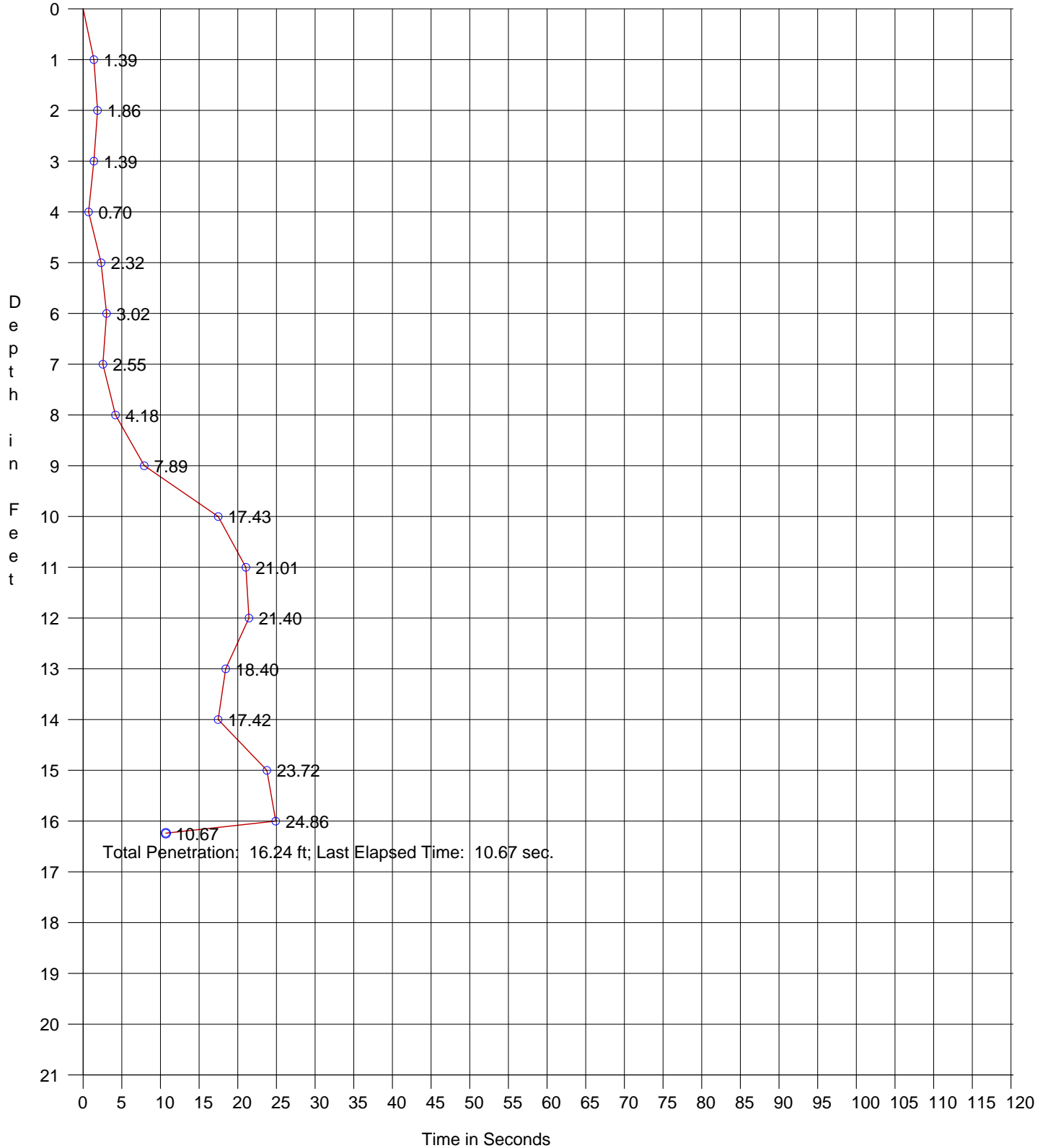
Date: 12/17/2011
Start Time: 2:43:09 PM
End Time: 2:46:09 PM

Penetration: 16.24 ft
Recovery: 19.33 ft
W. D. Corrected: 41.12 ft
W. D. Raw: 40.97 ft

Easting: 2573912.01
Northing: 325692.04
Coord. System: NCSPCS 83

Long: 77°05'31.4820"W
Lat: 034°37'47.0340"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z186, Run 1

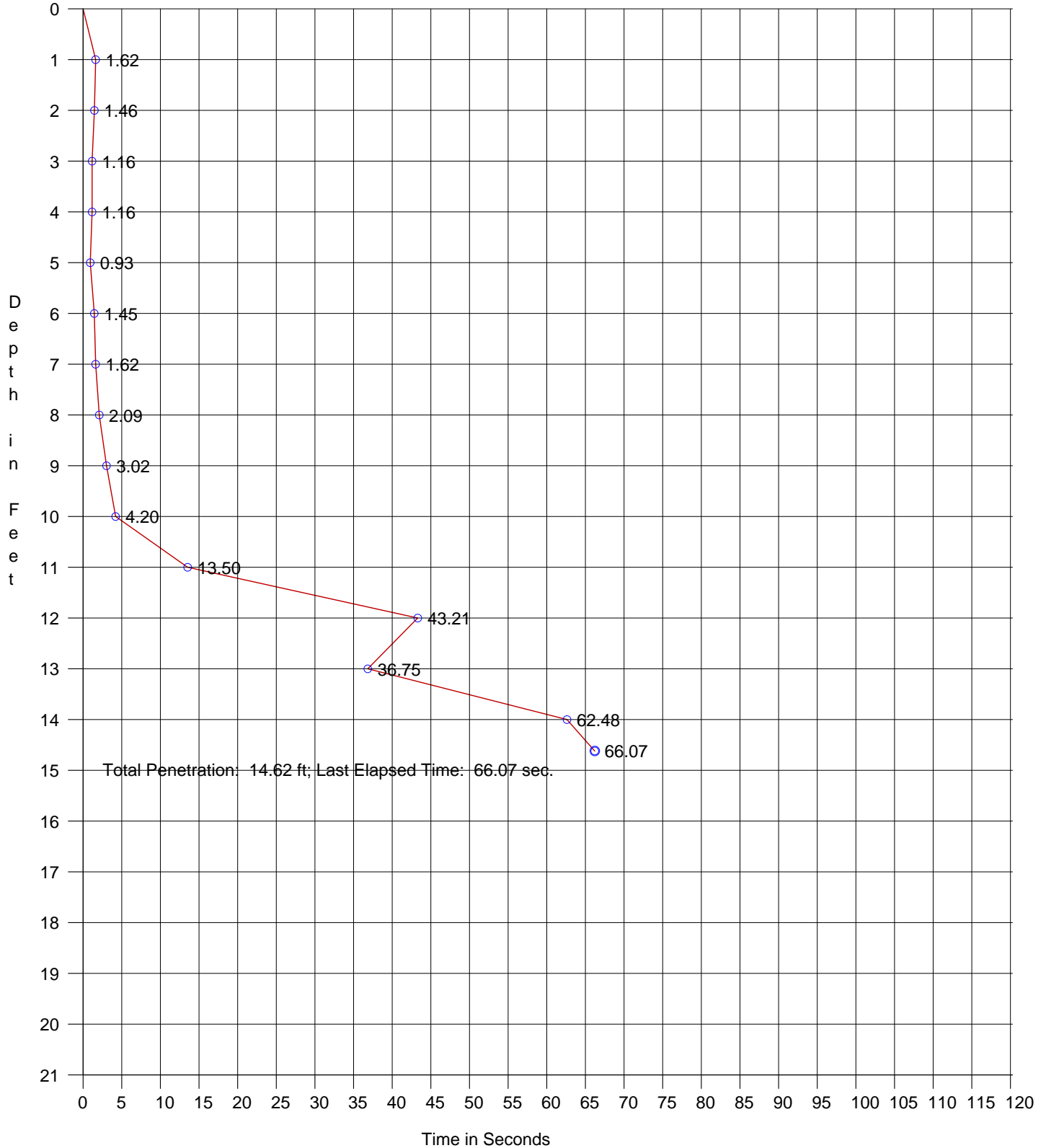
Date: 12/17/2011
Start Time: 10:31:01 AM
End Time: 10:35:02 AM

Penetration: 14.62 ft
Recovery: 15.42 ft
W. D. Corrected: 41.44 ft
W. D. Raw: 41.59 ft

Easting: 2574849.37
Northing: 326037.82
Coord. System: NCSPCS 83

Long: 77°05'20.1900" W
Lat: 034°37'50.2740" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z191, Run 1

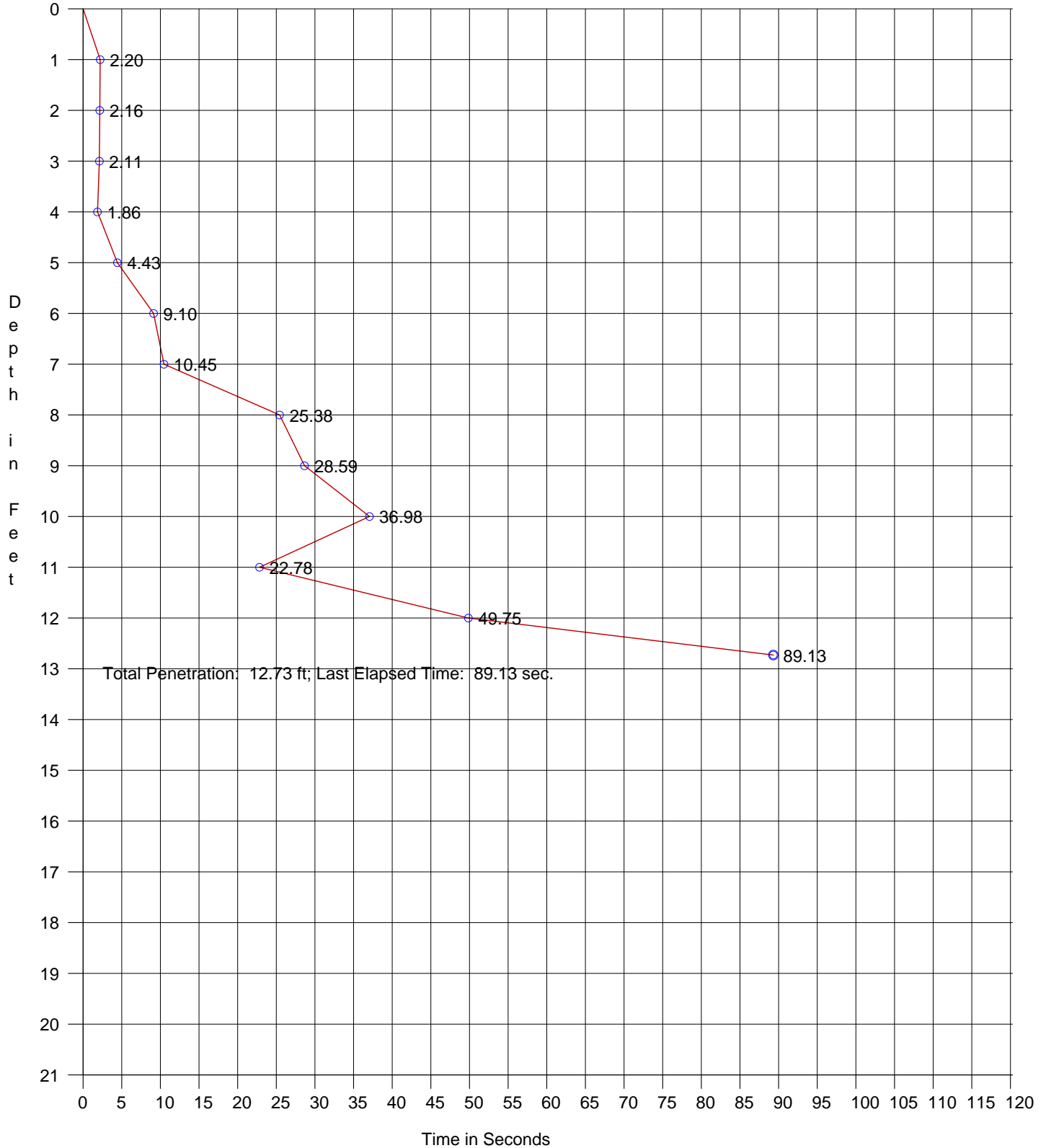
Date: 12/17/2011
Start Time: 10:51:49 AM
End Time: 10:56:38 AM

Penetration: 12.73 ft
Recovery: 15.33 ft
W. D. Corrected: 47.56
W. D. Raw: 47.90 ft

Easting: 2575538.09
Northing: 324167.06
Coord. System: NCSPCS 83

Long: 77°05'12.3780" W
Lat: 034°37'31.6440" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z193, Run 1

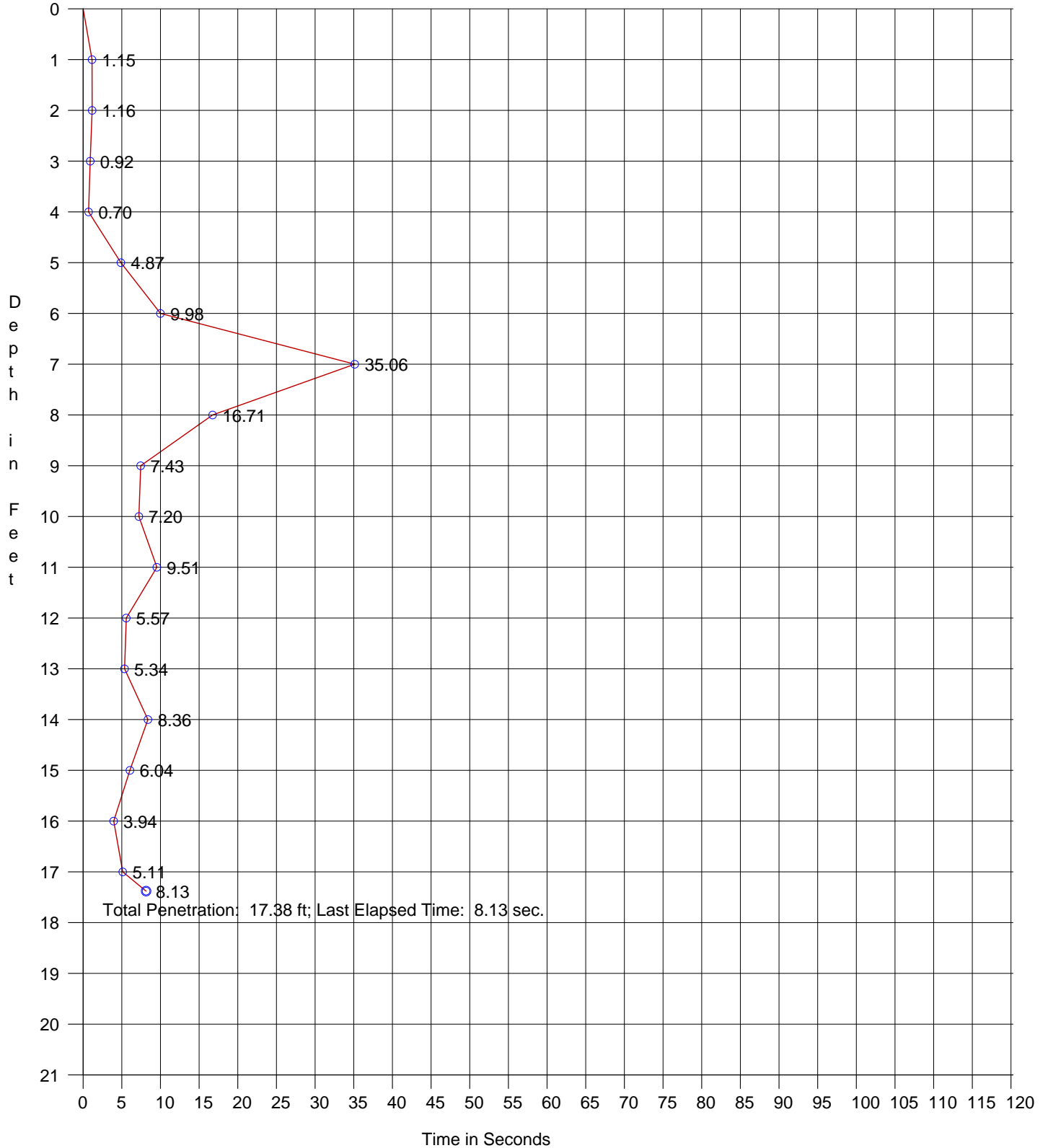
Date: 12/16/2011
Start Time: 2:48:17 PM
End Time: 2:50:40 PM

Penetration: 17.38 ft
Recovery: 17.00 ft
W. D. Corrected: 35.73 ft
W. D. Raw: 0.00 ft

Easting: 2560082.62
Northing: 322745.32
Coord. System: NCSPCS 83

Long: 77°08'17.6160"W
Lat: 034°37'20.4840"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z200, Run 1

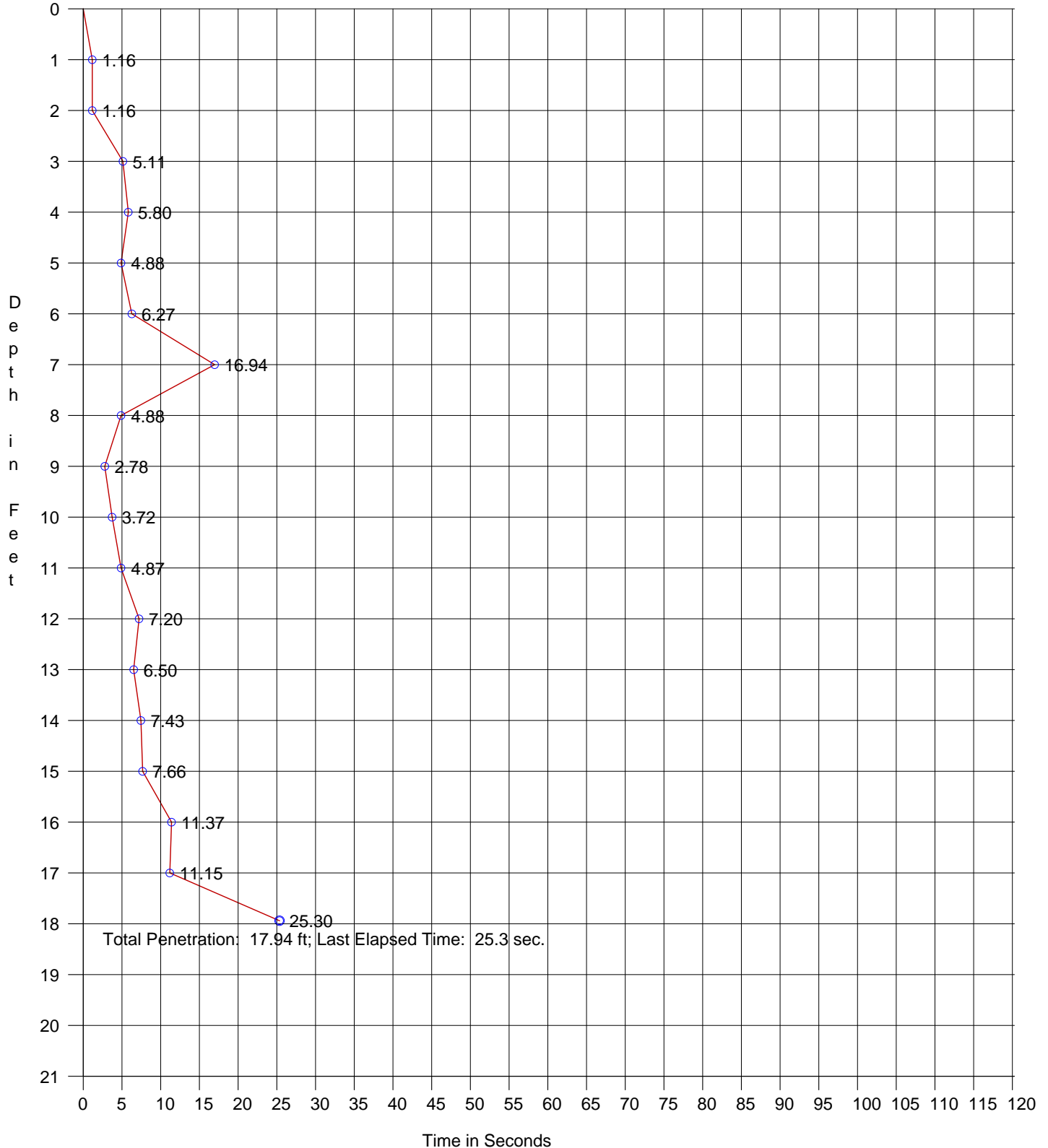
Date: 12/16/2011
Start Time: 2:25:57 PM
End Time: 2:28:11 PM

Penetration: 17.94 ft
Recovery: 17.25 ft
W. D. Corrected: 39.34 ft
W. D. Raw: 38.38 ft

Easting: 2561367.43
Northing: 322152.44
Coord. System: NCSPCS 83

Long: 77°08'02.3760" W
Lat: 034°37'14.3820" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z213, Run 1

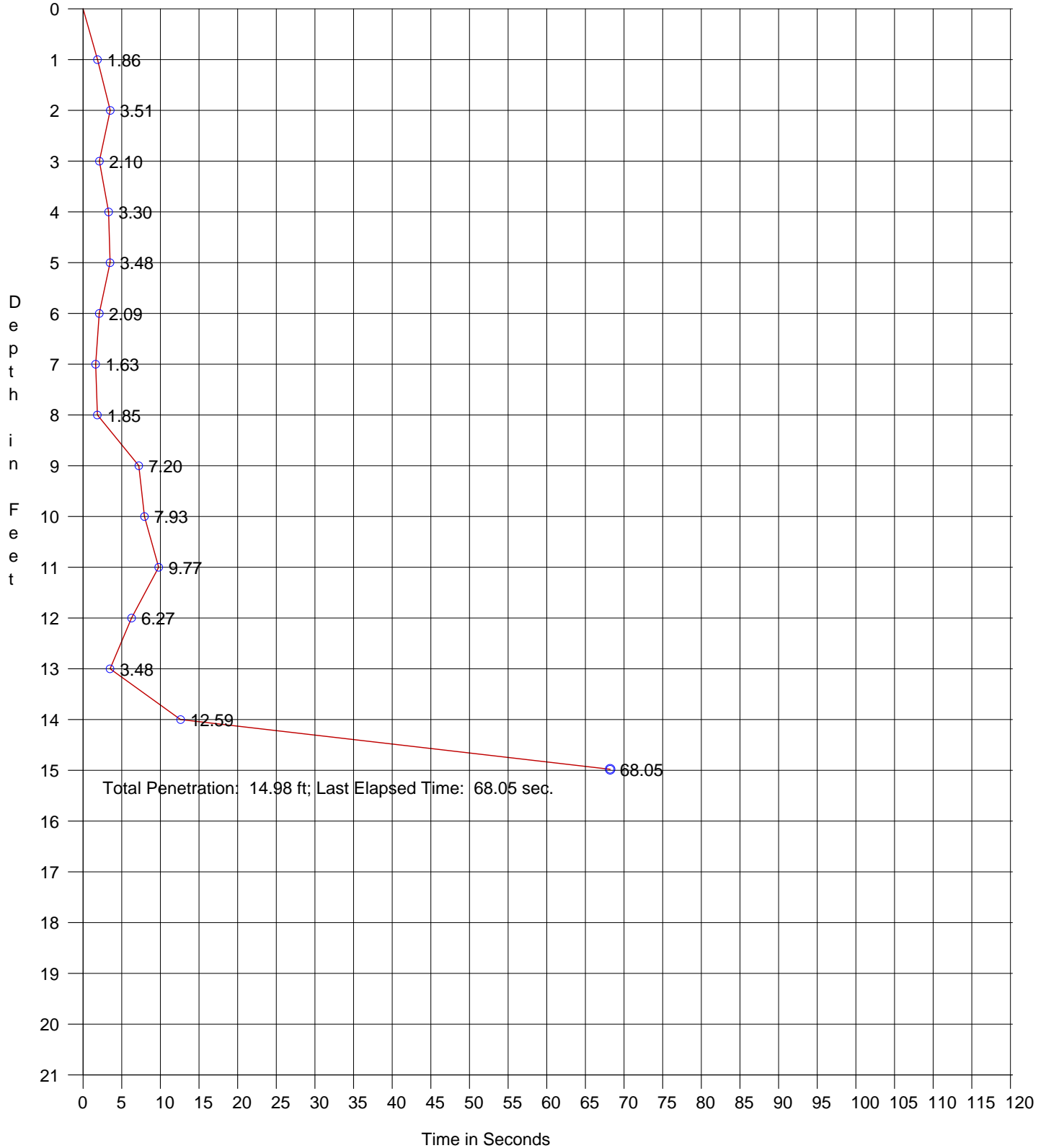
Date: 12/17/2011
Start Time: 2:20:48 PM
End Time: 2:23:03 PM

Penetration: 14.98 ft
Recovery: 13.50 ft
W. D. Corrected: 34.13 ft
W. D. Raw: 34.27 ft

Easting: 2573568.58
Northing: 326628.98
Coord. System: NCSPCS 83

Long: 77°05'35.3760" W
Lat: 034°37'56.3640" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z214, Run 1

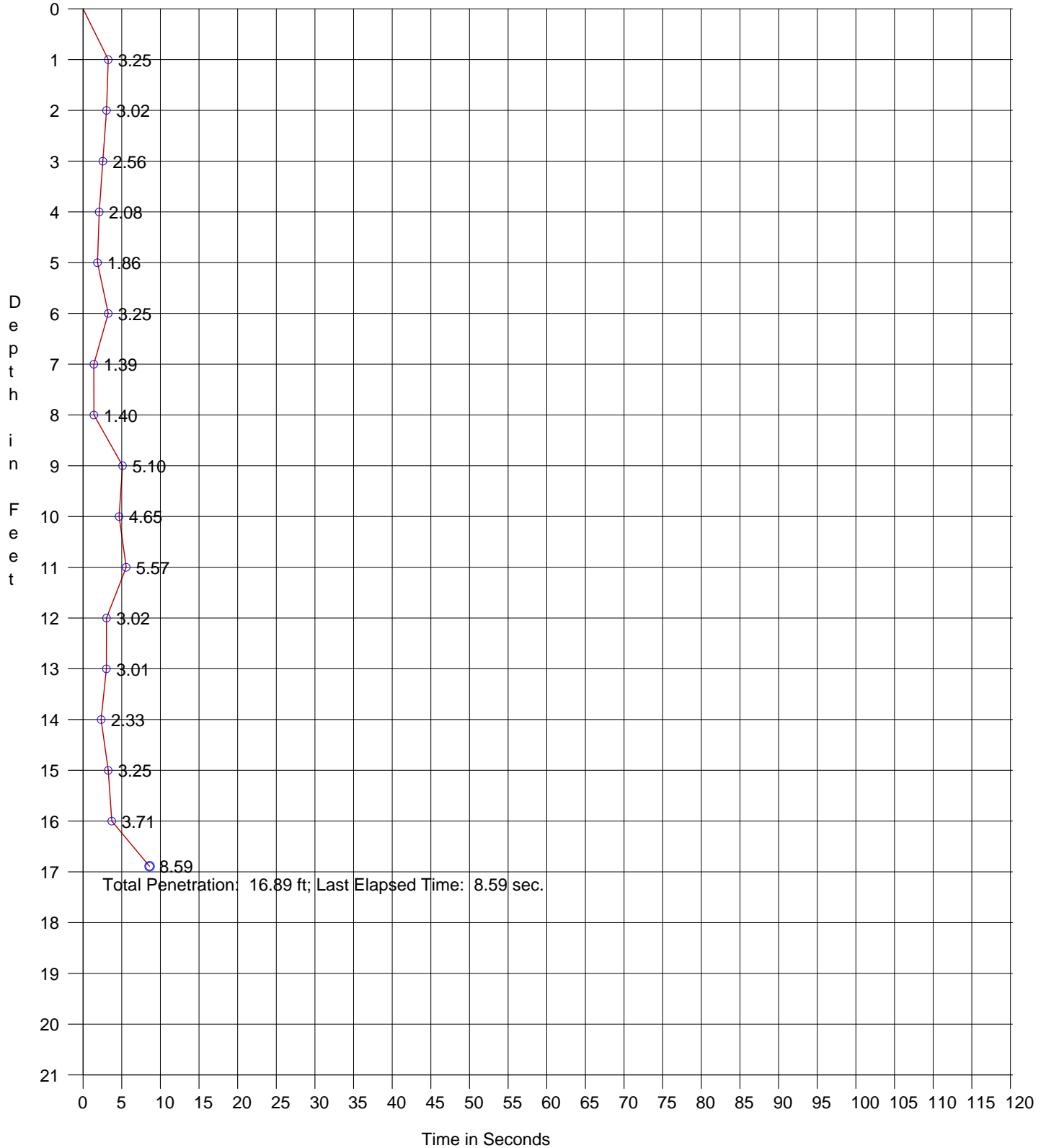
Date: 12/17/2011
Start Time: 2:02:07 PM
End Time: 2:03:05 PM

Penetration: 16.89 ft
Recovery: 16.80 ft
W. D. Corrected: 36.53 ft
W. D. Raw: 36.90 ft

Easting: 2574504.89
Northing: 326974.46
Coord. System: NCSPCS 83

Long: 77°05'24.0960" W
Lat: 034°37'59.6040" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z215, Run 1

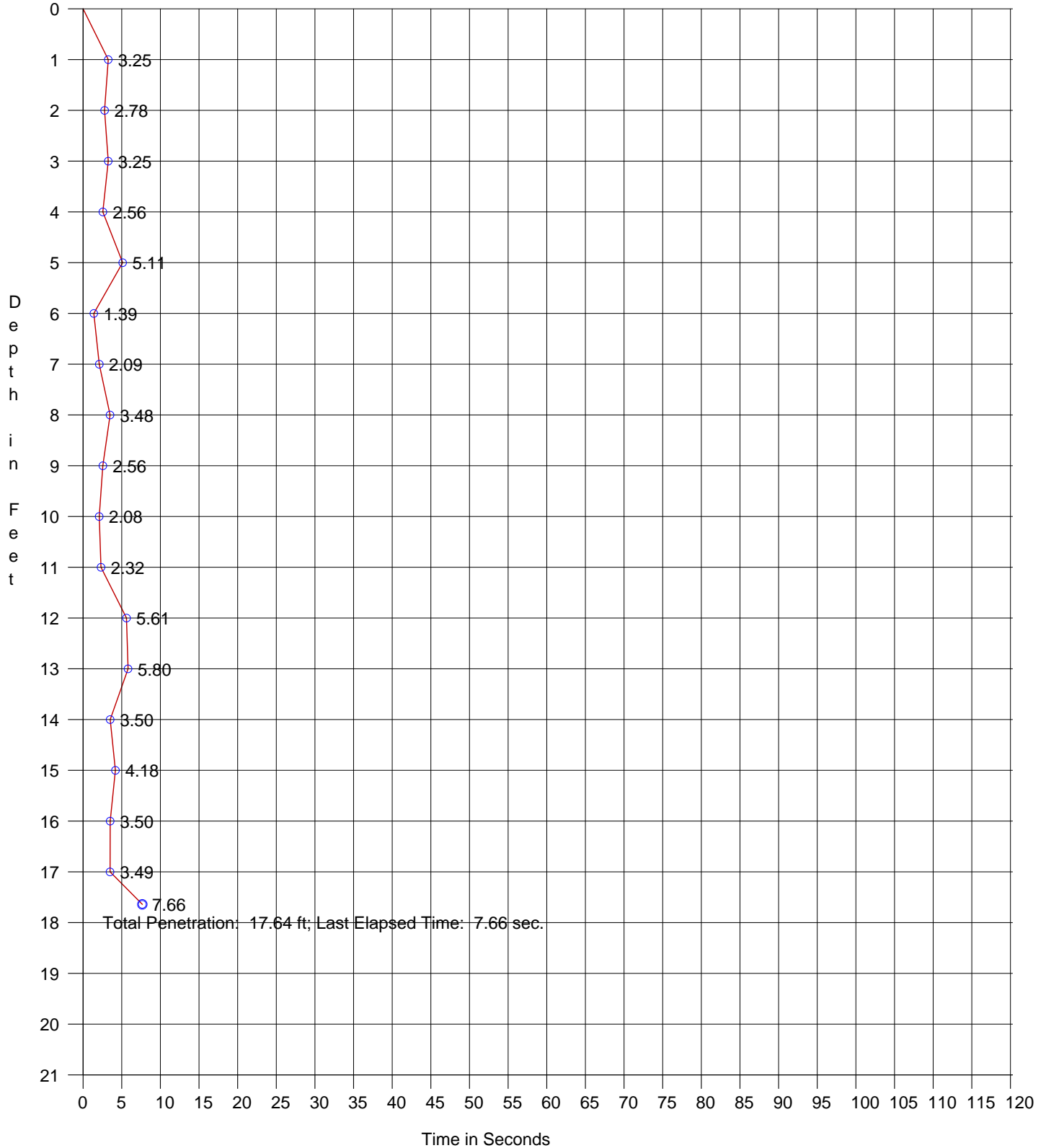
Date: 12/17/2011
Start Time: 1:38:36 PM
End Time: 1:39:41 PM

Penetration: 17.64 ft
Recovery: 17.17 ft
W. D. Corrected: 32.13 ft
W. D. Raw: 32.65 ft

Easting: 2575443.70
Northing: 327325.17
Coord. System: NCSPCS 83

Long: 77°05'12.7800" W
Lat: 034°38'02.8920" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z231, Run 1

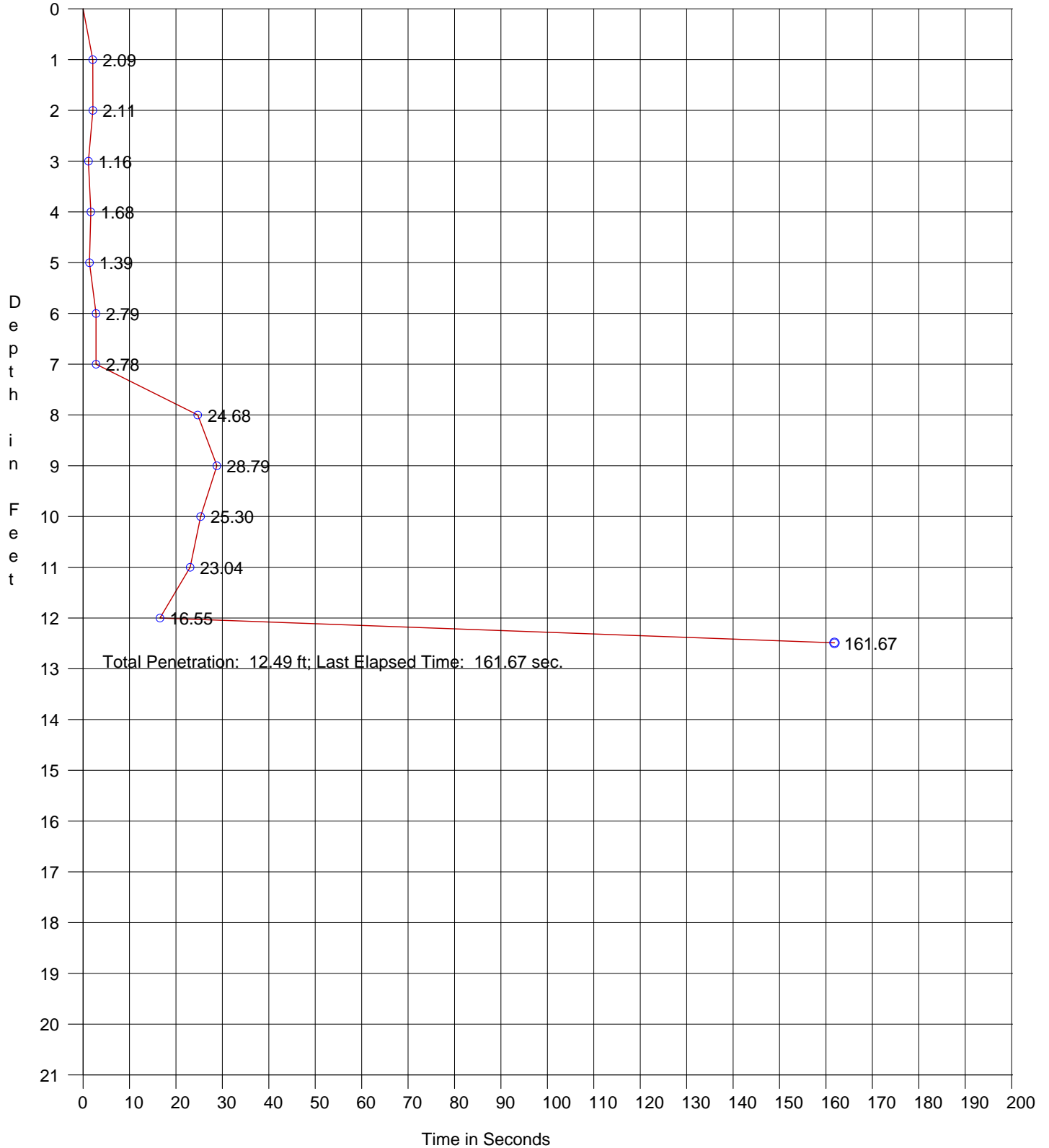
Date: 12/17/2011
Start Time: 9:42:57 AM
End Time: 9:47:51 AM

Penetration: 12.49 ft
Recovery: 10.33 ft
W. D. Corrected: 42.46 ft
W. D. Raw: 42.01 ft

Easting: 2575788.75
Northing: 326387.52
Coord. System: NCSPCS 83

Long 77°05'08.8680" W
Lat: 034°37'53.5560" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z232, Run 1

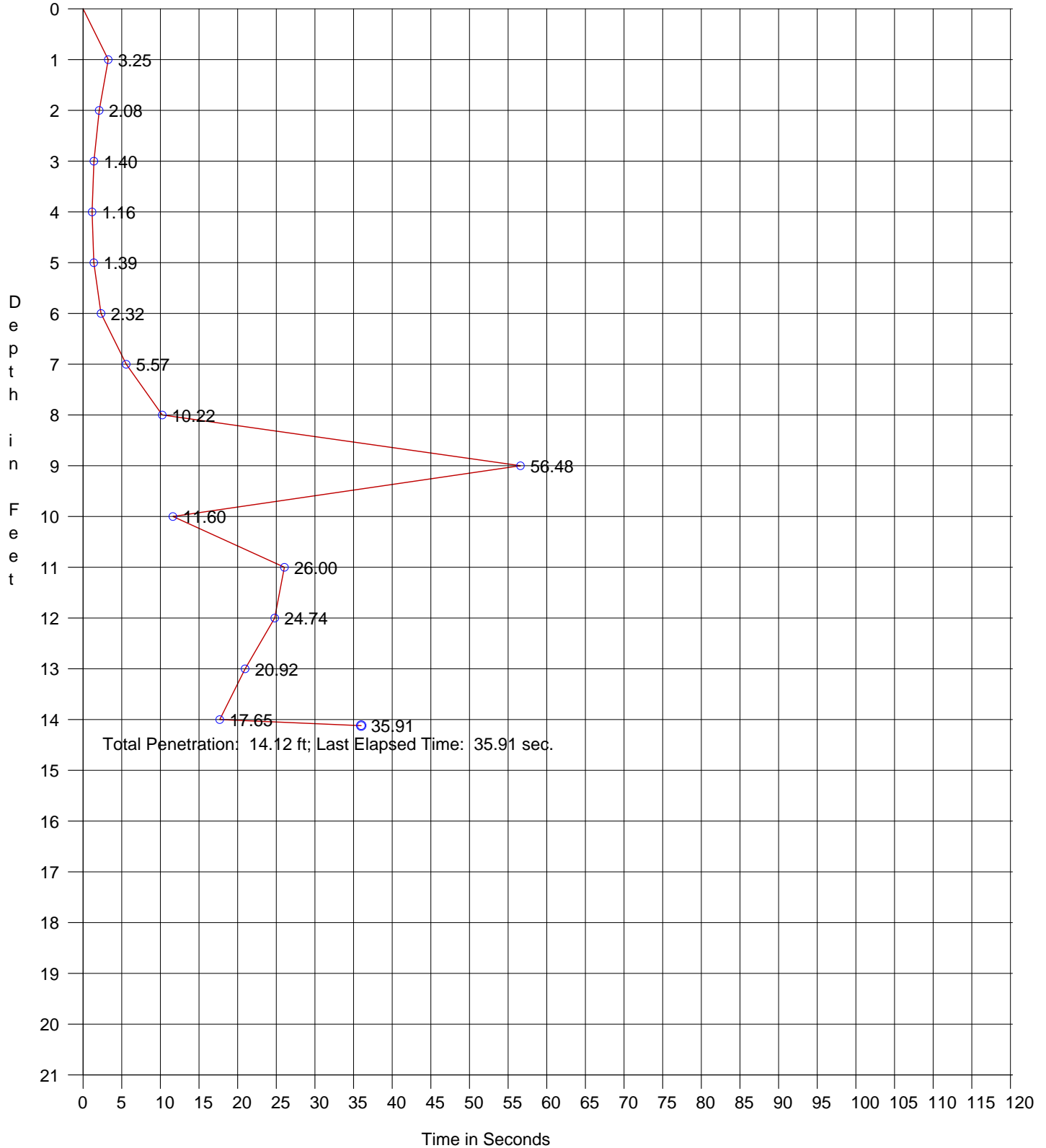
Date: 12/17/2011
Start Time: 9:21:32 AM
End Time: 9:25:13 AM

Penetration: 14.12 ft
Recovery: 15.17 ft
W. D. Corrected: 43.64 ft
W. D. Raw: 42.98 ft

Easting: 2576727.61
Northing: 326732.45
Coord. System: NCSPCS 83

Long: 77°04'57.5580" W
Lat: 034°37'56.7840" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z233, Run 1

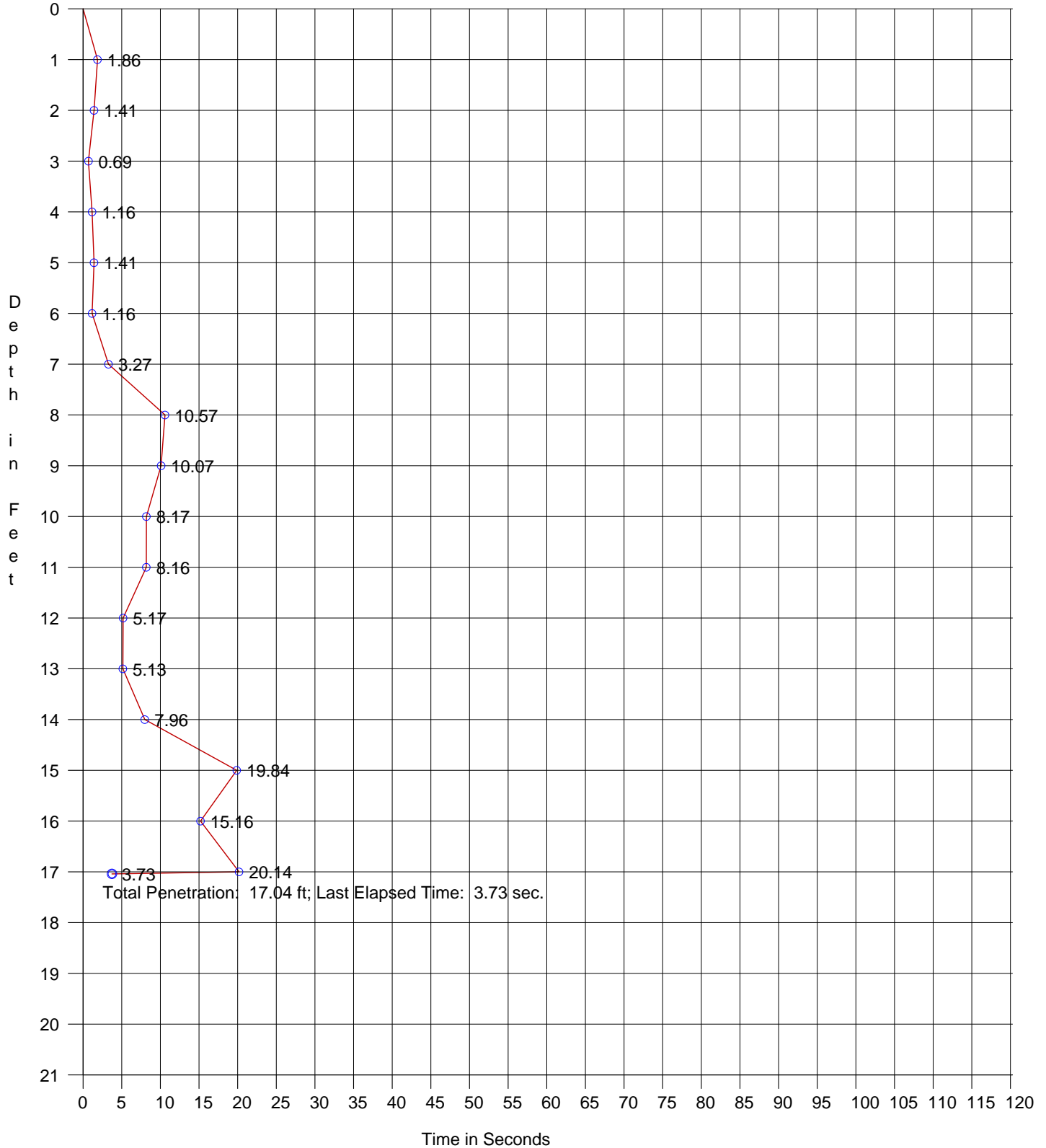
Date: 12/17/2011
Start Time: 9:03:27 AM
End Time: 9:05:32 AM

Penetration: 17.04 ft
Recovery: 17.92 ft
W. D. Corrected: 41.37 ft
W. D. Raw: 40.49 ft

Easting: 2577666.13
Northing: 327071.92
Coord. System: NCSPCS 83

Long: 77°04'46.2480" W
Lat: 034°37'59.9640" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z234, Run 1

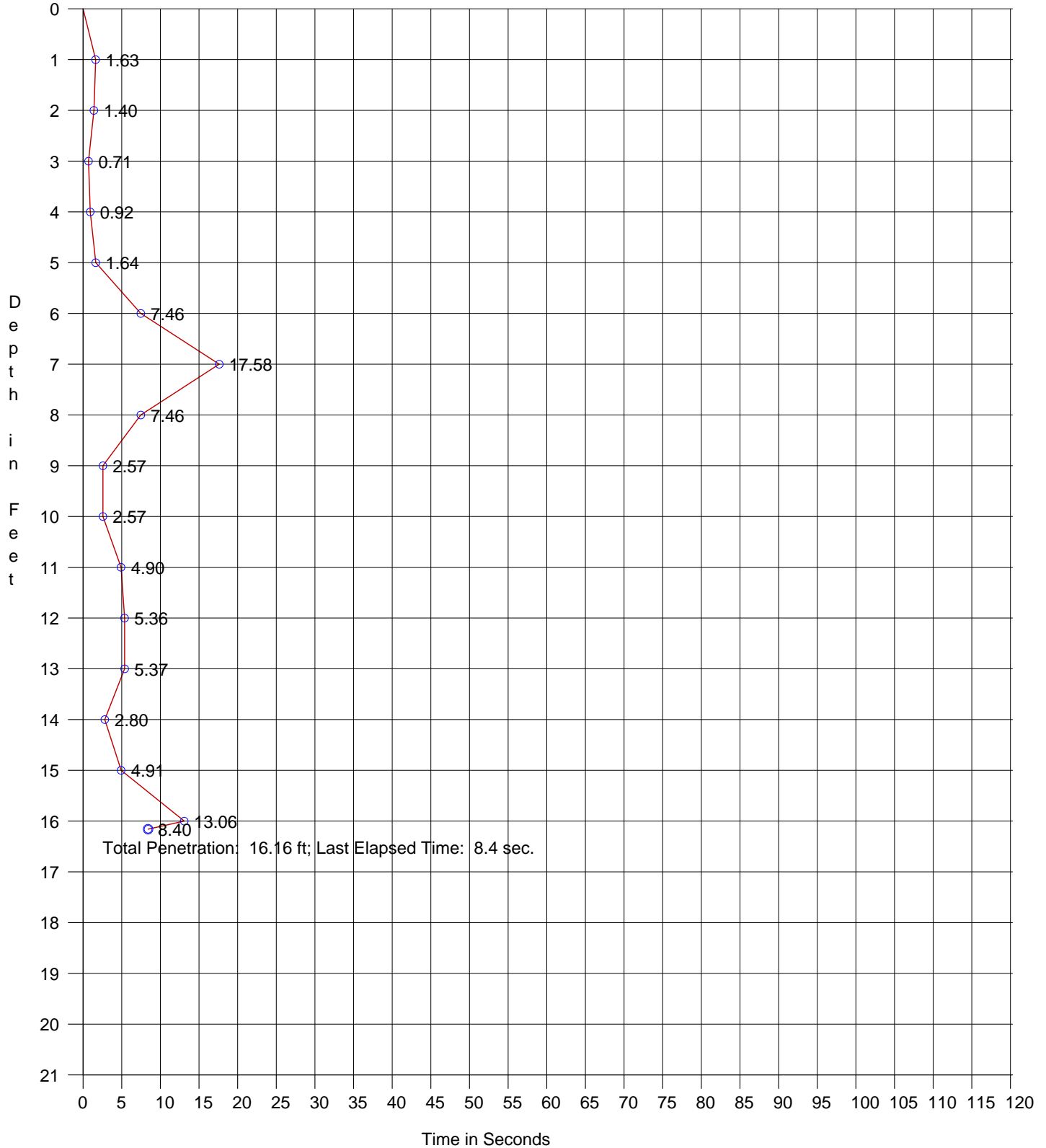
Date: 12/17/2011
Start Time: 8:45:45 AM
End Time: 8:47:14 AM

Penetration: 16.16 ft
Recovery: 14.58 ft
W. D. Corrected: 42. 71 ft
W. D. Raw: 41.70 ft

Easting: 2578603.35
Northing: 327418.86
Coord. System: NCSPCS 83

Long: 77°04'34.9500" W
Lat: 034°38'03.2160" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z235, Run 1

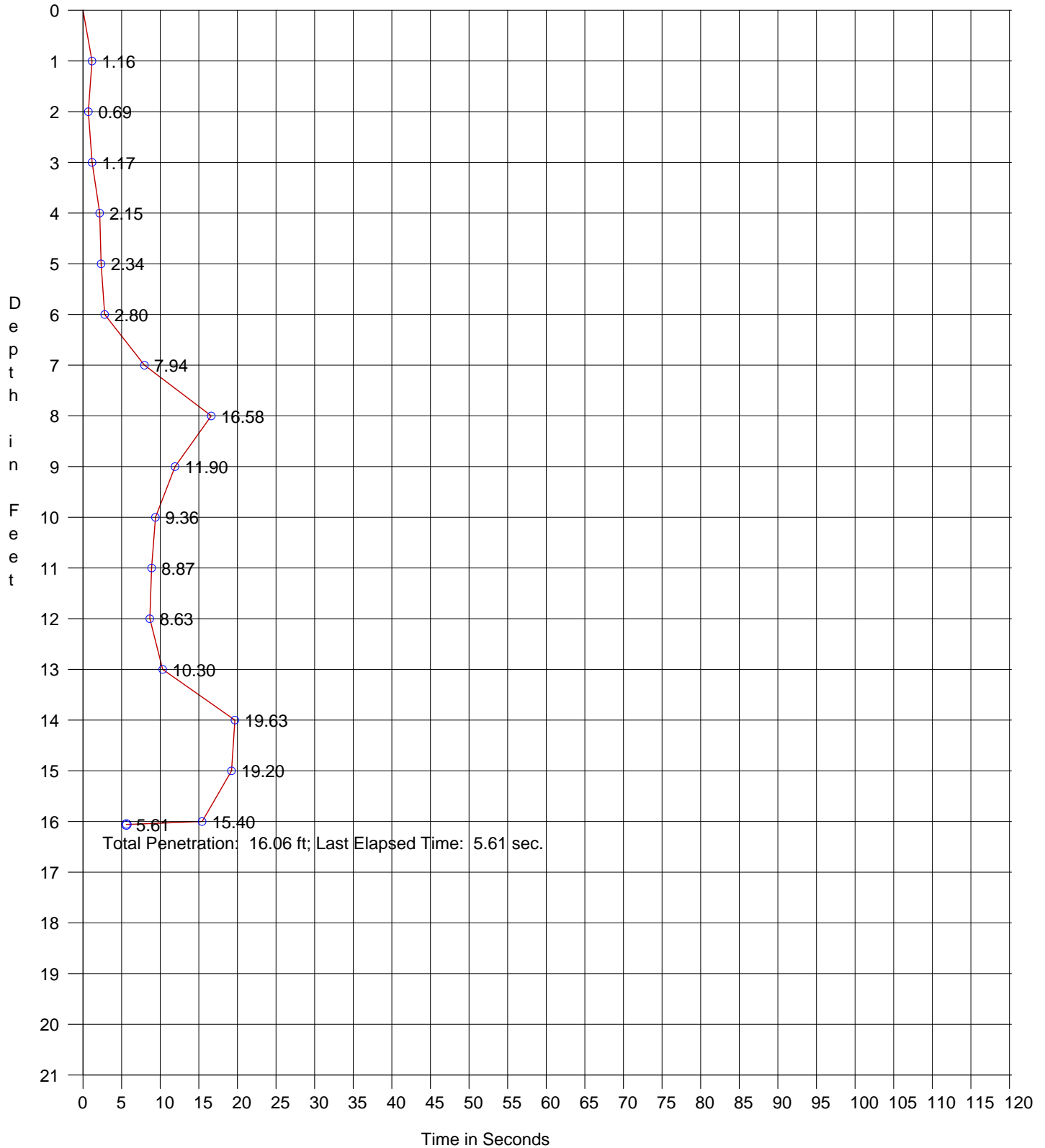
Date: 12/17/2011
Start Time: 8:28:48 AM
End Time: 8:31:12 AM

Penetration: 16.06 ft
Recovery: 18.17 ft
W. D. Corrected: 44.80 ft
W. D. Raw: 43.63 ft

Easting: 2579546.31
Northing: 327766.40
Coord. System: NCSPCS 83

Long: 77°04'23.5860" W
Lat: 034°38'06.4740" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z255, Run 1

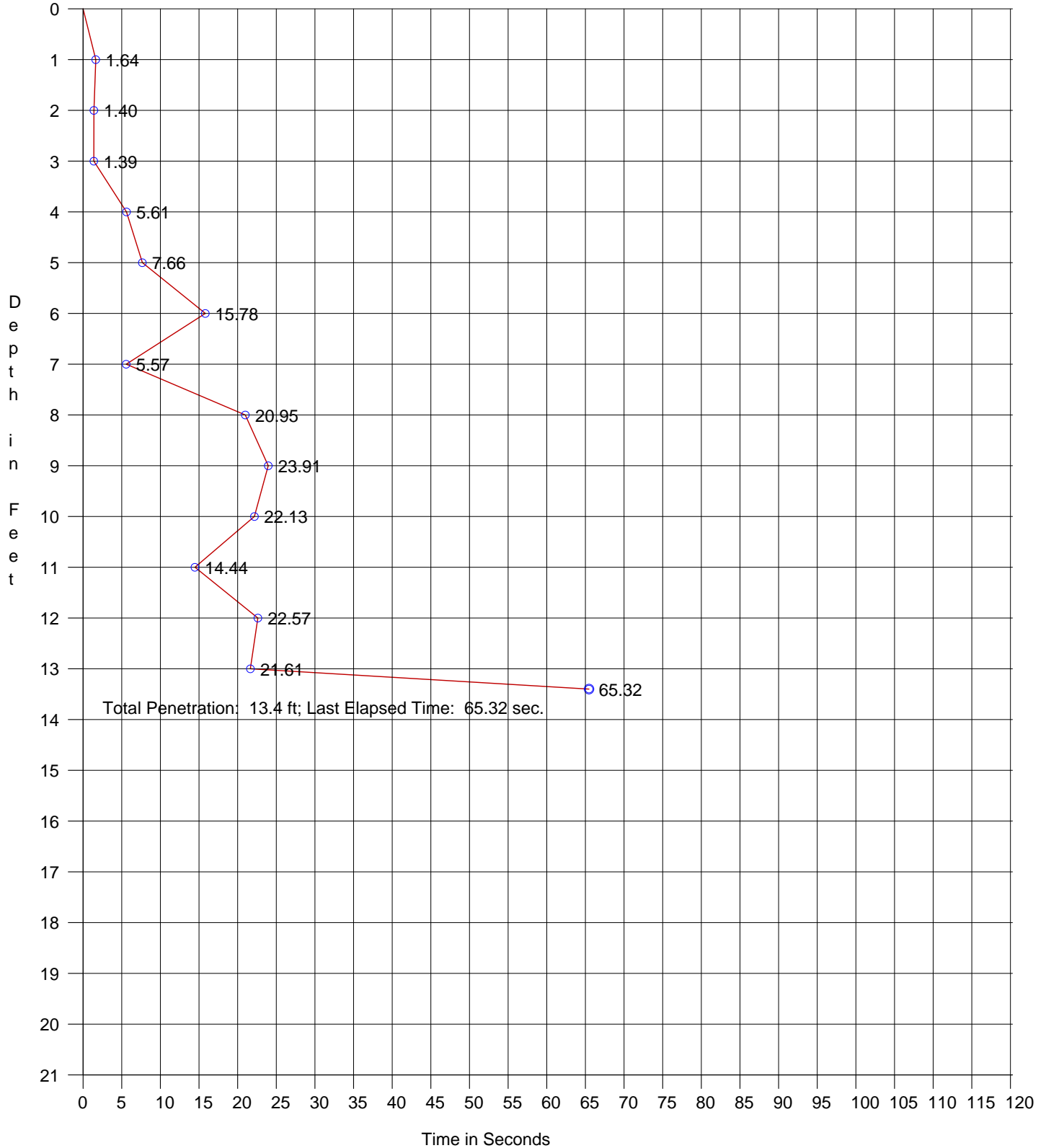
Date: 12/17/2011
Start Time: 11:15:09 AM
End Time: 11:18:59 AM

Penetration: 13.40 ft
Recovery: 15.83 ft
W. D. Corrected: 49.19 ft
W. D. Raw: 49.71 ft

Easting: 2576480.52
Northing: 324501.43
Coord. System: NCSPCS 83

Long: 77°05'01.0260" W
Lat: 034°37'34.7700" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z256, Run 1

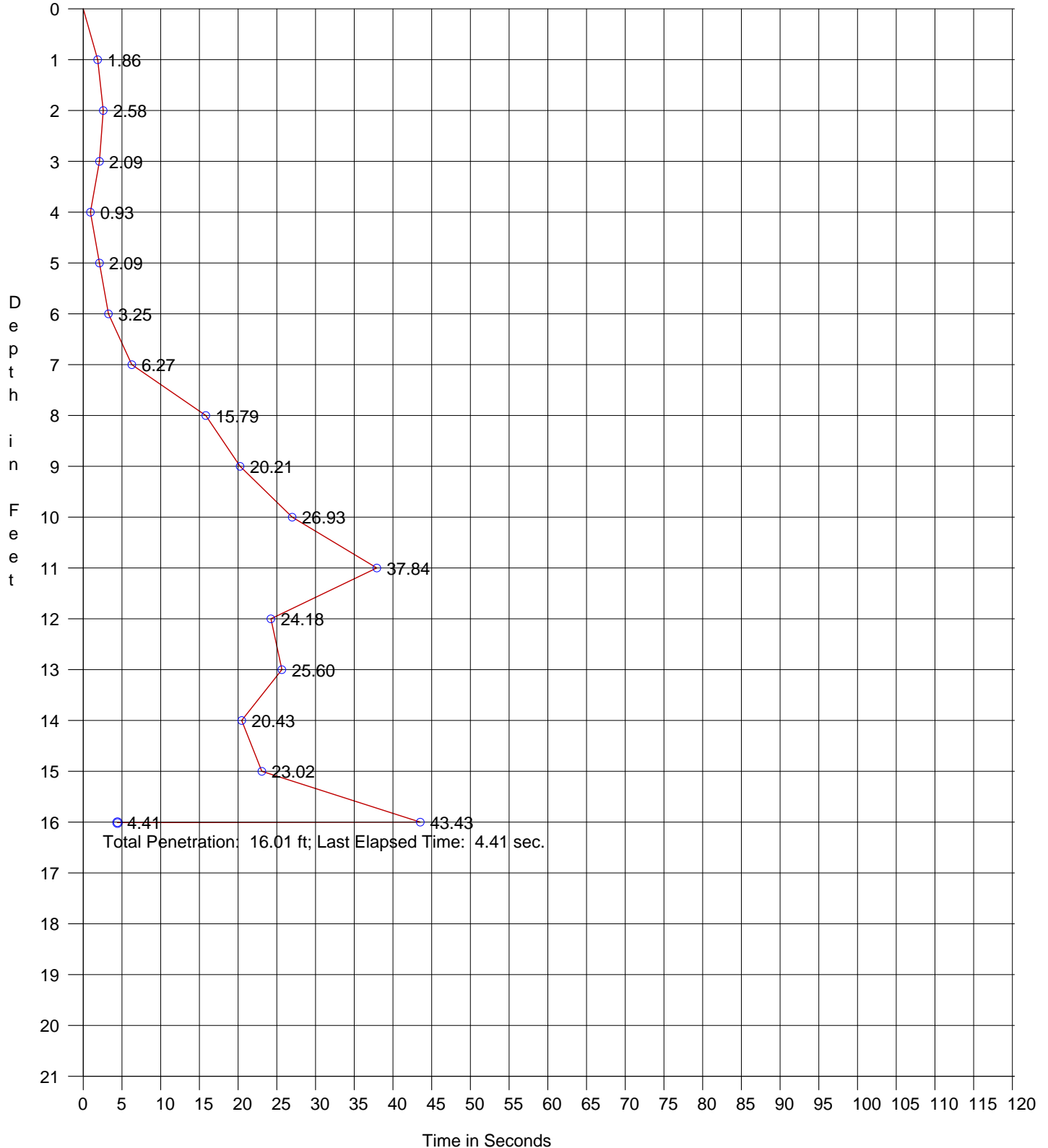
Date: 12/17/2011
Start Time: 11:36:20 AM
End Time: 11:40:41 AM

Penetration: 16.01 ft
Recovery: 17.30 ft
W. D. Corrected: 46.26 ft
W. D. Raw: 46.88 ft

Easting: 2577422.19
Northing: 324854.57
Coord. System: NCSPCS 83

Long: 77°04'49.6800" W
Lat: 034°37'38.0820" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z257, Run 1

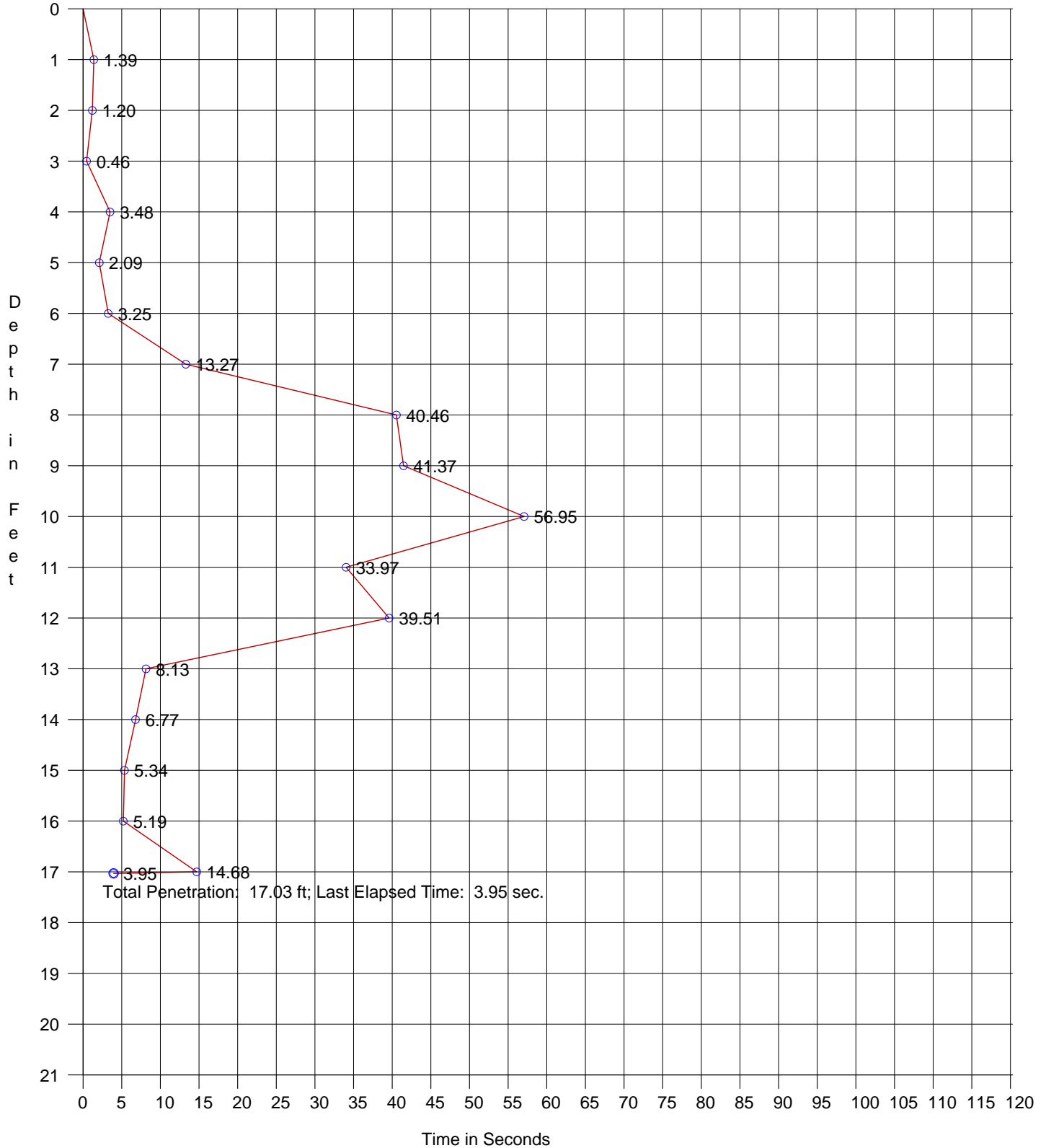
Date: 12/17/2011
Start Time: 11:57:32 AM
End Time: 12:02:13 PM

Penetration: 17.03 ft
Recovery: 19.10 ft
W. D. Corrected: 46.82 ft
W. D. Raw: 47.54 ft

Easting: 2578360.06
Northing: 325187.06
Coord. System: NCSPCS 83

Long: 77°04'38.3820" W
Lat: 034°37'41.1900" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z258, Run 1

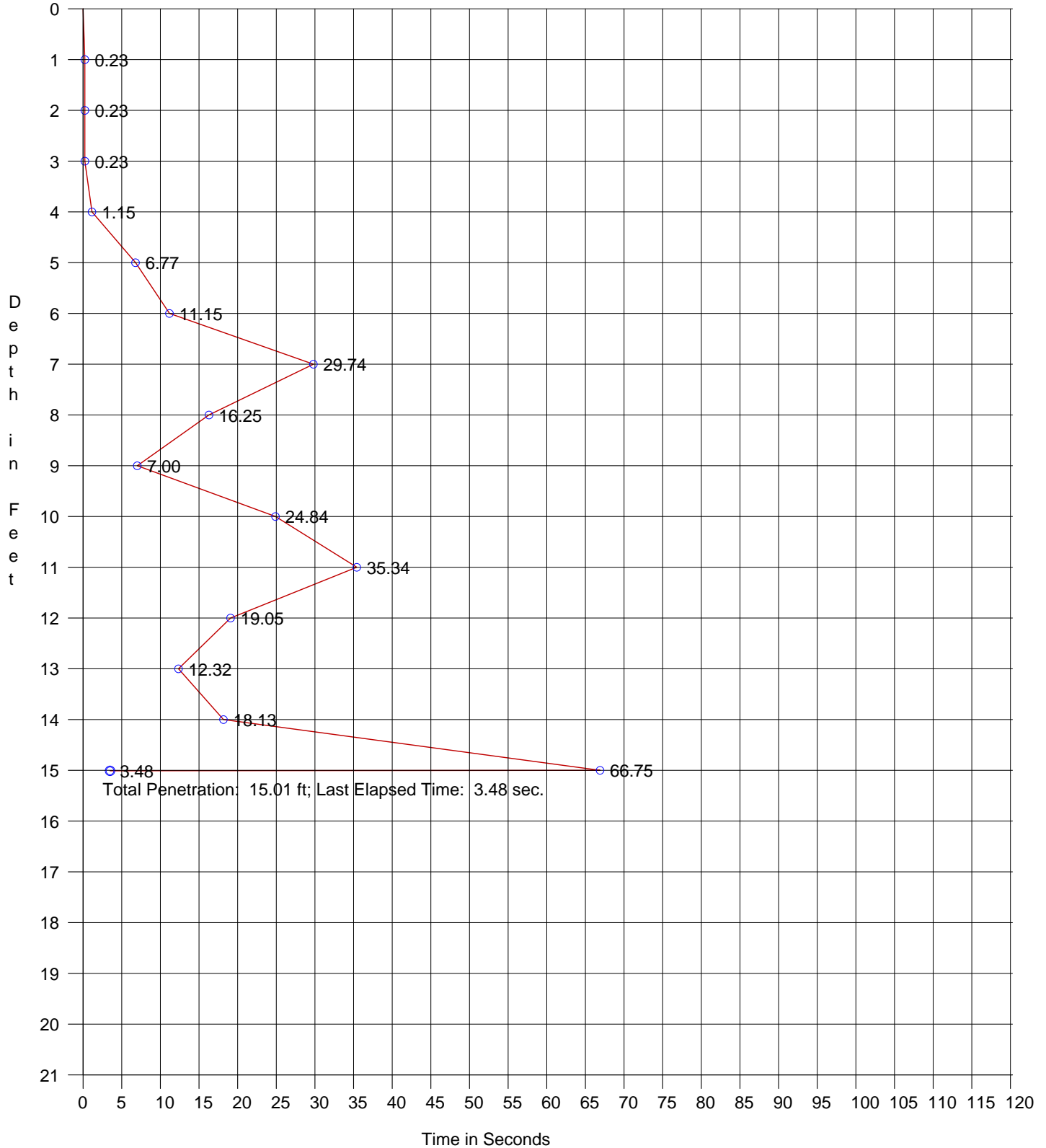
Date: 12/17/2011
Start Time: 12:22:47 PM
End Time: 12:27:00 PM

Penetration: 15.01 ft
Recovery: 18.42 ft
W. D. Corrected: 46.84 ft
W. D. Raw: 47.64 ft

Easting: 2579294.60
Northing: 325544.54
Coord. System: NCSPCS 83

Long: 77°04'27.1140" W
Lat: 034°37'44.5440" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z259, Run 1

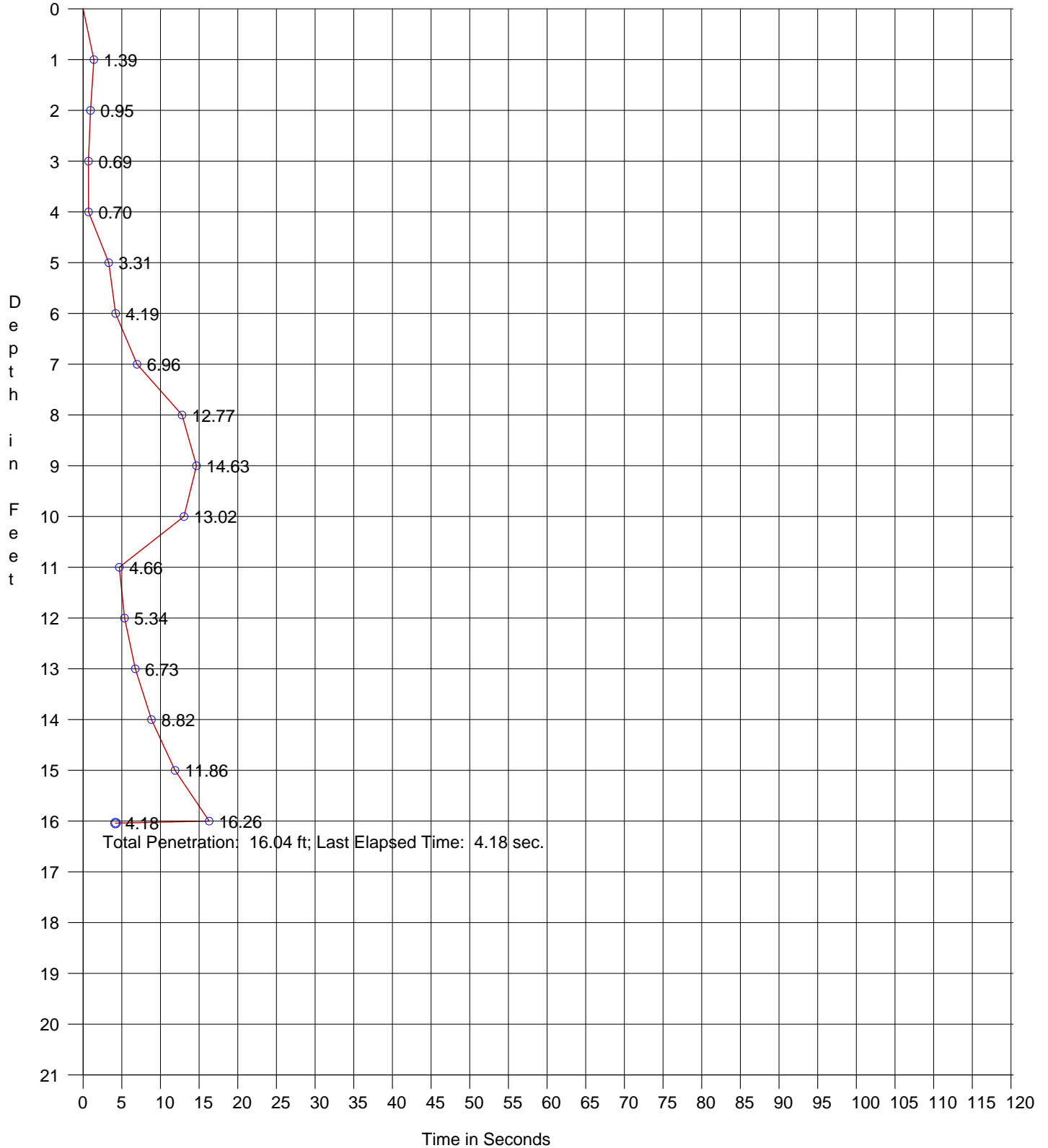
Date: 12/17/2011
Start Time: 1:15:28 PM
End Time: 1:17:24 PM

Penetration: 16.04 ft
Recovery: 18.33 ft
W. D. Corrected: 47.50 ft
W. D. Raw: 48.18 ft

Easting: 2580233.91
Northing: 325889.06
Coord. System: NCSPCS 83

Long: 77°04'15.7980" W
Lat: 034°37'47.7720" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z276, Run 1

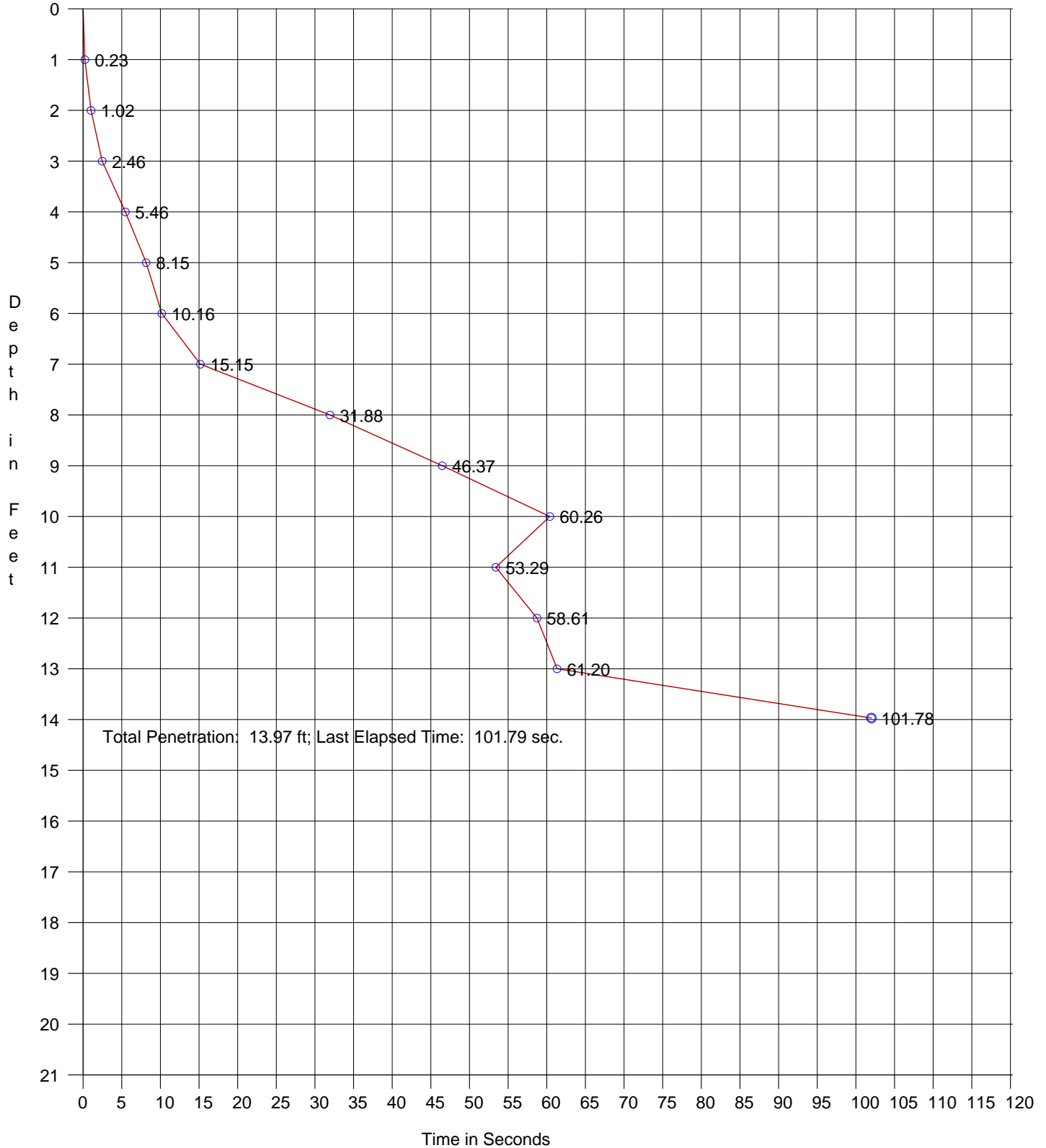
Date: 12/18/2011
Start Time: 7:17:25 AM
End Time: 7:25:26 AM

Penetration: 13.97 ft
Recovery: 18.33 ft
W. D. Corrected: 47.01 ft
W. D. Raw: 44.96 ft

Easting: 2575885.91
Northing: 323220.72
Coord. System: NCSPCS 83

Long: 77°05'08.4360" W
Lat: 034°37'22.2180" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z277, Run 1

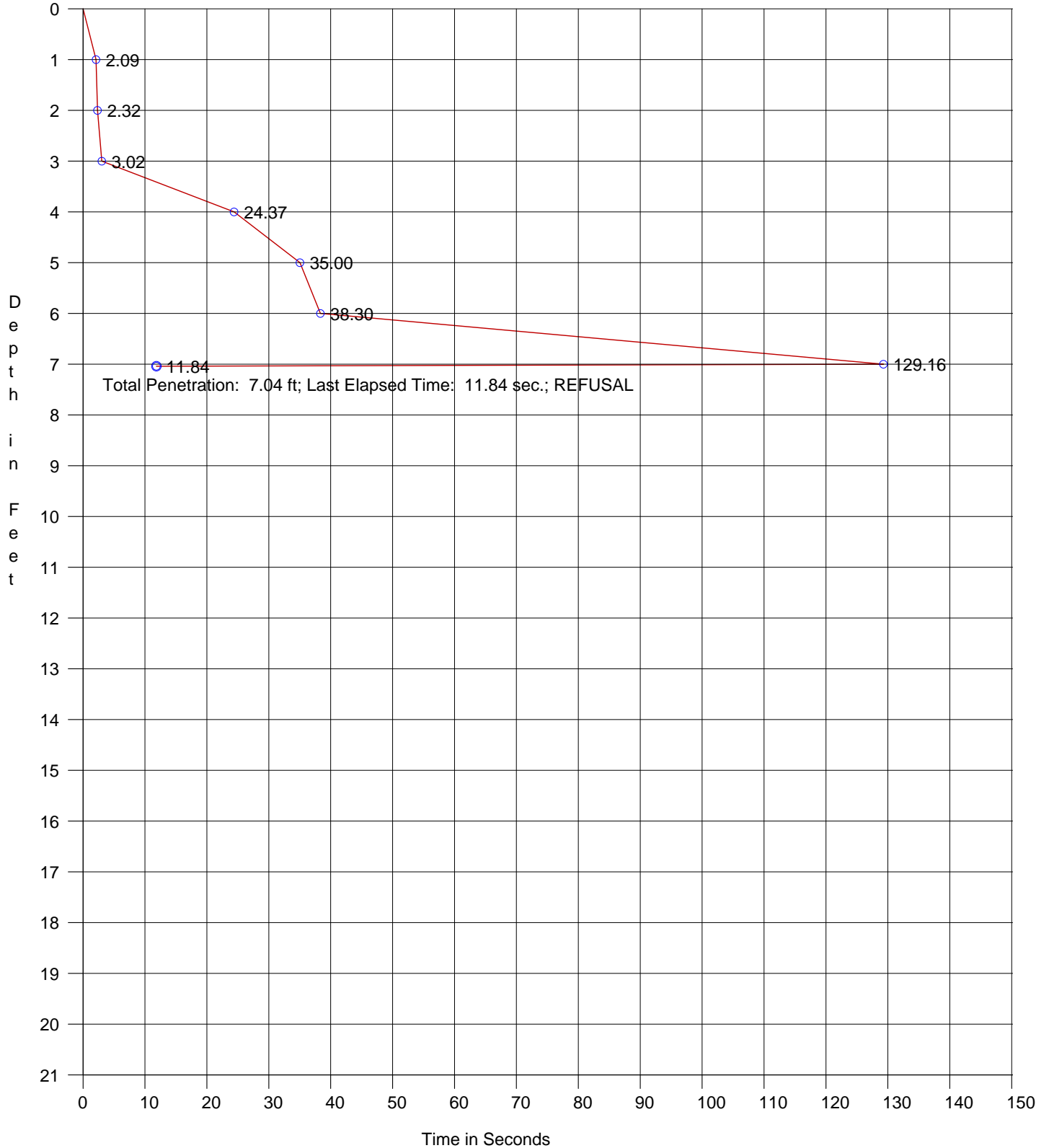
Date: 12/17/2011
Start Time: 3:29:49 PM
End Time: 3:35:07 PM

Penetration: 7.04 ft
Recovery: 7.00 ft
W. D. Corrected: 48.00 ft
W. D. Raw: 48.17 ft

Easting: 2576823.78
Northing: 323568.96
Coord. System: NCSPCS 83

Long. 77°04'57.1380" W
Lat: 034°37'25.4820" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z277, Run 2

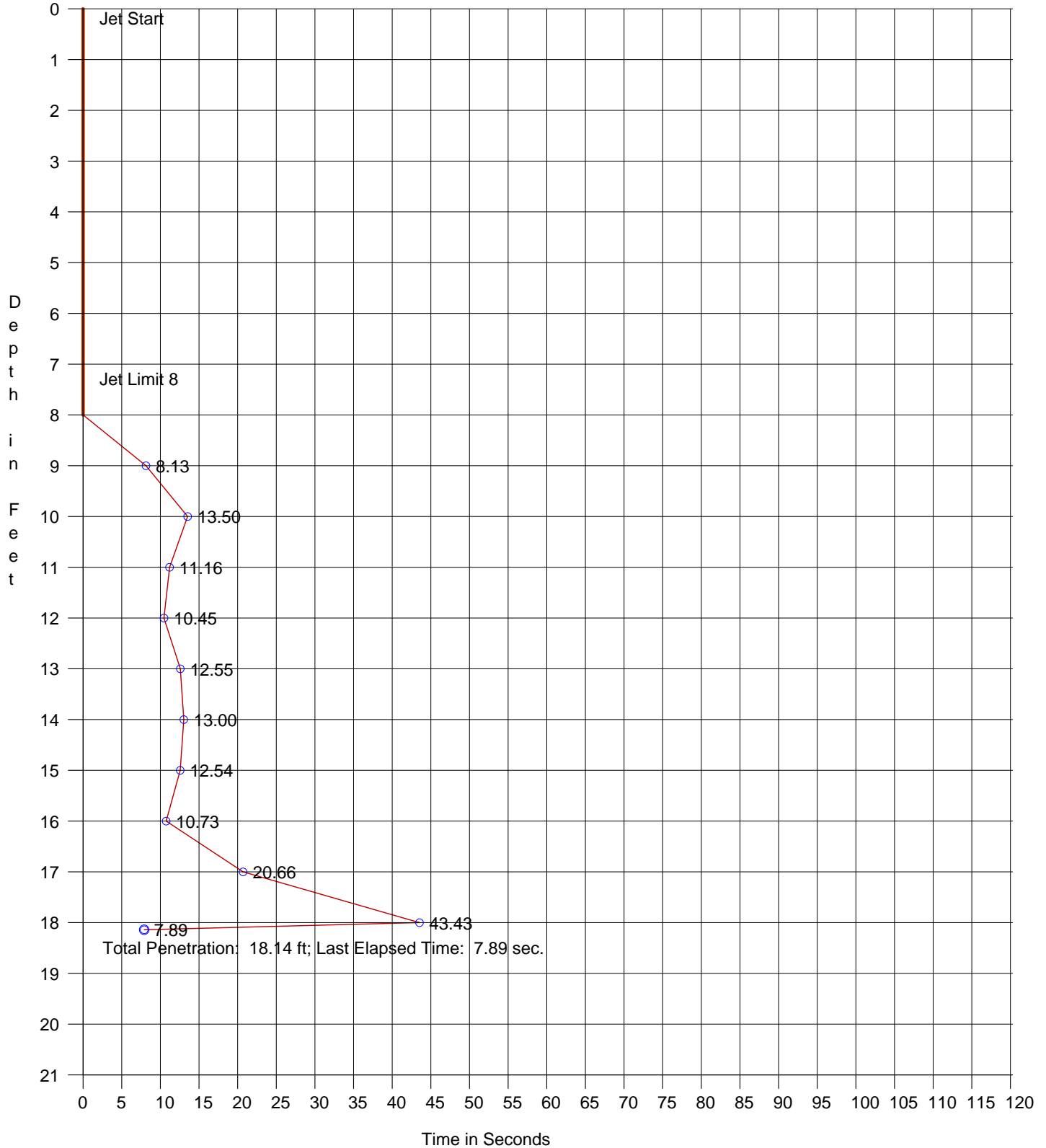
Date: 12/17/2011
Start Time: 3:52:29 PM
End Time: 3:57:42 PM

Penetration: 18.14 ft
Recovery: 13.60 ft
W. D. Corrected: 48.78 ft
W. D. Raw: 47.89 ft

Easting: 2576822.91
Northing: 323571.04
Coord. System: NCSPCS 83

Long: 77°04'57.1440" W
Lat: 034°37'25.5000" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z278, Run 1

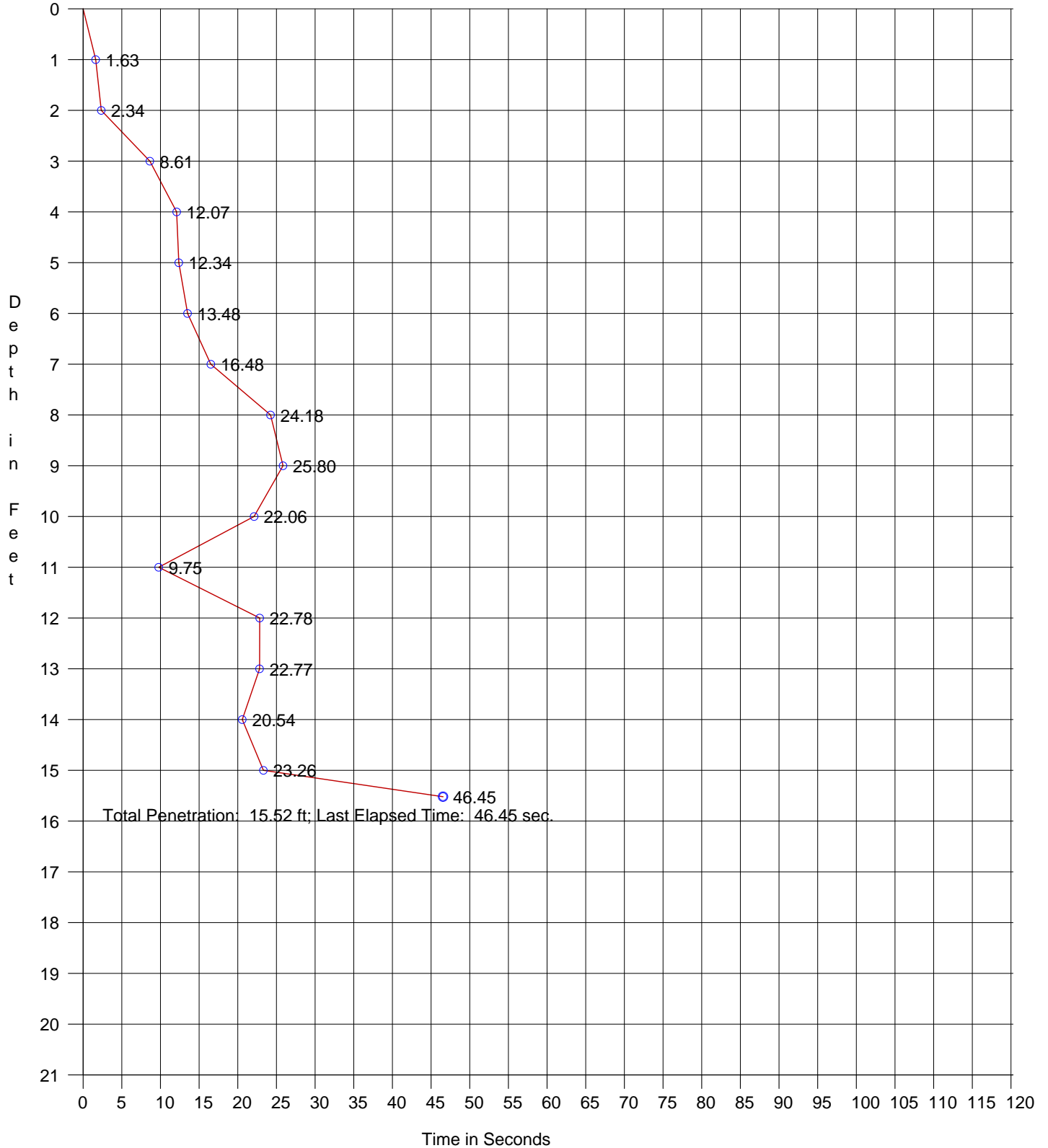
Date: 12/17/2011
Start Time: 4:15:23 PM
End Time: 4:20:07 PM

Penetration: 15.52 ft
Recovery: 20.00 ft
W. D. Corrected: 48.03 ft
W. D. Raw: 46.89 ft

Easting: 2577764.56
Northing: 323912.61
Coord. System: NCSPCS 83

Long: 77°04'45.7980"W
Lat: 034°37'28.6980"N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z279, Run 1

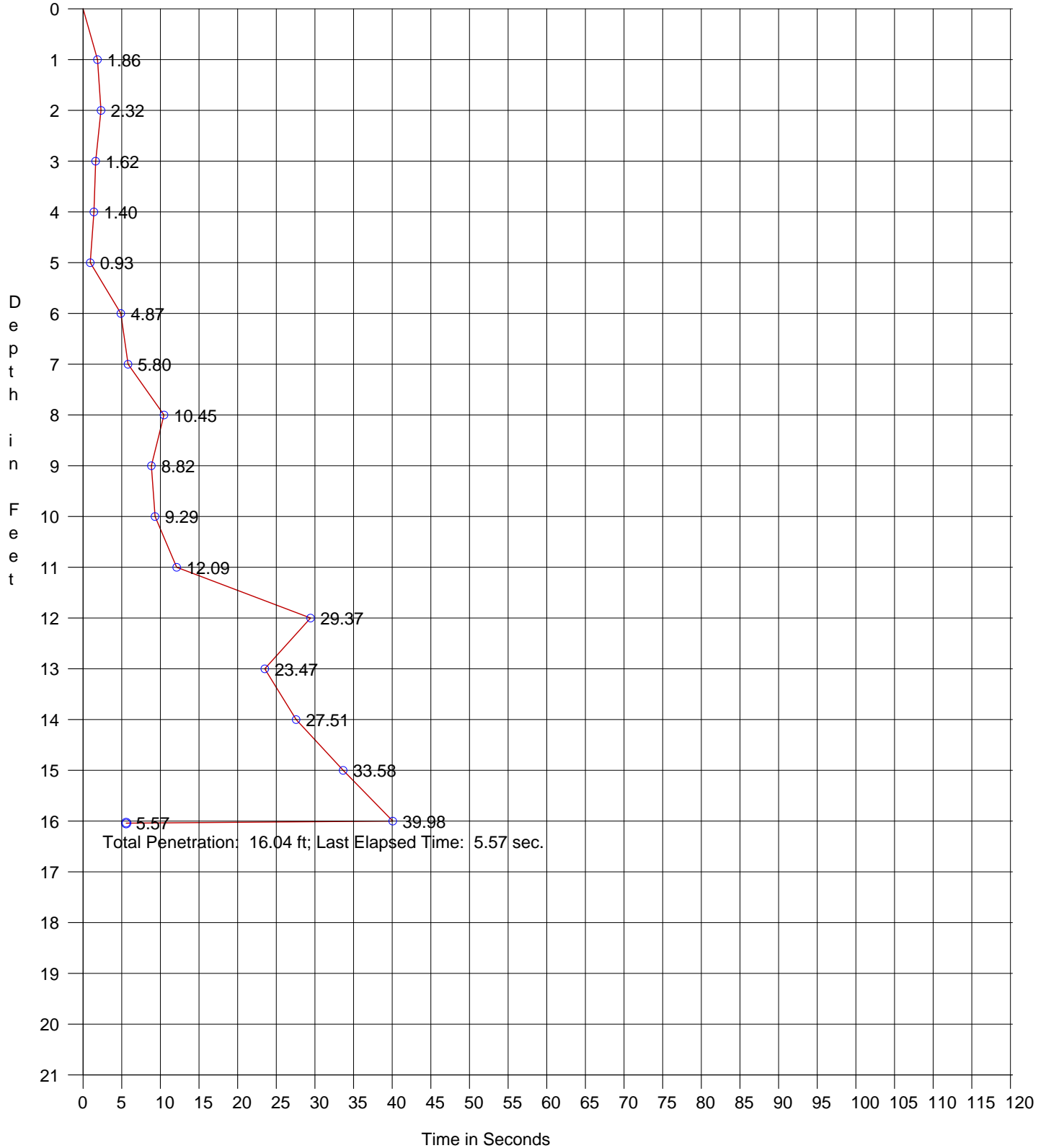
Date: 12/17/2011
Start Time: 4:42:40 PM
End Time: 4:46:19 PM

Penetration: 16.04 ft
Recovery: 14.92 ft
W. D. Corrected: 46.97 ft
W. D. Raw: 45.55 ft

Easting: 2578702.94
Northing: 324259.84
Coord. System: NCSPCS 83

Long: 77°04'34.4940" W
Lat: 034°37'31.9560" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z298, Run 1

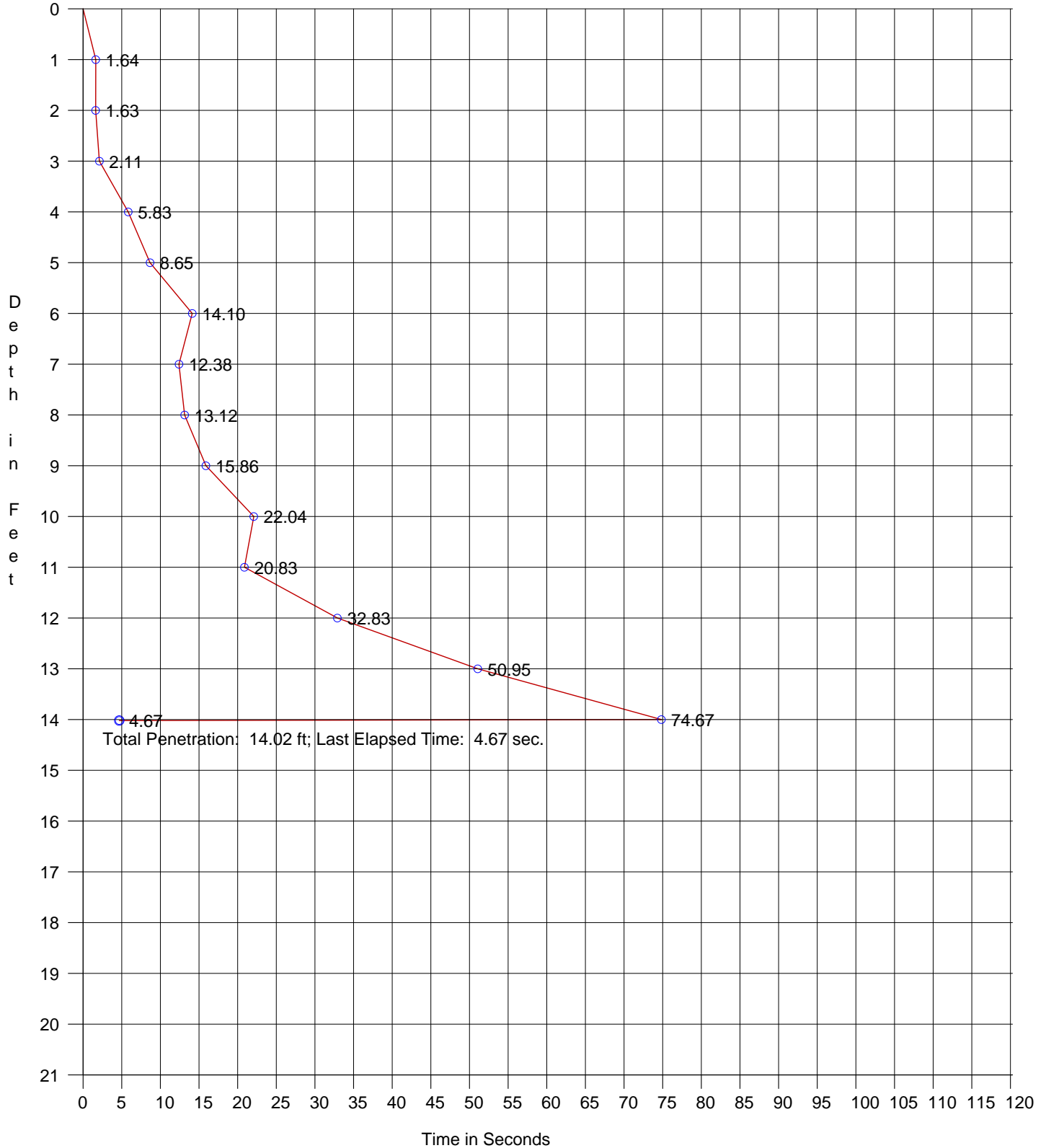
Date: 12/18/2011
Start Time: 8:08:57
End Time: 8:13:38

Penetration: 14.02 ft
Recovery: 16.50 ft
W. D. Corrected: 46.91 ft
W. D. Raw: 45.00 ft

Easting: 2576230.77
Northing: 322284.66
Coord. System: NCSPCS 83

Long: 77°05'04.5300" W
Lat: 034°37'12.8940" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z299, Run 1

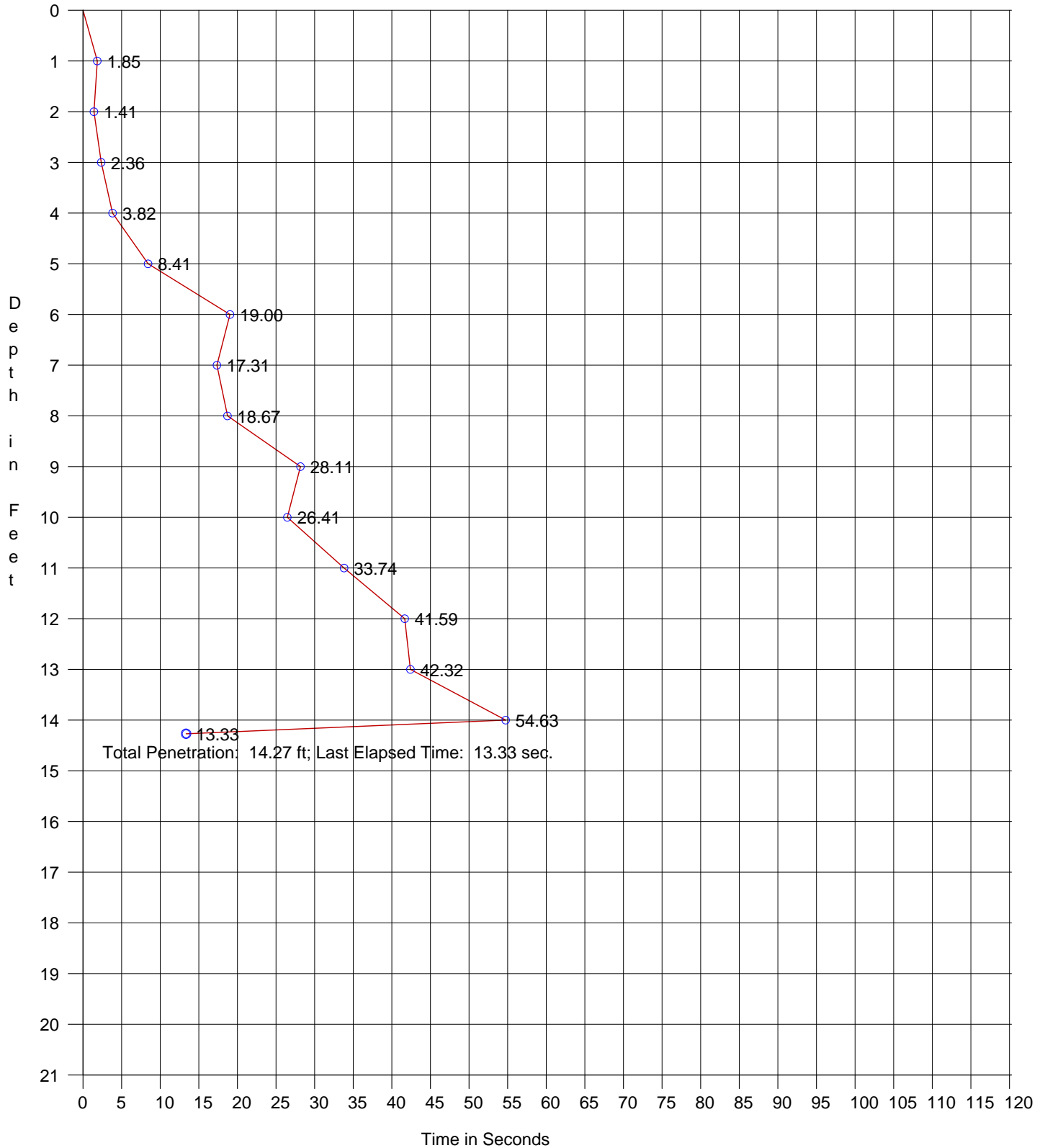
Date: 12/18/2011
Start Time: 7:48:05 AM
End Time: 7:53:18 AM

Penetration: 14.27 ft
Recovery: 18.50 ft
W. D. Corrected: 49.41 ft
W. D. Raw: 47.46 ft

Easting: 2577166.65
Northing: 322630.30
Coord. System: NCSPCS 83

Long: 77°04'53.2500" W
Lat: 034°37'16.1340" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z300, Run 1

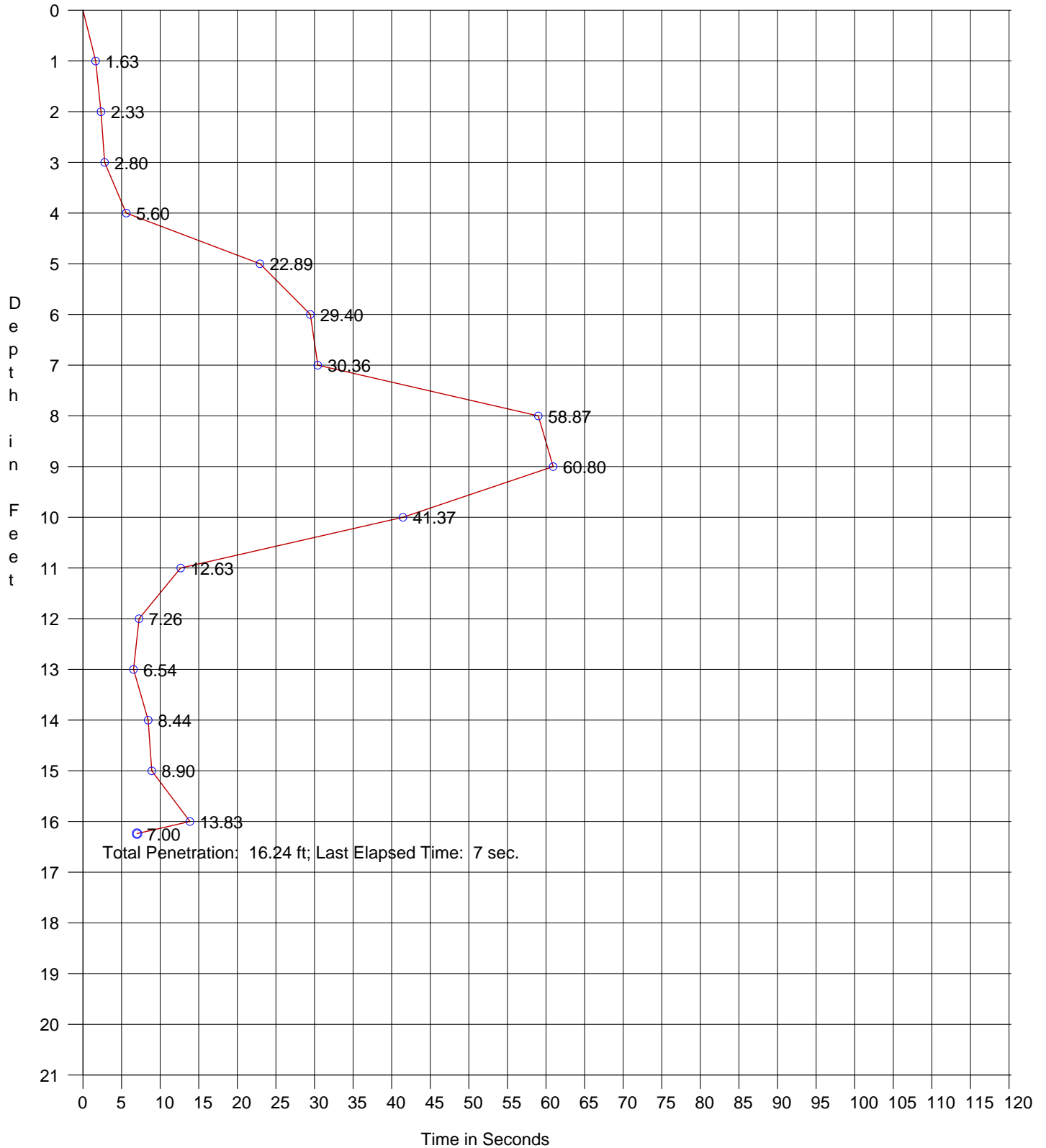
Date: 12/18/2011
Start Time: 8:29:32 AM
End Time: 8:36:13 AM

Penetration: 16.24 ft
Recovery: 16.92 ft
W. D. Corrected: 49.74 ft
W. D. Raw: 47.88 ft

Easting: 2578106.66
Northing: 322970.27
Coord. System: NCSPCS 83

Long: 77°04'41.9280"W
Lat: 034°37'19.3140" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. Z301, Run 1

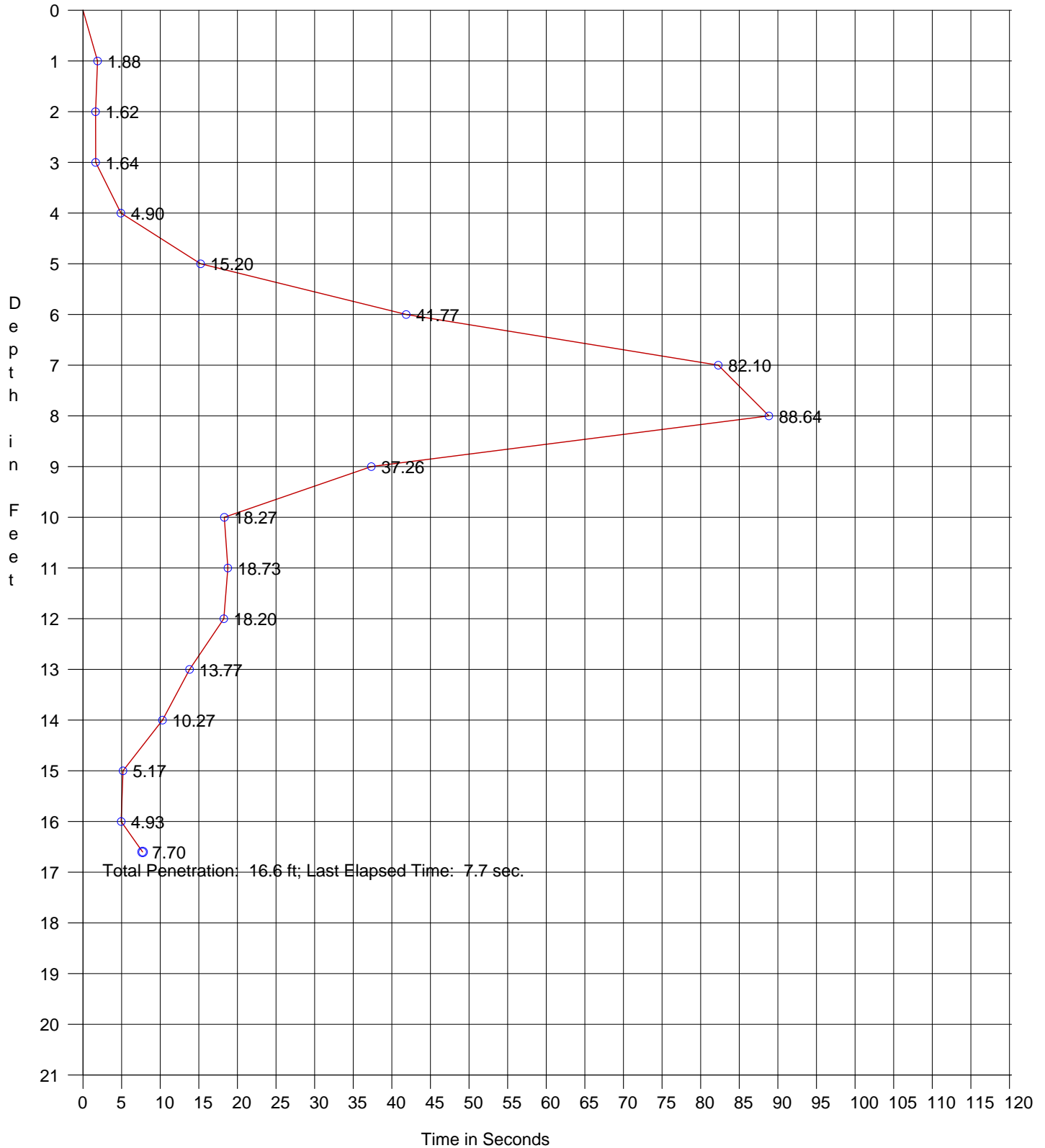
Date: 12/18/2011
Start Time: 8:51:54 AM
End Time: 8:58:06 AM

Penetration: 16.60 ft
Recovery: 18.00 ft
W. D. Corrected: 47.84 ft
W. D. Raw: 46.06 ft

Easting: 2579045.16
Northing: 323320.21
Coord. System: NCSPCS 83

Long: 77°04'30.6180" W
Lat: 034°37'22.5960" N
Datum: NAVD 88

Comment:



Penetration Graph for Core No. BI-1, Run 2

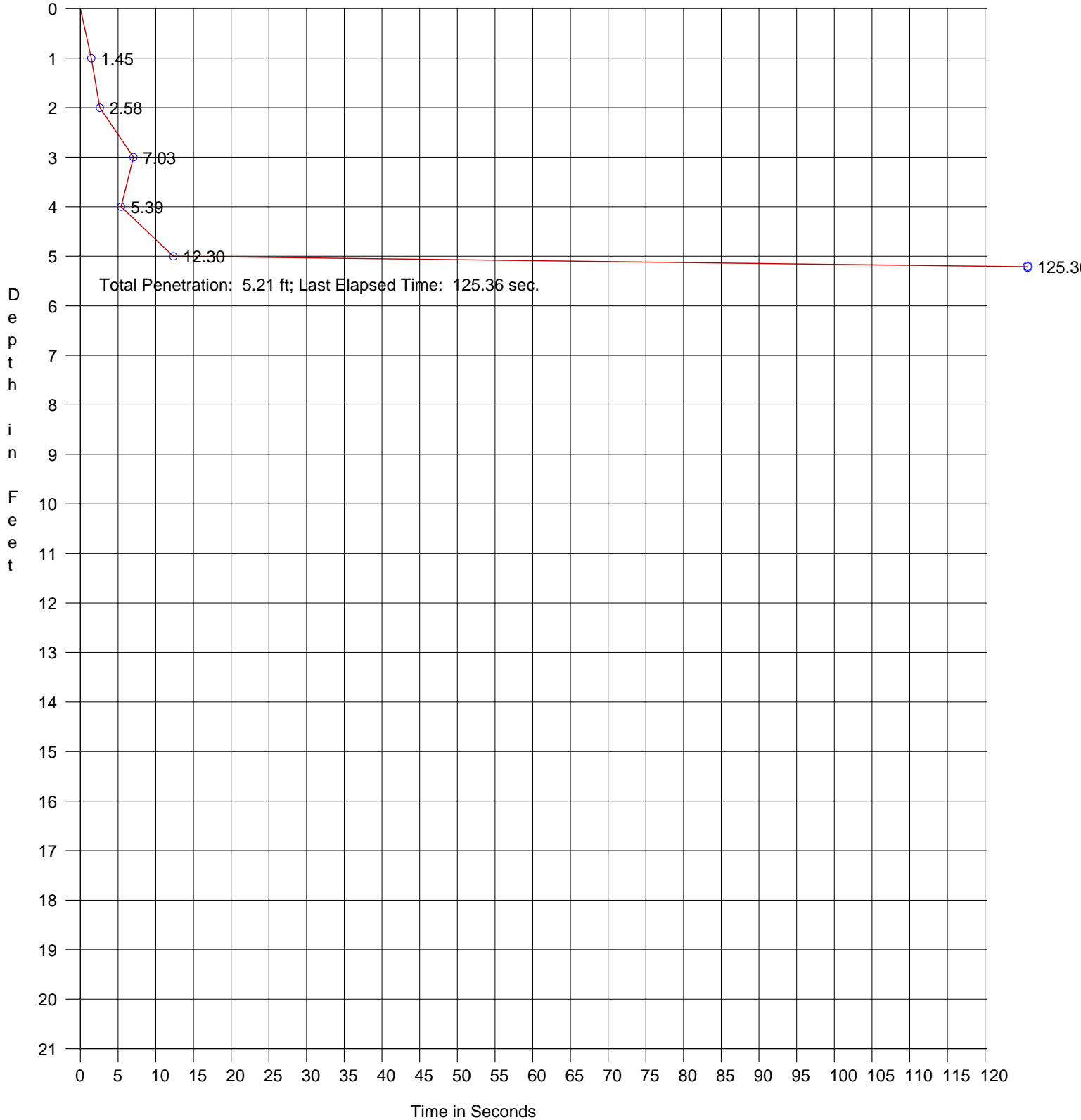
Date: 4/10/2012
Start Time: 12:52:29 PM
End Time: 12:54:30 PM

Penetration: 5.21 ft
Recovery: 5.2 ft
W. D. Corrected: 4.5 ft
W. D. Raw: 5.0 ft

Easting: 2568064.41
Northing: 332679.15
Coord. System: NCSPCS 83

Lat: 34.64923500°
Long: 77.11107167°
Datum: NAVD-88

Comment:



Penetration Graph for Core No. BI-2, Run 1

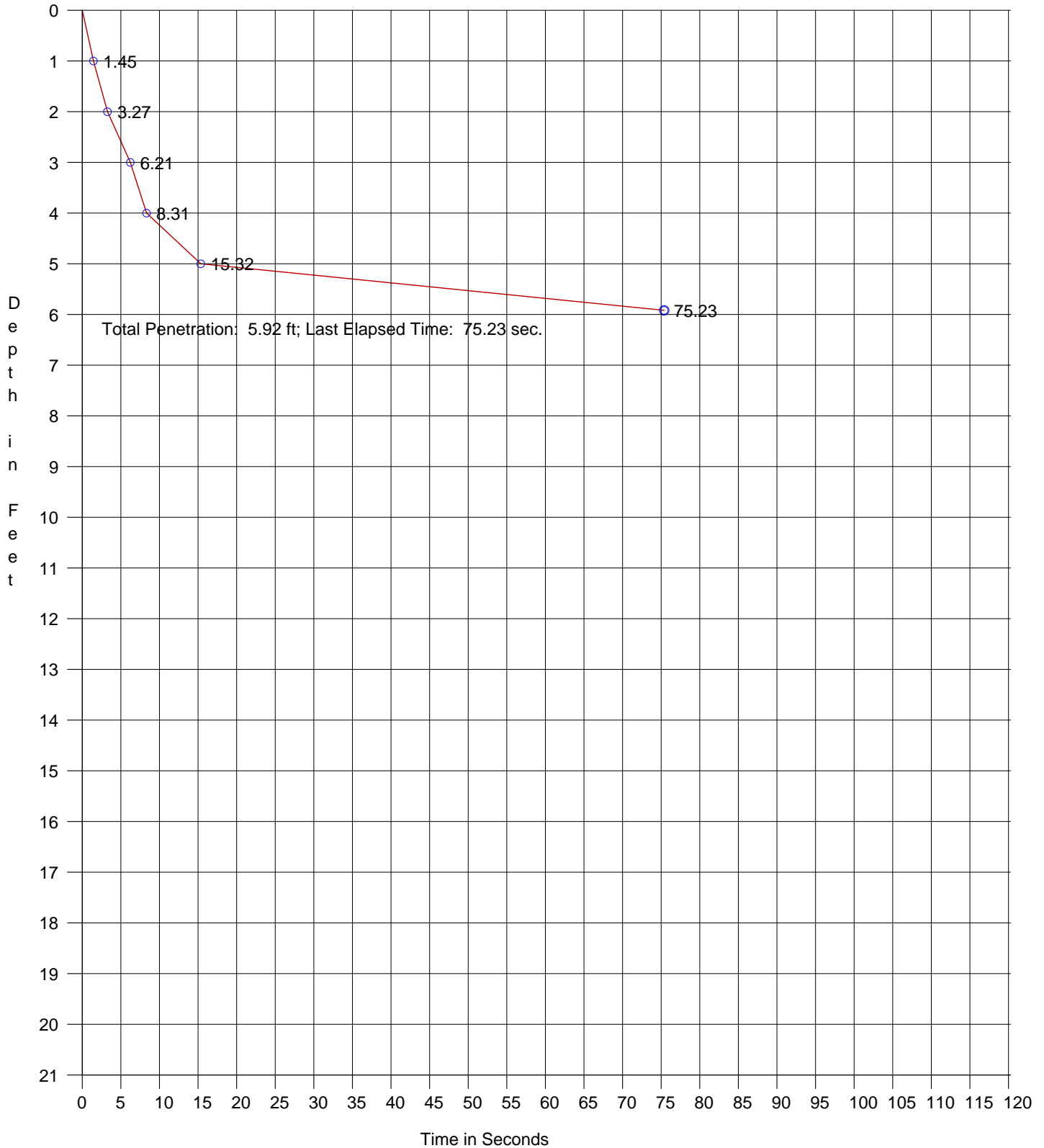
Date: 4/10/2012
Start Time: 14:15:29 PM
End Time: 14:17:03 PM

Penetration: 5.92 ft
Recovery: 5.2 ft
W. D. Corrected: 5.2 ft
W. D. Raw: 4.7 ft

Easting: 2568477.5
Northing: 331312.5
Coord. System: NCSPCS 83

Lat: 34 38' 43.65"N
Long: 77 06' 35.23"W
Datum: NAVD-88

Comment: moved south out of channel



Penetration Graph for Core No. BI-3, Run 1

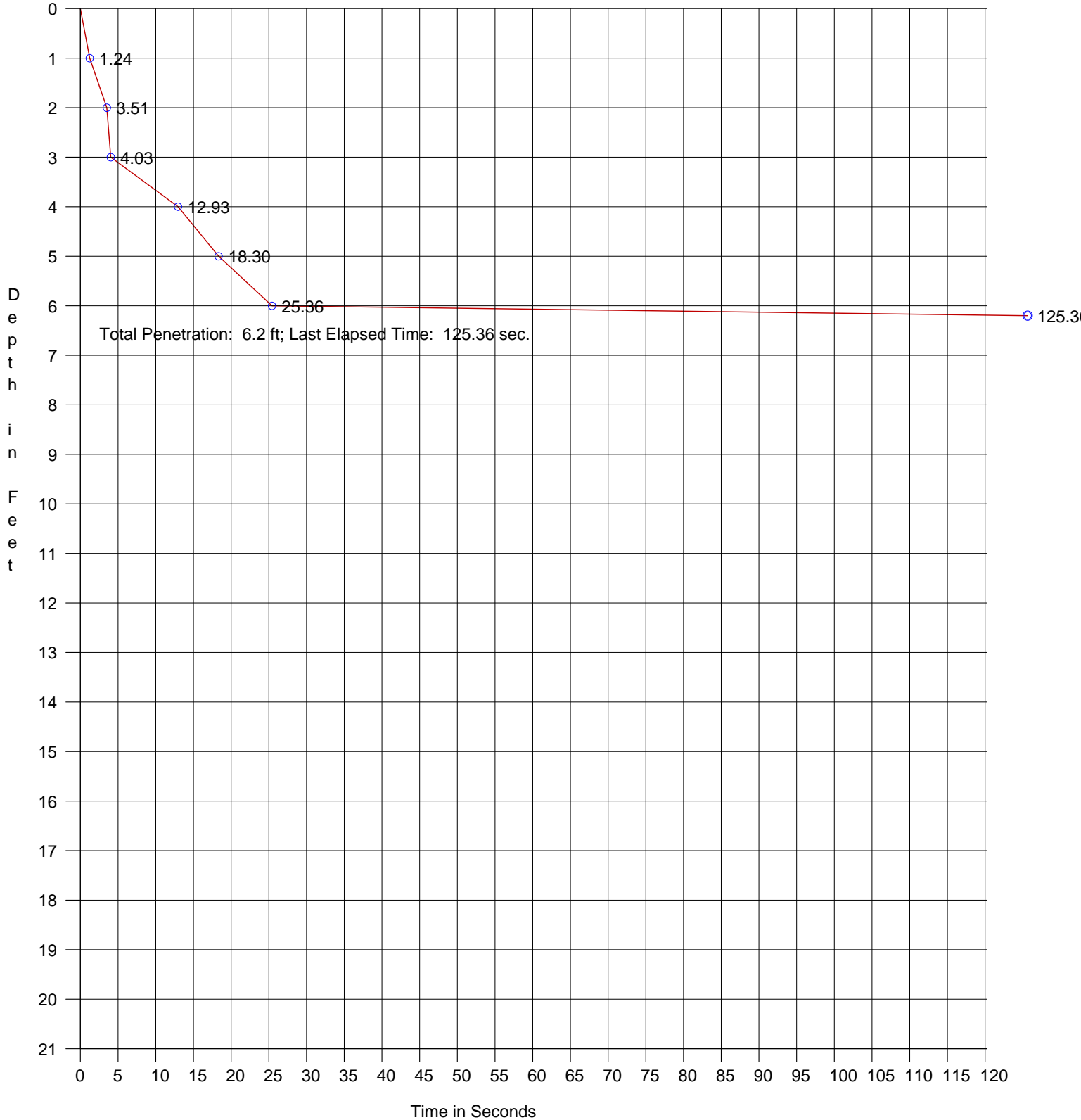
Date: 4/10/2012
Start Time: 14:52:07 PM
End Time: 14:54:27 PM

Penetration: 6.2 ft
Recovery: 5.67 ft
W. D. Corrected: 4.9 ft
W. D. Raw: 3.9 ft

Easting: 2568710.2
Northing: 330774.3
Coord. System: NCSPCS 83

Lat: 34° 38' 38.28"N
Long: 77° 06' 32.56"W
Datum: NAVD-88

Comment:



Penetration Graph for Core No. BI-4, Run 1

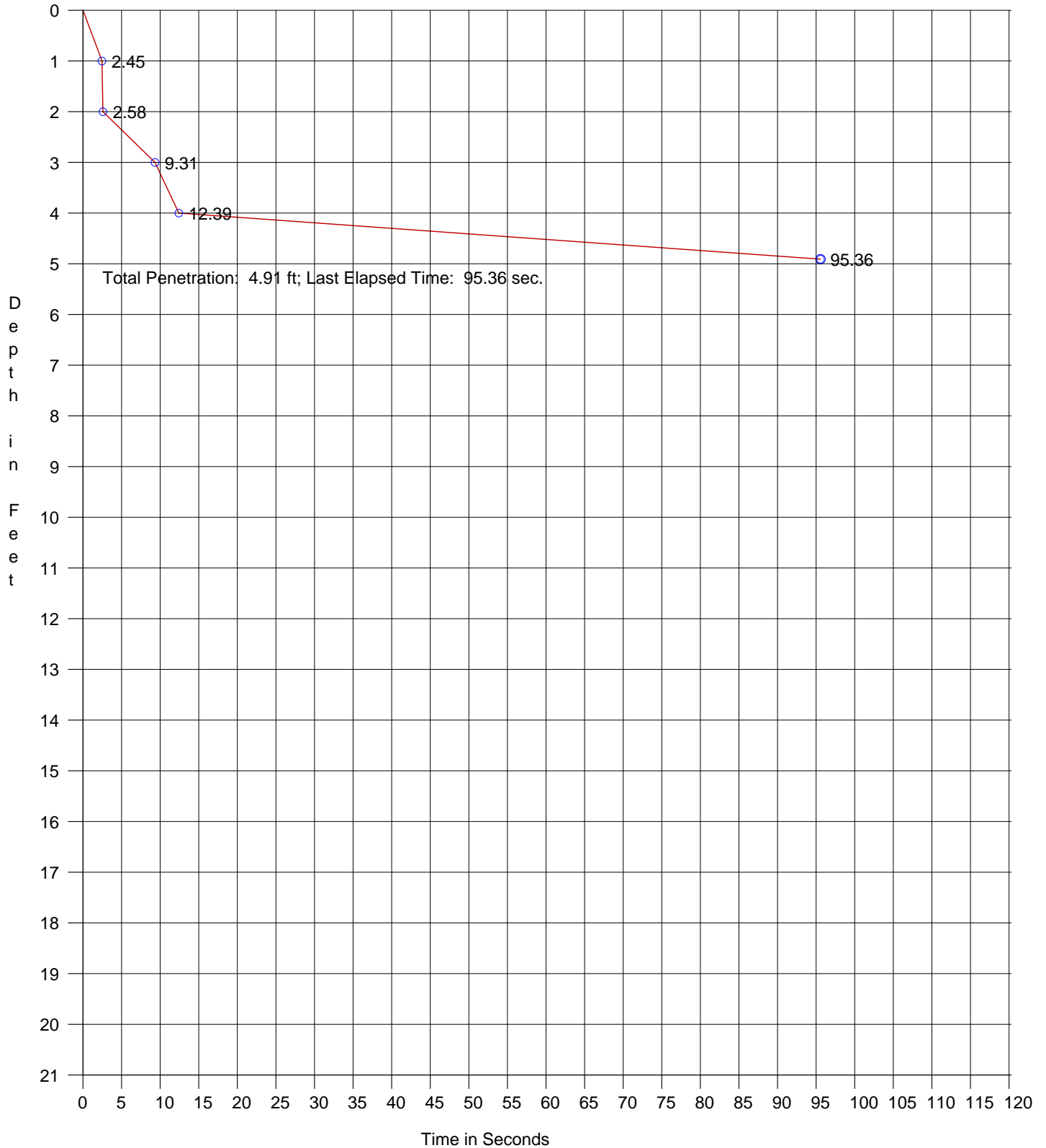
Date: 4/10/2012
Start Time: 15:25:29 PM
End Time: 15:28:30 PM

Penetration: 4.91 ft
Recovery: 5.2 ft
W. D. Corrected: 6.6 ft
W. D. Raw: 5.2 ft

Easting: 2569032.6
Northing: 329825.2
Coord. System: NCSPCS 83

Lat: 34°38'28.834"N
Long: 77° 06'28.923"W
Datum: NAVD-88

Comment:



Penetration Graph for Core No. 5, Run 1

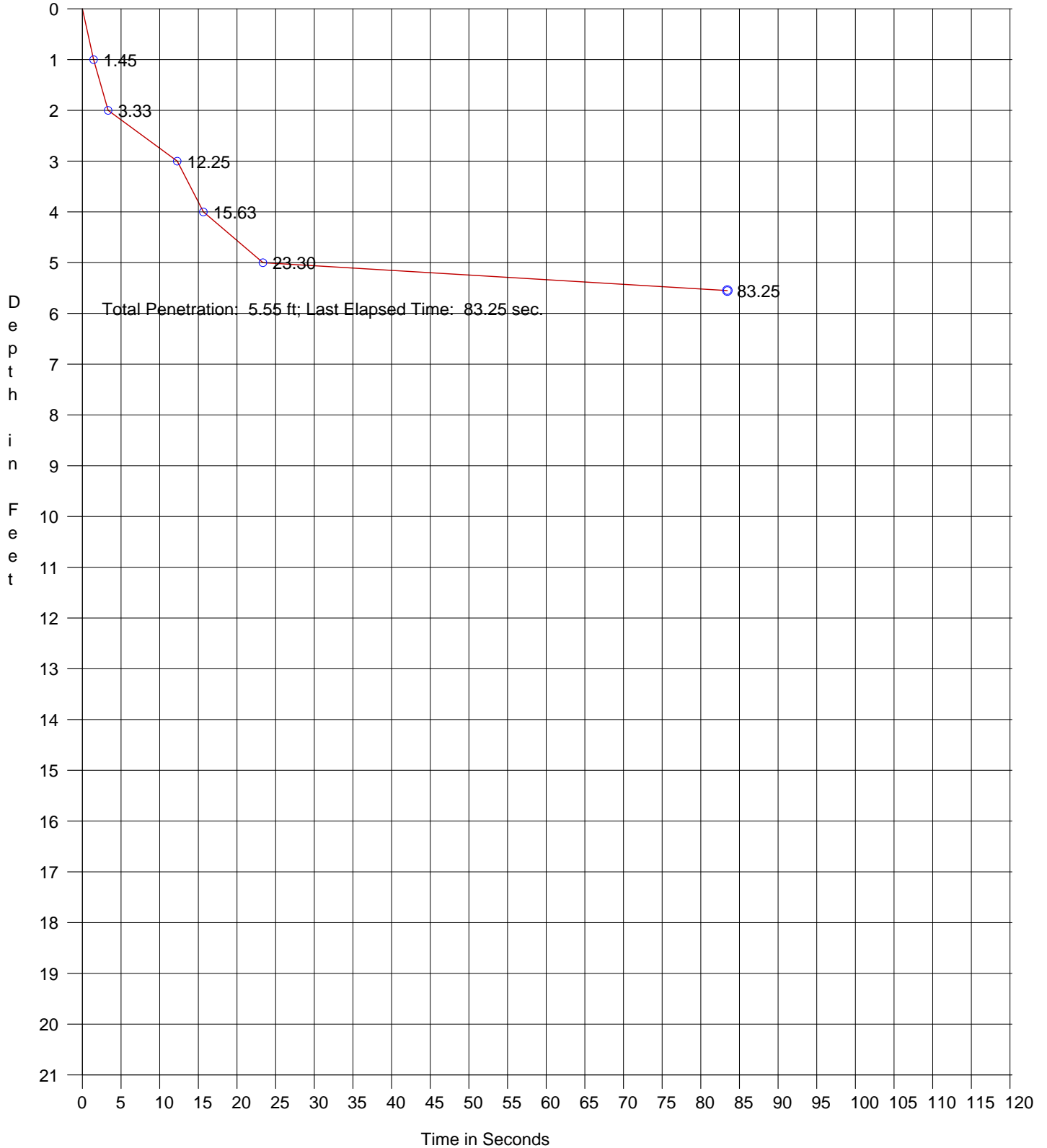
Date: 4/10/2012
Start Time: 16:05:02 PM
End Time: 16:08:15 PM

Penetration: 5.55 ft
Recovery: 5.0 ft
W. D. Corrected: 6.6 ft
W. D. Raw: 4.8 ft

Easting: 2569357.2
Northing: 328880.3
Coord. System: NC State Plane

Lat: 34° 49'32.122"N
Long: 77° 07' 32.141"W
Datum: NAVD-88

Comment:








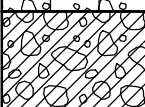
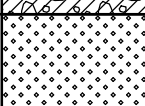
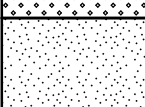
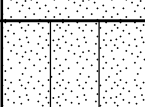
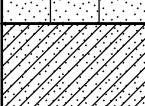
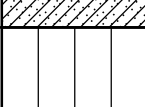
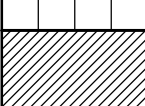
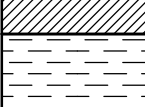


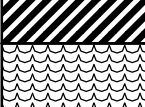
Bogue Banks
Master Beach Renourishment Plan



APPENDIX 3

GEOLOGICAL LOGS

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				BRECCIA	BROKEN SHELLS AND SHELL HASH; LITTLE SILT
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
		FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML
	CL			INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	OL			ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			OLSH	INORGANIC SILTS, LOW PLASTICITY WITH SHELLS	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY	
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 338,253.5 E 2,688,365.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-1				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 18.7				17. ELEVATION TOP OF HOLE -53.6			
8. Recovery, ft 18.3				18. TOTAL CORE RECOVERY FOR BORING 98 %			
9. Total Recovery, % 98.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-53.6	0.0		Dark gray fine to medium silty sand, with shells (10-20%) to 1/2"	101	1 0.0 2.9		
-56.5	2.9		Dark gray fine to medium Sand, 23% shell fragments	98	2 2.9 4.0		
-57.6	4.0		Dark gray silty fine Sand and shells to 2" (44%)	100	3 4.0 8.0		
-61.6	8.0		Light gray broken pieces of cemented calcareous sandstone to 7 inches long; with silt in between rock pieces	100	NA 8.0 11.0		
-64.6	11.0		Gray Silty fine sand and shells (30-40%)	100	4 11.0 16.0		
-69.6	16.0		Dark gray silty fine Sand, few shells (6%)	101	5 16.0 18.3		
-71.9	18.3						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 338,257.0 E 2,690,365.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-2				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 18.8				17. ELEVATION TOP OF HOLE -52.4			
8. Recovery, ft 19.6				18. TOTAL CORE RECOVERY FOR BORING 104 %			
9. Total Recovery, % 104.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-52.4	0.0		Dark gray fine to medium Sand, some Silt and large shell pieces (20%)	100	1		
-53.4	1.0				0.0 4.0		
			Dark gray fine sand and silt, few shell fragments (20%)				
-56.4	4.0						
			Dark gray silty fine Sand with 30-60% shells	100	2		
					4.0 12.0		
-64.4	12.0						
			Dark gray shell fragments and pieces of broken limestone to 1" in loose silt	100	3		
					12.0 15.0		
-67.4	15.0						
			Dark gray fine Sand, some silt, 20% small shell fragments	101	4		
					15.0 18.8		
-70.6	18.2						
-71.2	18.8		Green silty fine Sand, rare shells fragments				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 338,253.0 E 2,694,365.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-4				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH			
7. Penetration, ft 18.9				16. DATE HOLE		STARTED 12/11/2011 COMPLETED 12/11/2011	
8. Recovery, ft 16.8				17. ELEVATION TOP OF HOLE -50.2			
9. Total Recovery, % 89.0				18. TOTAL CORE RECOVERY FOR BORING 89 %			
				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-50.2	0.0		Dark gray silty fine Sand to sandy Silt, slightly cohesive, 10-20% shell fragments	100	1 0.0 7.5		
-57.7	7.5		Dark gray silty Shell hash, some fine sand, (>50% shell fragments)	100	2 7.5 12.0		
				101	3 12.0 16.7		
-66.9	16.7						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 336,249.4 E 2,688,364.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-5				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 17.8				17. ELEVATION TOP OF HOLE -47.6			
8. Recovery, ft 18.6				18. TOTAL CORE RECOVERY FOR BORING 104 %			
9. Total Recovery, % 104.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-47.6	0.0		Gray to dark gray fine to medium Sand, few shell fragments	100	1 0.0 6.5		
-54.1	6.5		Dark gray fine sand and silt, with 20-30% shell hash	100	2 6.5 10.0		
-57.6	10.0		Dark gray shells and shell fragments (50%) to 2" in sandy silt matrix	100	3 10.0 17.8		
-65.4	17.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 336,252.7 E 2,690,365.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-6				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 19.1				17. ELEVATION TOP OF HOLE -42.6			
8. Recovery, ft 19.0				18. TOTAL CORE RECOVERY FOR BORING 99 %			
9. Total Recovery, % 99.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-42.6	0.0		Light gray to gray fine to medium Sand, rare shell fragments (5%)	100	1 0.0 3.4		
-46.0	3.4						
-47.8	5.2		Dark gray fine to medium Sand and 1/2" thick clay lenses at 3.9' and 4.5"	100	2 3.4 5.2		
-51.6	9.0		Gray fine to medium Sand, few shell fragments (11%)	100	3 5.2 9.0		
-56.6	14.0		Dark gray to gray fine to medium Sand, some shells (15-20%)	100	4 9.0 14.0		
-59.6	17.0		Dark gray Silt, little fine sand, some small shell fragments (22%)	100	5 14.0 17.2		
-61.6	19.0		Dark gray fine to medium Sand, rare small shell fragments (5%)				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 336,256.4 E 2,692,366.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-7				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 15.7				17. ELEVATION TOP OF HOLE -38.8			
8. Recovery, ft 13.7				18. TOTAL CORE RECOVERY FOR BORING 87 %			
9. Total Recovery, % 87.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-38.8	0.0		Light brown gray fine to medium Sand, rate small shell fragments (5%)	100	1 0.0 2.5		
-41.3	2.5		Gray fine to medium Sand with some large shells (20%)	100	2 2.5 4.5		
-43.3	4.5		Gray fine to medium Sand, few shells in lenses between 6 and 6.9'	101	3 4.5 6.9		
-45.7	6.9		Densely packed gray to dark gray fine Sand, shell fragments in lens 9.9-10'	95	4 6.7 13.7		
-52.5	13.7						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 336,253.0 E 2,694,363.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-8				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 19.2				17. ELEVATION TOP OF HOLE -52.1			
8. Recovery, ft 19.0				18. TOTAL CORE RECOVERY FOR BORING 99 %			
9. Total Recovery, % 99.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-52.1	0.0		Black to dark gray soft organic silt to silty fine to medium Sand, few shell fragments	96	1 0.0 1.9		
-54.0	1.9		Dark gray fine to medium Sand, some 1/2" shell fragments (10-20%)	101	2 1.9 4.7		
-56.8	4.7		Sharp change at 4.5 feet to dark gray soft Organic Silt, few shells	101	3 4.7 7.5		
-59.6	7.5		Dark gray shell hash to 1.5" (45-50%), little fine silty Sand	100	4 7.5 19.0		
-71.1	19.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS			
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in					
2. LOCATION (Coordinates or Station) N 334,253.5 E 2,688,362.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88					
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore					
4. HOLE NO. (As shown on drawing title and file number) O-9				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED			
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES					
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 12/12/2011 COMPLETED 12/12/2011			
7. Penetration, ft 19.8				17. ELEVATION TOP OF HOLE -49.9					
8. Recovery, ft 18.4				18. TOTAL CORE RECOVERY FOR BORING 93 %					
9. Total Recovery, % 93.0				19. GEOLOGIST C. Dill					
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g			
-49.9	0.0		Gray fine to medium Sand, some small shell fragments (15%)	100	1 0.0 4.0				
-53.9	4.0								
-55.1	5.2		Dark gray fine sandy Silt, few shell fragments	97	2 4.0 5.2				
-59.4	9.5		Dark gray Shell Hash (32%), some fine to medium silty sand	101	3 5.2 9.5				
-68.3	18.4		Light gray to gray silty Shell Hash (46%)	100	4 9.5 18.4				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 334,251.1 E 2,690,363.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-10				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 20.0				17. ELEVATION TOP OF HOLE -38.2			
8. Recovery, ft 20.0				18. TOTAL CORE RECOVERY FOR BORING 100 %			
9. Total Recovery, % 100.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-38.2	0.0		Gray fine to medium Sand; shell fragments in 4-6" lenses at 1-1.5' (10-15%)	100	1 0.0 5.0		
-43.2	5.0		Gray fine to medium Sand; 10-15% shell fragments	100	2 5.0 10.0		
-48.2	10.0		Gray fine to medium Sand; 10-15% shell fragments	100	3 10.0 15.0		
-53.2	15.0		Gray fine to medium Sand; shell fragments in 4-6" lenses at 17-17.5' (10-15%)	100	4 15.0 20.0		
-58.2	20.0		Gray fine to medium Sand; shell fragments in 4-6" lenses at 17-17.5' (10-15%)	100	4 15.0 20.0		

ENG FORM MAR 71	1836	PREVIOUS EDITIONS ARE OBSOLETE.	PROJECT Bogue Banks Master Beach Nourishment Plan	HOLE NO. 0111
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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS															
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in																	
2. LOCATION (Coordinates or Station) N 334,250.7 E 2,694,365.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88																	
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore																	
4. HOLE NO. (As shown on drawing title and file number) O-12				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED															
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES																	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH																	
7. Penetration, ft 19.1				16. DATE HOLE		STARTED 12/12/2011 COMPLETED 12/12/2011															
8. Recovery, ft 18.0				17. ELEVATION TOP OF HOLE -46.6																	
9. Total Recovery, % 94.0				18. TOTAL CORE RECOVERY FOR BORING 94 %																	
				19. GEOLOGIST C. Dill																	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g															
-46.6	0.0		Gray fine to medium Sand, 15% shells and shell fragments in layers 12-18" thick	100	1 0.0 5.0																
				100	2 5.0 9.0																
-55.6	9.0		Dark gray silty fine Sand, some shell fragments (15-20%)	100	3 9.0 14.0																
-56.6	10.0									Dark gray soft Organic Silt, some fine shell fragments											
-58.6	12.0	Dark gray silty fine sand, some shell fragments																			
-60.6	14.0		100	4 14.0 18.0																	
-62.6	16.0	Dark gray fine to medium Sand, some Silt																			
-64.6	18.0									Dark gray silty fine to medium Sand and shell fragments (30%)											

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 334,251.0 E 2,696,360.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-13				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH			
7. Penetration, ft 18.8				16. DATE HOLE		STARTED 12/12/2011 COMPLETED 12/12/2011	
8. Recovery, ft 14.1				17. ELEVATION TOP OF HOLE -47.3			
9. Total Recovery, % 72.0				18. TOTAL CORE RECOVERY FOR BORING 72 %			
				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-47.3	0.0		Gray fine to medium Sand, some shell fragments (10-15%)	100	1 0.0 6.0		
-53.3	6.0		Dark gray silty fine Sand and shells (10-20%)	100	2 6.0 9.0		
-56.3	9.0		Dark gray soft cohesive Organic Silty Clay	100	3 9.0 11.0		
-62.3	15.0		Dark gray sandy Silt to silty fine to medium Sand				
-65.5	18.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 327,738.9 E 2,685,621.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-14				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 17.5				17. ELEVATION TOP OF HOLE -42.6			
8. Recovery, ft 12.0				18. TOTAL CORE RECOVERY FOR BORING 64 %			
9. Total Recovery, % 64.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-42.6	0.0		Gray fine Sand, with 6" thick lenses of shells to 1.5" in size (15-20%)	100	1 0.0 5.0		
				100	2 5.0 8.5		
-51.1	8.5		Light gray-brown fine to medium Sand and shells (30-50%); 12-17' washed out, no recovery	100	3 8.5 12.0		
-54.6	12.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,634.8 E 2,685,079.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-15				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 20.1				17. ELEVATION TOP OF HOLE -41.3			
8. Recovery, ft 12.3				18. TOTAL CORE RECOVERY FOR BORING 63 %			
9. Total Recovery, % 63.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-41.3	0.0		Light gray fine to medium Sand, 10-15% shell hash	100	1 0.0 5.0		
				100	2 5.0 10.5		
-51.8	10.5		Dark gray very shelly (35%) silty Sand to sandy Silt	100	3 10.5 12.2		
-53.5	12.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,253.3 E 2,686,364.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-16				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 19.1				17. ELEVATION TOP OF HOLE -48.5			
8. Recovery, ft 18.2				18. TOTAL CORE RECOVERY FOR BORING 83 %			
9. Total Recovery, % 83.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-48.5	0.0		Gray fine to medium Sand, few shells and shell hash (15-20%)	100	1 0.0 2.5		
-51.0	2.5		One inch thick layer of dark gray soft Organic Silt	99	2 2.5 4.6		
-51.1	2.6		Dark gray fine to medium Sand, few shells (10-15%)				
-52.0	3.5		Dark gray shells (50-60%) and soft organic Silt				
-53.0	4.5		Dark gray soft Organic Silt	104	3 4.6 5.0		
-55.7	7.2		Dark gray silty fine Sand and shell hash (40%)				
-58.0	9.5		Dark gray coarse Shells and shell hash (90%), little silt				
-63.0	14.5		Light gray coarse silty Shell hash (90%); shells to 2" in size				
-66.7	18.2		Light gray coarse silty Shell hash (90%); shells to 2" in size				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,247.9 E 2,688,366.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-17				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 18.5				17. ELEVATION TOP OF HOLE -49.6			
8. Recovery, ft 17.8				18. TOTAL CORE RECOVERY FOR BORING 95 %			
9. Total Recovery, % 95.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-49.6	0.0		Gray fine to medium Sand, few shell fragments (10-15%)	100	1 0.0 4.0		
-53.6	4.0						
-55.1	5.5		Dark gray very fine Sand, some silt, few shells and shell hash (10-15%)	100	2 4.0 5.5		
			Dark gray fine sand, rare small shell fragments (5%)	101	3 5.5 11.3		
-60.9	11.3						
			Gray to light gray shells to 1.5" (35%) and shell hash, little silt or fine sand; with pieces of cemented calcareous sandstone in bottom	107	4 11.3 12.0		
-67.4	17.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,252.6 E 2,690,367.3				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-18				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 20.2				17. ELEVATION TOP OF HOLE -44.1			
8. Recovery, ft 17.8				18. TOTAL CORE RECOVERY FOR BORING 90 %			
9. Total Recovery, % 90.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-44.1	0.0		Gray fine to medium Well-graded Sand, few shells and shell hash (12%)	100	1 0.0 6.0		
				100	2 6.0 12.0		
-56.1	12.0		Sharp break at 12 ft to Dark gray fine Silty Sand and shell hash (25%)	100	3 12.0 17.8		
-61.9	17.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,250.3 E 2,691,366.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-19				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE 12/12/2011	
7. Penetration, ft 19.3				17. ELEVATION TOP OF HOLE -36.1		18. TOTAL CORE RECOVERY FOR BORING 115 %	
8. Recovery, ft 21.5				19. GEOLOGIST C. Dill			
9. Total Recovery, % 115.0							
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 weathering, etc., if significant) g	
-36.1	0.0		Gray to dark gray fine to medium Well-graded Sand; lenses of shell fragments at 4'-5-5' and 6.9-7.5'	100	1 0.0 6.0		
				100	2 6.0 12.0		
				100	3 12.0 17.0		
-49.1	13.0						
-49.2	13.1		Dark gray Clay lens				
			Dark gray fine to medium Well-graded Sand, rare shell fragments (5%)				
-53.1	17.0						
			Gray fine Poorly-graded Sand, few shells, little dark gray silt-clay in thin laminae	100	4 17.0 19.2		
-55.4	19.3						

ENG FORM MAR 71	1836	PREVIOUS EDITIONS ARE OBSOLETE.	PROJECT Bogue Banks Master Beach Nourishment	HOLE NO. 0-20
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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,249.3 E 2,693,363.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-21				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 17.6				17. ELEVATION TOP OF HOLE -37.0			
8. Recovery, ft 15.9				18. TOTAL CORE RECOVERY FOR BORING 85 %			
9. Total Recovery, % 85.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-37.0	0.0		Gray-brown fine to medium Well-graded Sand, with some scattered shells	100	1		
	0.0						
	5.0						
-42.0	5.0		Gray fine to medium Well-graded Sand, some rare shell pieces; lens of dark gray clay 1" thick at 9.9'	100	2		
					5.0		
					10.0		
				100	3		
					10.0		
					15.0		
-52.9	15.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,253.7 E 2,694,363.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-22				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 19.1				17. ELEVATION TOP OF HOLE -32.7			
8. Recovery, ft 20.0				18. TOTAL CORE RECOVERY FOR BORING 105 %			
9. Total Recovery, % 105.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-32.7	0.0		Gray to brown fine to medium Well-graded Sand, intermittent shells and shell hash (20%); some shells to 2 inches in size at 8" and 1'3" below sea floor and between 8'10 and 10'	100	1 0.0 5.0		
				100	2 5.0 10.0		
				100	3 10.0 15.0		
				100	4 15.0 19.0		
-51.8	19.1						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS			
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in					
2. LOCATION (Coordinates or Station) N 332,253.0 E 2,696,365.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88					
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore					
4. HOLE NO. (As shown on drawing title and file number) O-23				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED			
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES					
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE			
				STARTED 12/10/2011		COMPLETED 12/10/2011			
7. Penetration, ft 19.7				17. ELEVATION TOP OF HOLE -47.8					
8. Recovery, ft 17.2				18. TOTAL CORE RECOVERY FOR BORING 86 %					
9. Total Recovery, % 86.0				19. GEOLOGIST C. Dill					
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 weathering, etc., if significant) g			
-47.8	0.0		Gray fine to medium Well-graded Sand with intermittent shells (20%)	100	1 0.0 6.0				
-53.8	6.0								
-62.8	15.0		Dark gray fine to medium Poorly-graded Sand with Silt some shells (20-30%)	100	2 6.0 10.0				
				100	3 10.0 15.0				
-65.0	17.2		Gray shells and fine Well-graded Sand with Silt (50-70% shells)	100	4 15.0 17.2				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 331,252.2 E 2,690,362.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-24				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE 12/12/2011	
7. Penetration, ft 18.5				17. ELEVATION TOP OF HOLE -49.3		COMPLETED 12/12/2011	
8. Recovery, ft 13.8				18. TOTAL CORE RECOVERY FOR BORING 73 %			
9. Total Recovery, % 73.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-49.3	0.0		Gray fine to medium Well-graded Sand with Silt, few shells (15-20%); dark gray clay lens at 4'4"	100	1 0.0 4.9		
-54.2	4.9		Sharp change to 4.9 feet to dark gray fine Poorly-graded Sand, some shell fragments (20-30%)	101	2 4.9 6.8		
-56.1	6.8		Soft dark gray organic Silty Sand, some shells (30-40%)	100	3 6.8 13.8		
-63.1	13.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 331,253.1 E 2,691,364.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-25				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 20.0				17. ELEVATION TOP OF HOLE -42.0			
8. Recovery, ft 19.5				18. TOTAL CORE RECOVERY FOR BORING 95 %			
9. Total Recovery, % 95.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-42.0	0.0		Light gray fine to medium Well-graded Sand, trace shells and shell fragments (10-15%)	100	1 0.0 6.0		
				100	2 6.0 12.0		
				100	3 12.0 17.9		
-59.9	17.9		Dark gray fine Poorly-graded Sand with Silt, some shells and shell fragments (15-25%)	100	4 17.9 19.5		
-61.5	19.5						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 331,247.3 E 2,692,365.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-26				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 20.4				17. ELEVATION TOP OF HOLE -45.7			
8. Recovery, ft 13.8				18. TOTAL CORE RECOVERY FOR BORING 68 %			
9. Total Recovery, % 68.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-45.7	0.0		Gray fine to medium Well-graded Sand, some small shell fragments (10-20%); Very rare 1" clay balls	100	1 0.0 5.0		
				100	2 5.0 9.3		
-55.0	9.3		Dark gray fine Silty Sand with some clay lenses and shells (30-50%)	100	3 9.3 13.8		
-59.5	13.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 331,253.5 E 2,693,366.3				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-27				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 19.4				17. ELEVATION TOP OF HOLE -43.6			
8. Recovery, ft 16.8				18. TOTAL CORE RECOVERY FOR BORING 86 %			
9. Total Recovery, % 86.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-43.6	0.0		Gray fine to medium Well-graded Sand, rare shells (5%) in lenses	100	1 0.0 4.0		
				100	2 4.0 8.0		
				100	3 8.0 12.9		
-56.5	12.9		Dark gray fine Silty Sand with shell fragments (20%) and rare clay lenses to 1/2" thick	100	4 12.9 16.8		
-60.4	16.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 331,246.1 E 2,694,358.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-28				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 19.2				17. ELEVATION TOP OF HOLE -42.7			
8. Recovery, ft 12.9				18. TOTAL CORE RECOVERY FOR BORING 63 %			
9. Total Recovery, % 63.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-42.7	0.0		Gray fine to medium Well-graded Sand, few shell fragments (15-20%)	100	1 0.0 6.0		
-54.3	11.6		Sharp change at 11.6 ft to dark gray soft Silty Sand and clay, few shells (20%)	100	2 6.0 11.6		
-55.6	12.9				3 11.6 12.9		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,251.9 E 2,682,363.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-29				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 18.9				17. ELEVATION TOP OF HOLE -51.9			
8. Recovery, ft 15.7				18. TOTAL CORE RECOVERY FOR BORING 81 %			
9. Total Recovery, % 81.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-51.9	0.0		Dark gray silty fine Sand, some shells and shell hash (20-30%)	100	1 0.0 3.0		
-54.9	3.0		Dark gray soft Organic Silt	100	2 3.0 4.3		
-56.2	4.3		Dark gray silty fine to medium Sand and shells (50%)	100	3 4.3 10.0		
-61.9	10.0						
-67.6	15.7		Light gray to dark gray shells and silt, some fine sand; 3" shell fragments 15.4-15.7'	100	4 10.0 15.7		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,251.1 E 2,684,365.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-30				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 18.5				17. ELEVATION TOP OF HOLE -51.0			
8. Recovery, ft 18.8				18. TOTAL CORE RECOVERY FOR BORING 101 %			
9. Total Recovery, % 101.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-51.0	0.0		Dark gray fine to medium Sand; shells (50%) in layer 2.2-2.6 ft	100	1 0.0 3.3		
-54.3	3.3		Soft dark gray Organic Silt	100	2 3.3 5.6		
-56.6	5.6		Dark gray silty fine to medium Sand and some shell fragments (30%)	100	3 5.6 9.0		
-60.0	9.0		Gray sandy silty Shell hash (70-90%)	100	4 9.0 16.0		
-67.0	16.0		Gray silty shells and cemented calcareous sandstone fragments to 3" in size				
-69.8	18.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,253.4 E 2,686,364.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-31				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 19.3				17. ELEVATION TOP OF HOLE -53.6			
8. Recovery, ft 17.9				18. TOTAL CORE RECOVERY FOR BORING 93 %			
9. Total Recovery, % 93.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-53.6	0.0		Dark gray fine to medium Sand, some shells and shell fragments (30-40%)	100	1 0.0 1.5		
-55.1	1.5		Dark gray soft Organic Silt	100	2 1.5 4.5		
-58.2	4.6		Dark gray sandy Silt and shells (40%)	100	3 4.5 6.0		
-59.6	6.0		Dark gray shell hash and fine to medium sandy silt				
-62.6	9.0		Dark gray Organic Silt and shells (30-50%)				
-63.6	10.0		Gray fine to medium sandy Silt, some shells to 2" (20-40%)				
-67.6	14.0		Light gray broken cemented calcareous sandstone, 4 " long sections				
-71.5	17.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,251.3 E 2,688,366.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-32				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 18.7				17. ELEVATION TOP OF HOLE -51.1			
8. Recovery, ft 17.5				18. TOTAL CORE RECOVERY FOR BORING 93 %			
9. Total Recovery, % 93.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-51.1	0.0		Dark gray to gray silty fine Sand grading with fine to medium sand lenses, trace shell fragments (5-15%)	100	1 0.0 4.2		
-55.4	4.3						
-58.6	7.5		Dark gray Organic Silt, few shell fragments (5-10%)	100	2 4.2 7.5		
-62.3	11.2						
-63.1	12.0		Gray shell hash (50%) and silty fine Sand	100	3 7.5 11.2		
-68.6	17.5						
			Dark gray Organic Silt and shells to 3" (50%)				
			Gray silty Shell hash (70-90%)				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,252.2 E 2,690,362.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-33				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 16.3				17. ELEVATION TOP OF HOLE -63.2			
8. Recovery, ft 18.2				18. TOTAL CORE RECOVERY FOR BORING 110 %			
9. Total Recovery, % 110.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-63.2	0.0		Dark gray to gray fine to medium Sand, some shell fragments (10-15%)	100	1 0.0 3.5		
-66.7	3.5		Dark gray silty fine Sand, some shell fragments (10-20%)	100	2 3.5 5.0		
-68.2	5.0		Dark gray silty fine sand and shell hash, small pieces (30-50%)	100	3 5.0 9.0		
-72.2	9.0		Light gray loose very coarse shells and shell hash (60-90%)				
-76.2	13.0		Light gray layers of cemented calcareous sand and fine to medium sand				
-79.4	16.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,251.8 E 2,692,365.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-34				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 18.6				17. ELEVATION TOP OF HOLE -50.2			
8. Recovery, ft 12.5				18. TOTAL CORE RECOVERY FOR BORING 67 %			
9. Total Recovery, % 67.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-50.2	0.0		Light gray fine to medium Sand and some shell fragments (10-15%)	100	1 0.0 4.0		
-54.2	4.0		Dark gray silty fine sand, few small shell fragments (5-10%)	100	2 4.0 5.9		
-56.1	5.9			100	3 5.9 8.0		
-58.2	8.0		Dark gray silty fine Sand and shell hash (35-50%); with two inch thick lenses of Organic Silt; shells to 3 inches at bottom	100	4 8.0 12.5		
-62.7	12.5						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,254.0 E 2,694,362.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-35				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 19.2				17. ELEVATION TOP OF HOLE -49.3			
8. Recovery, ft 11.9				18. TOTAL CORE RECOVERY FOR BORING 65 %			
9. Total Recovery, % 65.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-49.3	0.0		Gray fine to medium Sand, few shell fragments (5-10%)	100	1 0.0 4.9		
-54.2	4.9		Dark gray silty fine sand with shells and shell fragments (20-30%)	97	2 4.9 8.0		
-57.3	8.0						
-59.3	10.0		Gray to brown sticky silty fine Sand, with lenses of shell hash (10-15%)	100	3 8.0 10.0		
-61.2	11.9		Dark gray shelly Silt (30-50% shell)				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,251.5 E 2,696,364.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-36				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 19.5				17. ELEVATION TOP OF HOLE -49.1			
8. Recovery, ft 15.9				18. TOTAL CORE RECOVERY FOR BORING 81 %			
9. Total Recovery, % 81.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-49.1	0.0		Gray fine to medium Sand, rare (5%) shells	100	1 0.0 3.5		
-52.6	3.5						
-55.3	6.2		Dark gray silty fine sand and shells with shell hash (30-50%)	100	2 3.5 6.2		
-60.1	11.0						
-65.0	15.9		Gray to light brown fine Sand with 10% brown clay laminae	100	3 6.2 11.0		
			Dark gray shells (30-40%) and silty fine Sand, few clay lenses to 1" thickness	100	4 11.0 15.9		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,255.2 E 2,682,364.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-37				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 19.1				17. ELEVATION TOP OF HOLE -50.8			
8. Recovery, ft 15.0				18. TOTAL CORE RECOVERY FOR BORING 79 %			
9. Total Recovery, % 79.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-50.8	0.0		Gray fine to medium Sand, some shells (30%)	100	1 0.0 2.0		
-52.8	2.0		Dark gray silty fine to medium Sand, with shells and shell hash (30-50%)	100	2 2.0 5.0		
-55.8	5.0		Gray to brown silty very fine Sand, with rare clay lenses, no shells	100	3 5.0 11.0		
-61.8	11.0		Sharp break at 11 ft to Gray loose shell hash (70-90%) and silty fine Sand	100	4 11.0 15.0		
-65.8	15.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,255.7 E 2,684,367.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-38				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 20.0				17. ELEVATION TOP OF HOLE -46.6			
8. Recovery, ft 13.8				18. TOTAL CORE RECOVERY FOR BORING 70 %			
9. Total Recovery, % 70.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-46.6	0.0		Light gray to light brown fine to medium Sand, some shells and shell fragments (30%)	100	1 0.0 4.0		
-50.6	4.0		Dark gray silty fine Sand, few shells (10-20%)	100	2 4.0 7.0		
-53.6	7.0		Brown-gray cohesive Silt	100	3 7.0 12.0		
-58.6	12.0		Gray shell hash (40-60%) and silty fine Sand				
-60.4	13.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,252.6 E 2,686,364.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-39				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
						STARTED 12/10/2011 COMPLETED 12/10/2011	
7. Penetration, ft 18.2				17. ELEVATION TOP OF HOLE -53.9			
8. Recovery, ft 17.8				18. TOTAL CORE RECOVERY FOR BORING 97 %			
9. Total Recovery, % 97.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-54.2	0.3		Gray fine to medium Sand, few shells (20%) Dark gray silty fine Sand, rare clay lenses	100	1 0.0 4.0		
-57.9	4.0		Dark gray fine sand and Silt with shell fragments (20-40%)	100	2 4.0 6.0		
-59.9	6.0		Light gray loose very coarse Shells and shell fragments (80%) and a few pieces of cemented sandstone	100	3 6.0 11.0		
-64.9	11.0		Dark brown to dark green very hard brown Silt				
-65.1	11.2		Gray shell hash (100%)				
-65.4	11.5		Dark green very hard Clay with weathered white shell remnants (5%)				
-71.7	17.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,251.4 E 2,688,361.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-40				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 18.4				17. ELEVATION TOP OF HOLE -53.7			
8. Recovery, ft 18.8				18. TOTAL CORE RECOVERY FOR BORING 104 %			
9. Total Recovery, % 104.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-53.7	0.0		Dark gray silty fine Sand and shells (40-70%)	100	1 0.0 1.3		
-55.0	1.3		Dark gray sticky Organic Silt-Clay and fine Sand; some shell fragments (20-30%)	100	2 1.3 4.0		
-57.7	4.0		Dark gray shells and shell hash (80%) in silt matrix.	100	3 4.0 11.0		
-64.7	11.0						
-66.2	12.5		Light gray fine to medium Sand, few shells (15-20%)				
-72.0	18.3		Light gray coarse shell hash and shells (70-90%) with little fine sand and silt				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,249.4 E 2,690,364.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-41				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 19.4				17. ELEVATION TOP OF HOLE -45.9			
8. Recovery, ft 16.3				18. TOTAL CORE RECOVERY FOR BORING 84 %			
9. Total Recovery, % 84.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-45.9	0.0		Gray to light brown fine to medium Sand with shells and shell hash in layers to 1" thick	100	1 0.0 6.0		
-51.9	6.0		Gray fine sand, few small shells (10-20%)	100	2 6.0 9.0		
-54.9	9.0		Dark gray silty fine Sand with shells to 2 " and shell hash (40-70%)	100	3 9.0 16.2		
-62.1	16.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,247.0 E 2,692,365.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-42				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 18.7				17. ELEVATION TOP OF HOLE -52.4			
8. Recovery, ft 13.8				18. TOTAL CORE RECOVERY FOR BORING 74 %			
9. Total Recovery, % 74.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-52.4	0.0		Gray medium to coarse Sand and small shell fragments (40-50%)	100	1 0.0 2.0		
-54.4	2.0		Dark gray silty fine Sand and shells (20-40%); little clay	100	2 2.0 7.5		
-59.9	7.5		Dark gray sticky Organic Silt, some fine sand, some small shells (15-25%)	100	3 7.5 11.5		
-63.9	11.5		Dark gray Organic Silt and large shell fragments (60-75%)				
-64.4	12.0		Shells and shell fragments (60-80%) in a silty fine sand matrix				
-66.2	13.8						

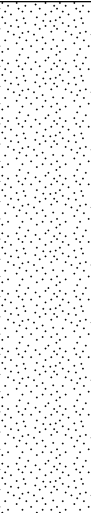

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,249.5 E 2,694,364.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-43				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 18.7				17. ELEVATION TOP OF HOLE -48.4			
8. Recovery, ft 19.4				18. TOTAL CORE RECOVERY FOR BORING 104 %			
9. Total Recovery, % 104.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-48.4	0.0		Light gray fine to medium Sand, coarse shell hash layers at 1.9 to 2.5 feet and at 3.1-3.5 ft.	100	1 0.0 4.9		
-53.3	4.9		Sharp change to dark gray silty fine sand, with occasional thin clay laminae	100	2 4.9 10.0		
				100	3 10.0 15.0		
-66.2	17.8		Grades with large 2-3" shells (30-50%)				
-67.1	18.7						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,252.3 E 2,696,367.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-44				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/10/2011		COMPLETED 12/10/2011	
7. Penetration, ft 18.6				17. ELEVATION TOP OF HOLE -53.3			
8. Recovery, ft 14.3				18. TOTAL CORE RECOVERY FOR BORING 77 %			
9. Total Recovery, % 77.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-53.3	0.0		Dark gray silty fine Sand; rare brown clay lenses, less than 1/2" thick; some shells (30%) in layers at 0-1.9 ft and 7-9.5 ft.	100	1 0.0 5.0		
-62.8	9.5		Dark gray to gray shells and shell hash (80%) in silt matrix	100	2 5.0 9.5		
-67.6	14.3				3 9.5 14.3		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,254.2 E 2,682,364.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-45				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/9/2011		COMPLETED 12/9/2011	
7. Penetration, ft 19.0				17. ELEVATION TOP OF HOLE -54.2			
8. Recovery, ft 19.0				18. TOTAL CORE RECOVERY FOR BORING 100 %			
9. Total Recovery, % 100.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-54.2	0.0		Dark gray silty fine Sand, some shells and shell hash (30-40%)	100	0.0 3.0		
-56.2	2.0			Dark gray sticky Organic Silt			
-57.2	3.0			Dark gray to brown silty fine Sand with Dark gray Clay lenses; pieces of wood (old roots) at 3.6 feet and 6.5 ft	1000		
-60.9	6.7			Gray dense shells and shell hash, little sandy silt in matrix; 4 inch thick layer of Clay at 10.5-11 ft	100		
-73.2	19.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,253.0 E 2,684,367.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-46				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/9/2011		COMPLETED 12/9/2011	
7. Penetration, ft 19.4				17. ELEVATION TOP OF HOLE -47.3			
8. Recovery, ft 15.2				18. TOTAL CORE RECOVERY FOR BORING 78 %			
9. Total Recovery, % 78.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-47.3	0.0		Light brown medium to coarse Sand and shell fragments (30-50%)	100	1 0.0 4.5		
-51.8	4.5		Dark gray fine Sand and some shells (30-40%)	100	2 4.5 7.8		
-55.1	7.8		Dark gray soft Organic Silt, rare small shell fragments	100	3 7.8 11.0		
-58.3	11.0		Dark gray silty fine Sand and fine shell hash (40-60%); some shell fragments to 3/4"				
-62.5	15.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,253.6 E 2,686,365.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-47				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/9/2011		COMPLETED 12/9/2011	
7. Penetration, ft 20.0				17. ELEVATION TOP OF HOLE -47.4			
8. Recovery, ft 18.0				18. TOTAL CORE RECOVERY FOR BORING 90 %			
9. Total Recovery, % 90.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-47.4	0.0		Light brown-gray fine to medium Sand with shell fragments (30-50%) in layers at 0-1.8 ft and 3.5-4.2 ft	100	1 0.0 4.3		
-51.7	4.3		Gray fine to medium Sand with shelly layers (50%) between 7 and 7.7 ft	100	2 4.3 10.5		
-57.9	10.5		Dark gray sticky Organic Silt, rare (5%) small shells	100	3 10.5 13.6		
-61.0	13.6		Dark gray silty shell hash, mostly less than 1/4" size (60-80%)				
-65.4	18.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,256.6 E 2,688,363.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-48				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
						STARTED 12/9/2011 COMPLETED 12/9/2011	
7. Penetration, ft 20.0				17. ELEVATION TOP OF HOLE -46.6			
8. Recovery, ft 8.9				18. TOTAL CORE RECOVERY FOR BORING 44 %			
9. Total Recovery, % 44.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-46.6	0.0		Gray fine to medium Sand	100	1 0.0 5.0		
				109	2 5.0 7.9		
-54.5	7.9		Dark gray silty fine Sand and shells to 3" diameter (40-60%)	100	3 7.9 8.9		
-55.5	8.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,260.7 E 2,690,351.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-49				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/9/2011		COMPLETED 12/9/2011	
7. Penetration, ft 16.3				17. ELEVATION TOP OF HOLE -54.1			
8. Recovery, ft 16.5				18. TOTAL CORE RECOVERY FOR BORING 101 %			
9. Total Recovery, % 101.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-54.1	0.0		Dark gray fine Sand, some shells and shell fragments (25-40%)	100	1 0.0 2.5		
-56.6	2.5		Dark gray sticky Organic Silt, some fine sand and shells (20-30%)	100	2 2.5 4.0		
-58.1	4.0		Dark gray fine to medium Sand, some sticky clay layers and shells (20-30%)	100	3 4.0 9.0		
-63.1	9.0		Dark gray fine to medium Sand, few shells (10-20%)	100	4 9.0 11.0		
-65.1	11.0		Light gray shell hash (60-80%), some shells to 3 inches, some silt	100	5 11.0 16.5		
-70.6	16.5						

ENG FORM MAR 71	1836	PREVIOUS EDITIONS ARE OBSOLETE.	PROJECT Boque Banks Master Beach Nourishment	HOLE NO. 0-50
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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,252.9 E 2,694,364.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-51				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/9/2011		COMPLETED 12/9/2011	
7. Penetration, ft 19.3				17. ELEVATION TOP OF HOLE -52.7			
8. Recovery, ft 17.3				18. TOTAL CORE RECOVERY FOR BORING 90 %			
9. Total Recovery, % 90.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-52.7	0.0		Dark gray silty fine Sand, some fine shells fragments (20-30%)	100	1 0.0 1.5		
-54.2	1.5		Dark gray Organic Silt, little fine sand, few shell fragments (10-20%)	100	2 1.5 3.5		
-56.2	3.5		Dark gray fine Sand, trace silt, trace shell fragments (5-10%)	100	3 3.5 9.6		
-62.3	9.6		Dark gray to light gray coarse Shells and shell hash to 2" in size, little silt in matrix	100	4 9.6 17.3		
-70.0	17.3						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,251.6 E 2,696,364.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-52				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4	UNDISTURBED
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH			
7. Penetration, ft 19.2				16. DATE HOLE		STARTED 12/9/2011	COMPLETED 12/9/2011
8. Recovery, ft 18.3				17. ELEVATION TOP OF HOLE -54.7			
9. Total Recovery, % 93.0				18. TOTAL CORE RECOVERY FOR BORING 93 %			
				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-54.7	0.0		Gray fine Sand with brown-gray clay lenses 1/4"-3/8" thick	100	1 0.0 3.0		
-57.7	3.0		Dark gray sandy sticky Silt to silty fine Sand, few small shell fragments (10-15%)	100	2 3.0 7.0		
-61.7	7.0		Dark gray fine to medium Sand and Silt, some shells and shell fragments (20-30%)	100	3 7.0 13.0		
-67.7	13.0		Gray shell hash (70-90%) and some silty fine sand	100	4 13.0 17.9		
-72.6	17.9						
-73.0	18.3		Sections of light gray cemented calcareous sand				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,251.0 E 2,682,357.3				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-53				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/9/2011		COMPLETED 12/9/2011	
7. Penetration, ft 19.1				17. ELEVATION TOP OF HOLE -55.1			
8. Recovery, ft 17.3				18. TOTAL CORE RECOVERY FOR BORING 95 %			
9. Total Recovery, % 95.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-55.4	0.3		Dark brown silty fine Sand, few shell fragments (10-15%)	100	1		
			Dark brown Organic Silt, trace fine sand, trace shell fragments (5%)	100	0.0 0.3 2 0.3 3.7		
-58.8	3.7		Dark gray silty shell hash (60-80%), some fine to medium Sand	100	3 3.7 12.0		
-67.1	12.0		Light gray silty coarse shells (60-80%) and some fine to medium Sand	100	4 12.0 16.3		
-71.4	16.3		Gray broken cemented calcareous sandstone pieces and shell fragments, little fine to medium sand				
-72.4	17.3						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,250.9 E 2,684,362.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-54				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
						STARTED 12/9/2011 COMPLETED 12/9/2011	
7. Penetration, ft 18.6				17. ELEVATION TOP OF HOLE -55.1			
8. Recovery, ft 19.0				18. TOTAL CORE RECOVERY FOR BORING 104 %			
9. Total Recovery, % 104.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-55.1	0.0		Dark brown-gray Organic Silt, rare silty fine sand laminae; no shells	100	1 0.0 8.5		
-63.6	8.5						
-67.8	12.7	△ △	Loose gray shells (50-70%) and silty fine to medium Sand; few pieces of rock to 2x3"	100	2 8.5 12.7		
-70.0	14.9		Stiff dark gray silt with weatherd shells				
-73.7	18.6		Dark green silty medium to coarse Sand, rare fine gravel; no shells				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,249.0 E 2,686,361.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-55				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/9/2011		COMPLETED 12/9/2011	
7. Penetration, ft 18.3				17. ELEVATION TOP OF HOLE -55.2			
8. Recovery, ft 19.2				18. TOTAL CORE RECOVERY FOR BORING 104 %			
9. Total Recovery, % 104.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-55.2	0.0		Gray fine to medium Sand, few small shells and shell fragments (10-15%)	100	1 0.0 1.0		
-56.2	1.0		Dark gray Organic Silt, few small shell fragments (10-15%)	100	2 1.0 4.0		
-59.2	4.0		Dark gray silty fine Sand and shells (30-50%)	100	3 4.0 10.3		
-65.5	10.3		Gray coarse Shells and shell hash with white layers of silty fine sand	100	4 10.3 14.5		
-69.7	14.5		Gray broken pieces of cemented calcareous sandstone				
-72.2	17.0		Dark green dense fine to coarse sand, some silt, trace fine gravel; no shells				
-73.5	18.3						

ENG FORM MAR 71	1836	PREVIOUS EDITIONS ARE OBSOLETE.	PROJECT Boque Banks Master Beach Nourishment	HOLE NO. 056
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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,250.4 E 2,690,363.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-57				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/12/2011		COMPLETED 12/12/2011	
7. Penetration, ft 18.0				17. ELEVATION TOP OF HOLE -54.7			
8. Recovery, ft 18.0				18. TOTAL CORE RECOVERY FOR BORING 100 %			
9. Total Recovery, % 100.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-54.7	0.0		Dark gray fine to medium Sand, some shells and shell fragments (20-30%)	100	1		
-55.6	0.9				0.0		
					0.9		
			Dark gray Organic Silt, rare shell fragments (5%) and little fine sand	100	2		
					0.9		
					3.0		
-57.7	3.0						
			Dark gray fine to medium Sand, some shells and shell fragments (20-30%)	100	3		
					3.0		
					9.0		
-63.7	9.0						
			Dark gray fine to medium sand and layers of shells and shell fragments, with lenses of sticky clay; grades to light gray 13-14 feet	100	4		
					9.0		
					14.0		
-68.7	14.0						
			At 14 feet - sharp change to dark green dense Silt, rare white laminae - appear to be highly weathered shell fragments				
-72.7	18.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,253.9 E 2,692,363.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-58				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/9/2011		COMPLETED 12/9/2011	
7. Penetration, ft 10.9				17. ELEVATION TOP OF HOLE -55.7			
8. Recovery, ft 9.7				18. TOTAL CORE RECOVERY FOR BORING 89 %			
9. Total Recovery, % 89.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-55.7	0.0		Dark gray sticky Organic Silt, little fine sand, few shells (10-20%)	100	1 0.0 2.0		
-57.7	2.0		Dark gray silty fine Sand and shells, few to 2" (40-60%); refusal at bottom of core	100	2 2.0 9.7		
-65.4	9.7						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,250.4 E 2,694,360.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-59				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH			
7. Penetration, ft 18.5				16. DATE HOLE		STARTED 12/9/2011 COMPLETED 12/9/2011	
8. Recovery, ft 18.2				17. ELEVATION TOP OF HOLE -54.9			
9. Total Recovery, % 99.0				18. TOTAL CORE RECOVERY FOR BORING 99 %			
				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-54.9	0.0		Dark gray fine to medium Sand, some shell fragments (20-35%)	100	1		
-55.5	0.6		Dark gray silty fine Sand with layers of sandy Silt (sticky) up to one foot thick; some shell fragments in the sand layers (20-30%)	100	0.0 0.6 2 0.6 6.5		
-61.4	6.5		Dark gray-green dense fine to medium sand, rare small shell fragments (5%)	100	3 6.5 8.7		
-63.6	8.7		Dark gray to gray coarse shells and shell hash (70-90%). Little sticky silt to fine sand in matrix.	100	4 8.7 18.2		
-73.1	18.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,248.3 E 2,696,356.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-60				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/9/2011		COMPLETED 12/9/2011	
7. Penetration, ft 16.1				17. ELEVATION TOP OF HOLE -56.1			
8. Recovery, ft 13.1				18. TOTAL CORE RECOVERY FOR BORING 81 %			
9. Total Recovery, % 81.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-56.1	0.0		Dark gray silty fine Sand, some fine shell fragments (25-40%)	100	1 0.0 3.5		
-59.6	3.5		Dark gray Silt, some fine sand, few shell fragments (10-15%)	100	2 3.5 8.0		
-64.1	8.0		Dark gray shell sand shell hash (60-80%), shells to 1.5"; some shells to 1.5"	100	3 8.0 13.1		
-69.2	13.1						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				ODMDS		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 329,052.1 E 2,690,549.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) O-192				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/11/2011		COMPLETED 12/11/2011	
7. Penetration, ft 16.2				17. ELEVATION TOP OF HOLE -41.7			
8. Recovery, ft 17.3				18. TOTAL CORE RECOVERY FOR BORING 107 %			
9. Total Recovery, % 107.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-41.7	0.0		Light brown fine to medium Sand, some fine shell fragments (10-20%)	100	1 0.0 1.2		
-42.9	1.2						
-43.7	2.0		Light brown shell hash layer (80%), little fine to medium Sand	100	2 1.2 2.0		
			Gray fine to medium Sand, some 2-3" layers of light brown shell hash	100	3 2.0 7.0		
-48.7	7.0						
			Light brown medium Sand, some small shell fragments (20-30%)	100	4 7.0 9.5		
-51.2	9.5						
			Gray fine to medium Sand; layers of shell hash at 12 ft, 13 ft and 14 ft.	100	5 9.5 16.2		
-57.9	16.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,291.0 E 2,581,068.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-66				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 6 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				16. DATE HOLE		STARTED 12/15/2011 COMPLETED 12/15/2011	
7. Penetration, ft 11.6				17. ELEVATION TOP OF HOLE -40.3			
8. Recovery, ft 10.2				18. TOTAL CORE RECOVERY FOR BORING 88 %			
9. Total Recovery, % 88.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-40.3	0.0		Dark gray soft Organic Silt	100	1		
-41.4	1.1				0.0 1.1		
-42.6	2.3		Dark gray silty fine to medium Sand, little coarse Sand, little shell fragments (10-15%)	100	2		
					1.1 2.3		
-43.8	3.5		Dark gray medium to coarse Sand, trace fine gravel, some shell fragments (45%)	100	3		
					2.3 3.5		
-45.2	4.9		Gray shell hash (20%) in medium to fine sand matrix	100	4		
					3.5 4.9		
-47.6	7.3		Light brown fine to medium Sand, rare 1 inch diameter soft gray clay balls, little coarse sand to fine gravel; no shells	100	5		
					4.9 7.3		
-49.3	9.0		Gray medium to coarse Sand and fine gravel to 1/2" diameter	100	6		
					7.3 9.0		
-50.5	10.2		Light brown very hard sand, partially cemented				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 331,179.8 E 2,582,861.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-67				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/15/2011		COMPLETED 12/15/2011	
7. Penetration, ft 16.4				17. ELEVATION TOP OF HOLE -39.9			
8. Recovery, ft 15.0				18. TOTAL CORE RECOVERY FOR BORING 92 %			
9. Total Recovery, % 92.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-39.9	0.0		Dark gray coarse to fine Sand, little fine gravel	100	1		
-40.8	0.9				0.0 0.9		
-42.7	2.8		Dark gray silty fine Sand, no shells	100	2		
					0.9 2.8		
-44.9	5.0		Dark gray to gray-green shell hash (25%) with silty fine to medium sand matrix	100	3		
-45.9	6.0		Light brown fine to coarse Sand, no shells		2.8 6.0		
-54.9	15.0		Dark gray-green very fine Sand; no shells	100	4		
					6.0 15.0		

DRILLING LOG		DIVISION		INSTALLATION Area Y		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,068.2 E 2,584,652.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y68				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 12/15/2011 COMPLETED 12/15/2011	
7. Penetration, ft 17.2				17. ELEVATION TOP OF HOLE -40.6			
8. Recovery, ft 17.5				18. TOTAL CORE RECOVERY FOR BORING 92 %			
9. Total Recovery, % 92.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-40.6	0.0		Dark gray coarse to fine Sand, little fine to medium gravel; rare small shell fragments (5%)	100	1		
-41.5	0.9				0.0		
			Dark gray fine Sand, rare pebbles to 1" diameter at 2.6-3 ft	100	2		
					0.9		
-43.6	3.0				3.0		
			Gray shells and shell hash to 2" size (60-80%), in silty fine sand matrix	100	3		
-44.5	3.9				3.0		
			Brown sticky, dense Organic Silt- Clay; layer of shells in bottom 3 inches	100	4		
					3.9		
-50.1	9.5				9.5		
			Dark gray-green silty fine Sand; no shells	100	5		
					9.5		
-57.8	17.2				17.2		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,954.7 E 2,586,445.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-69				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 12/15/2011 COMPLETED 12/15/2011	
7. Penetration, ft 17.4				17. ELEVATION TOP OF HOLE -40.4			
8. Recovery, ft 17.9				18. TOTAL CORE RECOVERY FOR BORING 104 %			
9. Total Recovery, % 104.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-40.4	0.0		Dark gray silty fine to medium Sand, few shell fragments (20-30%)	100	1 0.0 1.8		
-42.2	1.8		Dark gray silty Sand to Sandy Silt, some shell fragments (15-25%)	100	2 1.8 4.5		
-44.9	4.5		Dark gray Shells and Shell hash (30-40%), sandy silt matrix	100	3 4.5 6.9		
-47.3	6.9		Sharp contact to dense dark green-brown silty fine Sand, no shells	100	4 6.9 17.4		
-57.8	17.4						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 333,843.2 E 2,588,236.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-70				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/15/2011		COMPLETED 12/15/2011	
7. Penetration, ft 19.5				17. ELEVATION TOP OF HOLE -35.9			
8. Recovery, ft 19.2				18. TOTAL CORE RECOVERY FOR BORING 98 %			
9. Total Recovery, % 98.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-35.9	0.0		Dark gray silty fine Sand, few small shell fragments (5-10%)	100	1 0.0 7.0		
-42.9	7.0		Dark gray Shells and shell fragments (20-30%), rare gravel to 3/4"	100	2 7.0 9.8		
-45.7	9.8		Dense dark gray-green silty fine Sand; no visible shells or shell fragments	100	3 9.8 19.2		
-55.1	19.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,498.1 E 2,581,958.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-71				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/15/2011		COMPLETED 12/15/2011	
7. Penetration, ft 12.5				17. ELEVATION TOP OF HOLE -45.7			
8. Recovery, ft 16.9				18. TOTAL CORE RECOVERY FOR BORING 124 %			
9. Total Recovery, % 124.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-45.7	0.0		Dark gray fine to medium Sand, trace fine gravel to 1/4" toward bottom of section; few small shell fragments (10-20%)	100	1 0.0 1.1		
-46.8	1.1		Dense dark brown Clay; no shells	100	2 1.1 12.0		
-57.7	12.0						
-61.2	15.5		Brown silty fine Sand, trace wood fragments (small roots) at top of section; no shells. NOTE: Core logged and photographed including all of recovered length; NOT adjusted to represent only penetrated depth of 12.5 feet				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 329,384.7 E 2,583,748.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-72				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/15/2011		COMPLETED 12/15/2011	
7. Penetration, ft 11.8				17. ELEVATION TOP OF HOLE -46.3			
8. Recovery, ft 13.5				18. TOTAL CORE RECOVERY FOR BORING 113 %			
9. Total Recovery, % 113.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-46.8	0.5		Very soft dark gray Organic Silt; no shells	100	1		
			Dark gray fine Sand, Shells to 2" size (60-80%)	100	0.0 0.5		
-48.3	2.0		Brown fine Sand with dark gray/brown laminae of Silt/Clay.	100	2 0.5 2.0		
					3 2.0 6.0		
-52.3	6.0						
-53.3	7.0		Dark brown peaty Clay				
			Dark brown silty fine Sand, small root fragments near 10 ft below sea floor	100	4 7.0 11.9		
-58.2	11.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,274.6 E 2,585,541.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-73				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 16.2				17. ELEVATION TOP OF HOLE -46.2			
8. Recovery, ft 16.1				18. TOTAL CORE RECOVERY FOR BORING 99 %			
9. Total Recovery, % 99.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-46.2	0.0		Loose gray shells and shell hash (40-50%) in coarse sand matrix; few pieces of gravel to 3/4"	100	1 0.0 2.0		
-48.2	2.0		Very sharp contact to dark gray- green dense sandy Silt to silty Sand; no visible shells	100	2 2.0 5.0		
				100	3 5.0 10.0		
				100	4 10.0 16.0		
-62.2	16.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 331,159.7 E 2,587,333.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-74				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 17.2				17. ELEVATION TOP OF HOLE -48.8			
8. Recovery, ft 19.1				18. TOTAL CORE RECOVERY FOR BORING 111 %			
9. Total Recovery, % 111.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-48.8	0.0		Dark gray fine to coarse Sand, little fine gravel; some shells and shell fragments (20-30%)	100	1 0.0 1.1		
-49.9	1.1		Gray fine to medium Sand, trace clay balls and clay lenses between 4.5 and 5'; rare shells (5%)	100	2 1.1 8.5		
-57.3	8.5						
-58.3	9.5		Gray interbedded layers of coarse shells and fine to medium sand (30-50% shells)	100	3 8.5 11.5		
-60.3	11.5		Gray fine to medium Sand, some small shell fragments (10-15%)				
-66.0	17.2		Gray fine to medium Sand and some shells and shell fragments (15%); 1/2' thick layer of gray clay at 12.5'	100	4 11.5 17.2		

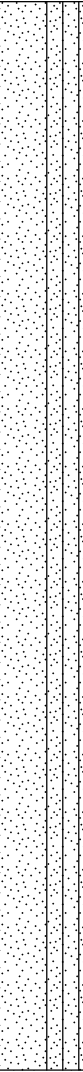
DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,046.5 E 2,589,122.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-75				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/14/2011		COMPLETED 12/14/2011	
7. Penetration, ft 16.9				17. ELEVATION TOP OF HOLE -47.8			
8. Recovery, ft 19.2				18. TOTAL CORE RECOVERY FOR BORING 114 %			
9. Total Recovery, % 114.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-47.8	0.0		Dark gray fine to medium Sand, trace rare thin dark gray clay lenses; few small shell fragments (10-15%)	100	1 0.0 5.0		
				100	2 5.0 11.0		
-58.8	11.0		Dark gray-green dense silty fine Sand, no visible shells	100	3 11.0 16.9		
-64.7	16.9						

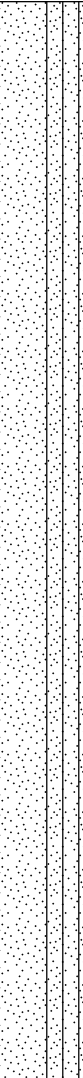
DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,707.4 E 2,582,843.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-76				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 12/15/2011 COMPLETED 12/15/2011	
7. Penetration, ft 16.3				17. ELEVATION TOP OF HOLE -49.6			
8. Recovery, ft 15.1				18. TOTAL CORE RECOVERY FOR BORING 93 %			
9. Total Recovery, % 93.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-49.6	0.0		Dark gray coarse to fine Sand, trace fine gravel	104	1		
-50.4	0.8				0.0		
			Gray-green silty fine Sand	100	0.8		
					2		
					0.8		
					4.2		
-53.8	4.2		Dark green-brown silty fine Sand to sandy Silt	100	3		
					4.2		
					9.0		
-58.6	9.0		Dark green silty fine Sand	100	4		
					9.0		
					15.0		
-64.7	15.1		Dark green silty fine Sand	100	4		
					9.0		
					15.0		
			Dark green silty fine Sand	100	4		
					9.0		
					15.0		
			Dark green silty fine Sand	100	4		
					9.0		
					15.0		
			Dark green silty fine Sand	100	4		
					9.0		
					15.0		
			Dark green silty fine Sand	100	4		
					9.0		
					15.0		
			Dark green silty fine Sand	100	4		
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			Dark green silty fine Sand	100	4		
					9.0		
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			Dark green silty fine Sand	100	4		
					9.0		
					15.0		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 327,594.7 E 2,584,636.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-77				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/15/2011		COMPLETED 12/15/2011	
7. Penetration, ft 15.1				17. ELEVATION TOP OF HOLE -47.8			
8. Recovery, ft 20.1				18. TOTAL CORE RECOVERY FOR BORING 133 %			
9. Total Recovery, % 133.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-47.8	0.0		Dark brown dense Clay with peat lenses and tree roots (NOTE: Additional 1.5 feet of this material was recovered from the top of the Vibracore pipe after removal of the core liner. This means that the actual thickness of dense peaty clay layer may be almost 4 feet at this site.)	100	1		
-50.0	2.2				0.0 2.2		
			Light brown to light gray fine to medium Sand; no visible shells	100	2		
					2.2 12.9		
-60.7	12.9						
			Dark green dense silty fine Sand to sandy Silt; no visible shells	100	3		
-62.8	15.0				12.9 15.0		

ENG FORM MAR 71	1836	PREVIOUS EDITIONS ARE OBSOLETE.	PROJECT Boque Banks Master Beach Nourishment Plan	HOLE NO. 78
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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 329,370.0 E 2,588,219.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-79				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/14/2011		COMPLETED 12/14/2011	
7. Penetration, ft 13.9				17. ELEVATION TOP OF HOLE -48.7			
8. Recovery, ft 19.5				18. TOTAL CORE RECOVERY FOR BORING 140 %			
9. Total Recovery, % 140.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-48.9	0.2		Lag deposit of Dark gray shells (30-50%) and coarse sand and gravel Interbedded lenses of fine to medium Sand with rare (5%) shells, rare gravel and lenses of gray/brown clay	100	1 0.0 3.0		
-51.7	3.0		Dark gray soft Clay	100	2 3.0 5.0		
-53.7	5.0		Sharp contact to dense green sandy Silt to silty fine Sand, 20% shell fragments in top few inches of section	100	3 5.0 13.9		
-62.6	13.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,255.7 E 2,590,014.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-80				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/14/2011		COMPLETED 12/14/2011	
7. Penetration, ft 15.9				17. ELEVATION TOP OF HOLE -48.5			
8. Recovery, ft 19.4				18. TOTAL CORE RECOVERY FOR BORING 122 %			
9. Total Recovery, % 122.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-48.5	0.0		Dark green dense silty fine Sand to sandy Silt; grades with rare weathered shell fragments below 9 ft.	100	1 0.0 5.0		
	100			2 5.0 10.0			
	100			3 10.0 15.9			
-64.4	15.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,915.6 E 2,583,723.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-81				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/15/2011		COMPLETED 12/15/2011	
7. Penetration, ft 16.1				17. ELEVATION TOP OF HOLE -50.7			
8. Recovery, ft 19.4				18. TOTAL CORE RECOVERY FOR BORING 122 %			
9. Total Recovery, % 122.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-50.7	0.0		Dark green-brown dense sandy Silt to silty Sand; grades with few 1/2" thick clay lenses below 13.5 feet	100	1 0.0 5.0		
	100			2 5.0 10.0			
	100			3 10.0 13.5			
	100			4 13.5 16.1			
-66.8	16.1						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 325,799.9 E 2,585,524.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-82				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/15/2011		COMPLETED 12/15/2011	
7. Penetration, ft 11.6				17. ELEVATION TOP OF HOLE -48.9			
8. Recovery, ft 14.6				18. TOTAL CORE RECOVERY FOR BORING 125 %			
9. Total Recovery, % 125.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-49.4	0.5		Lag deposit, Brown coarse to fine Sand, some shells and shell fragments	100	1		
			Interbedded 1/2 inch to 3 inch thick layers of dark brown clay and silty fine to medium Sand; dense		0.5 6.0		
				100	2 6.0 11.6		
-60.5	11.6						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,689.7 E 2,587,316.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-83				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 13.1				17. ELEVATION TOP OF HOLE -51.5			
8. Recovery, ft 19.8				18. TOTAL CORE RECOVERY FOR BORING 125 %			
9. Total Recovery, % 152.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-51.5	0.0		Dark brown dense hard Clay; Note- due to expansion of the core, more of this sediment type was lost out of the top of the core pipe; Actual thickness more than 2.7 feet.	100	1 0.0 2.7		
-54.2 -54.5	2.7 3.0		Dark brown silty fine Sand, one 1" thick round piece of wood (tree root) Light gray-brown silty fine Sand; no shells	100	2 2.7 7.5		
-59.0	7.5		Gray medium to coarse Sand, trace fine Gravel	100	3 7.5 11.5		
-63.0	11.5		Dense dark green-gray sandy Silt to Silty fine Sand	100	4 11.5 13.1		
-64.6	13.1						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 327,575.4 E 2,589,107.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-84				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/14/2011		COMPLETED 12/14/2011	
7. Penetration, ft 14.4				17. ELEVATION TOP OF HOLE -51.3			
8. Recovery, ft 19.7				18. TOTAL CORE RECOVERY FOR BORING 139 %			
9. Total Recovery, % 139.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-51.3	0.0		Gray silty fine Sand and shells (40-60%)	100	1 0.0 2.0		
-53.3	2.0		Gray-green silty fine to medium Sand	100	2 2.0 5.0		
				100	3 5.0 10.0		
				100	4 10.0 14.4		
-65.7	14.4						

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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,010.1 E 2,586,412.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-86				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/15/2011		COMPLETED 12/15/2011	
7. Penetration, ft 13.2				17. ELEVATION TOP OF HOLE -51.0			
8. Recovery, ft 18.1				18. TOTAL CORE RECOVERY FOR BORING 137 %			
9. Total Recovery, % 137.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-51.4	0.4		Light brown-gray fine to medium Sand, rare fine gravel	100	1		
			Interbedded dark brown Clay and gray to light brown fine to medium Sand lenses		0.4 3.5		
-54.5	3.5		Dark brown dense Clay; grades to peaty clay between 9 and 10 feet	100	2 3.5 10.0		
-61.0	10.0		Gray to light brown fine Sand with brown clay lenses; one piece of wood at 12.5 ft	100	3 10.0 13.2		
-64.2	13.2						

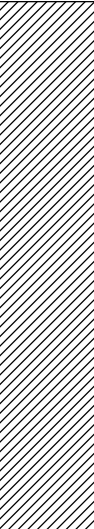


DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,899.2 E 2,588,204.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-87				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 13.0				17. ELEVATION TOP OF HOLE -52.5			
8. Recovery, ft 18.1				18. TOTAL CORE RECOVERY FOR BORING 137 %			
9. Total Recovery, % 137.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-52.5	0.0		White to light gray-green densely packed Shells and shell hash (30-50%); some fine to medium sand in matrix	100	1		
	0.0						
	5.4				5.4		
-57.9	5.4		Dark gray-green fine Sand	100	2		
					5.4		
					10.0		
					3		
					10.0		
					13.0		
-65.5	13.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 325,785.6 E 2,589,996.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-88				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/14/2011		COMPLETED 12/14/2011	
7. Penetration, ft 8.4				17. ELEVATION TOP OF HOLE -51.4			
8. Recovery, ft 12.5				18. TOTAL CORE RECOVERY FOR BORING 134 %			
9. Total Recovery, % 134.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-51.4	0.0		Light gray Shells and shell hash (40%) with layers of gray dense fine Sand	100	1 0.0 5.0		
-56.4	5.0		Gray green dense fine Sand and some small shell fragments (10-15%)	100	2 5.0 7.0		
-58.4	7.0		Gray green coarse Shell hash (20-25%) with little fine Sand	100	3 7.0 8.3		
-59.8	8.4						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 321,327.7 E 2,585,512.3				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-89				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/15/2011		COMPLETED 12/15/2011	
7. Penetration, ft 12.0				17. ELEVATION TOP OF HOLE -51.9			
8. Recovery, ft 16.1				18. TOTAL CORE RECOVERY FOR BORING 134 %			
9. Total Recovery, % 134.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-51.9	0.0		Gray fine to medium Sand, few shell fragments (10-15%)	100	1 0.0 2.0		
-53.9	2.0		Dark brown dense hard Clay, few pieces of wood (roots); no shells	100	2 2.0 8.0		
-59.9	8.0		Sharp contact to dense green-gray fine sandy Silt to silty fine Sand; no visible shells	100	3 8.0 12.0		
-63.9	12.0		Sharp contact to dense green-gray fine sandy Silt to silty fine Sand; no visible shells				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 322,214.3 E 2,587,301.3				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibrocure			
4. HOLE NO. (As shown on drawing title and file number) Y-90				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH			
7. Penetration, ft 14.0				16. DATE HOLE		STARTED 12/15/2011 COMPLETED 12/15/2011	
8. Recovery, ft 19.3				17. ELEVATION TOP OF HOLE -53.2			
9. Total Recovery, % 132.0				18. TOTAL CORE RECOVERY FOR BORING 132 %			
				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-53.2	0.0		Brown to gray very fine Sand and gray soft Clay balls (30%); no visible shells	100	1		
-53.9	0.7				0.0		
			Gray medium Sand, some fine gravel in lenses at 2.9 ft and 3.1 ft	100	0.7		
					2		
					0.7		
					4.0		
-57.2	4.0		Gray sandy gravel to gravelly Sand; no visible shells	100	3		
					4.0		
					8.0		
-61.2	8.0						
-61.3	8.1		Green-gray shell layer in fine sand matrix	100	4		
					8.1		
			Sharp contact to top of Gray-green silty very fine Sand		11.0		
-64.2	11.0		Grades to dark gray silty fine Sand	100	5		
					11.0		
					14.0		
-67.2	14.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1			
				Area Y		OF 1 SHEETS			
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in					
2. LOCATION (Coordinates or Station) N 323,108.1 E 2,589,099.3				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88					
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore					
4. HOLE NO. (As shown on drawing title and file number) Y-91				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED			
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES					
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE			
				STARTED 12/15/2011		COMPLETED 12/15/2011			
7. Penetration, ft 14.0				17. ELEVATION TOP OF HOLE -52.5					
8. Recovery, ft 20.0				18. TOTAL CORE RECOVERY FOR BORING 142 %					
9. Total Recovery, % 142.0				19. GEOLOGIST S. Miller					
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 weathering, etc., if significant) g			
-52.5	0.0		Gray to dark brown silty fine Sand	100	1				
-53.8	1.3		Gray Shells and Shell hash(40%) in soft silt matrix		0.0 2.7				
-55.2	2.7		Light green coarse Shell hash and shells (40%) and fine sand matrix	100	2 2.7 8.0				
-60.5	8.0								
-62.0	9.5								
-63.5	11.0		Dark gray silty fine Sand, some shells (20-30%)	100	3 8.0 9.5				
-66.5	14.0		Light green coarse Shells and Shell hash (60-70%)	100	4 9.5 11.0				
			Dark gray-green silty fine Sand; rare small shells (5%)	100	5 11.0 14.0				




DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 319,538.9 E 2,586,399.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-92				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
						STARTED 12/15/2011 COMPLETED 12/15/2011	
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -54.2			
8. Recovery, ft 18.0				18. TOTAL CORE RECOVERY FOR BORING 112 %			
9. Total Recovery, % 112.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-54.2	0.0		Dark brown clay, some thin fine sand laminae	100	1 0.0 8.0		
-62.2	8.0		Gray Gravel to 1.2 inches diameter and silty fine Sand as a matrix	100	2 8.0 9.5		
-63.7	9.5		Light gray silty fine Sand with shell hash layers at 11-12 ft and 13-14 ft (60-80%)	100	3 9.5 12.0		
				100	4 12.0 16.0		
-70.2	16.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 320,426.9 E 2,588,189.3				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-93				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
						STARTED 12/15/2011 COMPLETED 12/15/2011	
7. Penetration, ft 11.8				17. ELEVATION TOP OF HOLE -53.5			
8. Recovery, ft 15.7				18. TOTAL CORE RECOVERY FOR BORING 133 %			
9. Total Recovery, % 133.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-53.8	0.3		Gray fine to medium Sand	100	1		
			Dense brown Clay with rare roots and organic matter (peat like lenses)		0.3 7.0		
-60.5	7.0		Dark brown-gray silty fine Sand	100	2		
					7.0 9.0		
-62.5	9.0		Gray-green silty fine Sand	100	3		
					9.0 11.8		
-64.5	11.0		Gray sandy Gravel				
-65.3	11.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,730.1 E 2,581,965.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-94				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 16.3				17. ELEVATION TOP OF HOLE -40.7			
8. Recovery, ft 16.9				18. TOTAL CORE RECOVERY FOR BORING 104 %			
9. Total Recovery, % 104.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-40.7	0.0		Dark gray silty fine Sand	100	1 0.0 1.5		
-42.2	1.5		Dark gray shelly Sand and Gravel to 3/4" diameter	100	2 1.5 4.0		
-44.7	4.0		Dark gray silty fine Sand, rare (5%) small shell fragments; 1" diameter pebbles at bottom of section	100	3 4.0 5.5		
-46.2	5.5		Sharp contact to top of dark brown dense Clay	100	4 5.5 15.5		
-56.2	15.5		Dark brown Clay grades with Peat				
-56.9	16.2						

ENG FORM MAR 71	1836	PREVIOUS EDITIONS ARE OBSOLETE.	PROJECT Boque Banks Master Beach Nourishment Plan	HOLE NO. 95
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ENG FORM MAR 71	1836	PREVIOUS EDITIONS ARE OBSOLETE.	PROJECT Boque Banks Master Beach Nourishment	HOLE NO. Y-06
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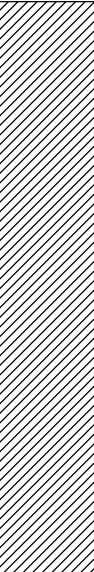
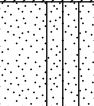
DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,281.6 E 2,583,302.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-97				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -49.1			
8. Recovery, ft 17.9				18. TOTAL CORE RECOVERY FOR BORING 112 %			
9. Total Recovery, % 112.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-49.1	0.0		Dark gray to dark gray-green Shell hash (30-40%) and gravel; some coarse to fine sand	100	1 0.0 2.7		
-51.8	2.7		Sharp contact to top of Gray- green silty fine Sand to sandy Silt	100	2 2.7 10.0		
-65.1	16.0			100	3 10.0 16.1		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,940.6 E 2,582,849.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-98				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 16.1				17. ELEVATION TOP OF HOLE -45.3			
8. Recovery, ft 19.1				18. TOTAL CORE RECOVERY FOR BORING 116 %			
9. Total Recovery, % 116.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-45.3	0.0		Dark gray coarse to fine Sand and 2 inch shells (20%)	100	1		
-45.9	0.6				0.0		
-46.2	0.9		Dark gray sandy soft Organic Silt		1.9		
-47.2	1.9		Dark gray coarse to fine Sand and shells to 2 inches (20%)				
			Sharp contact to Dark brown Silt, few fine sand laminae	100	2		
					1.9		
					8.0		
-53.3	8.0		Dark brown silty fine to medium Sand and brown Clay laminae	100	3		
					8.0		
					16.0		
-61.4	16.1						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,940.6 E 2,582,849.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-98				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 16.1				17. ELEVATION TOP OF HOLE -45.3			
8. Recovery, ft 19.1				18. TOTAL CORE RECOVERY FOR BORING 116 %			
9. Total Recovery, % 116.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-45.3	0.0		Dark gray coarse to fine Sand and 2 inch shells (20%)	100	1		
-45.9	0.6				0.0		
-46.2	0.9		Dark gray sandy soft Organic Silt		1.9		
-47.2	1.9		Dark gray coarse to fine Sand and shells to 2 inches (20%)				
			Sharp contact to Dark brown Silt, few fine sand laminae	100	2		
					1.9		
					8.0		
-53.3	8.0						
			Dark brown silty fine to medium Sand and brown Clay laminae	100	3		
					8.0		
					16.0		
-61.4	16.1						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,487.1 E 2,584,195.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-101				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -49.9			
8. Recovery, ft 18.2				18. TOTAL CORE RECOVERY FOR BORING 113 %			
9. Total Recovery, % 113.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-49.9	0.0		Dark gray fine to coarse Sand and fine to medium gravel; some shell fragments (5-10%); some lenses of dark gray soft clay	100	1 0.0 2.5		
-52.4	2.5		Sharp break to top of brown dense Clay; grades with peat in lower one foot of section	100	2 2.5 9.0		
-58.9	9.0		Sharp contact to top of light gray silty fine Sand; no visible shells	100	3 9.0 16.0		
-65.9	16.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 328,038.1 E 2,585,532.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-103				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 16.3				17. ELEVATION TOP OF HOLE -48.6			
8. Recovery, ft 20.0				18. TOTAL CORE RECOVERY FOR BORING 130 %			
9. Total Recovery, % 130.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-48.6	0.0		Gray silty fine Sand	100	1 0.0 4.0		
-51.1	2.5		Light gray fine to medium Sand, rare small clay balls				
-52.6	4.0		Gray- green sandy Gravel to 1.5" diameter	100	2 4.0 7.0		
-55.6	7.0		Sharp contact to light tan-green silty fine Sand to sandy Silt; no shells	100	3 7.0 10.0		
-58.6	10.0		Grades to dark green-gray silty fine Sand to sandy Silt; at 12.5 feet- two clay layers up to 3 inches thick; no shells	100	4 10.0 16.3		
-64.9	16.3						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 327,138.4 E 2,585,977.3				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-107				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 10.1				17. ELEVATION TOP OF HOLE -51.1			
8. Recovery, ft 15.0				18. TOTAL CORE RECOVERY FOR BORING 149 %			
9. Total Recovery, % 149.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-51.1	0.0		Dense brown Clay, trace peat like organics	100	1 0.0 8.5		
-59.6	8.5			Gray-brown fine Sand; no visible shells	100		
-61.2	10.1						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,244.5 E 2,586,423.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-110				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 14.3				17. ELEVATION TOP OF HOLE -51.2			
8. Recovery, ft 18.5				18. TOTAL CORE RECOVERY FOR BORING 130 %			
9. Total Recovery, % 130.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-51.2	0.0		Gray fine to medium Sand	100	1		
-51.9	0.7				0.0		
-52.3	1.1		Dark gray shell hash (50-70%); some fine to medium Sand, with few pebbles to 1"		1.1		
			Sharp contact to gray fine to medium Sand with clay balls to 1" diameter; some fine to medium Gravel (20-30%); no visible shells	100	2		
					1.1		
					5.5		
-56.0	4.8						
-56.7	5.5		Dark gray silty sandy Gravel; no visible shells				
			Sharp contact to top of light green-gray silty fine Sand	100	3		
					5.5		
					8.0		
-59.2	8.0						
			Dark gray silty fine Sand to sandy Silt	100	4		
					8.0		
					14.2		
-65.4	14.2						



DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 325,349.2 E 2,586,864.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-114				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
						STARTED 12/19/2011 COMPLETED 12/19/2011	
7. Penetration, ft 10.3				17. ELEVATION TOP OF HOLE -52.1			
8. Recovery, ft 14.0				18. TOTAL CORE RECOVERY FOR BORING 136 %			
9. Total Recovery, % 136.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-52.1	0.0		Brown to dark gray fine sandy Silt to silty Sand; trace medium shell fragments (10-20%)	100	1		
-52.9	0.8				0.0		
			Stiff dark brown Clay with light brown to gray Sand laminae in top foot of unit	101	0.8		
					2		
					0.8		
					10.3		
-62.4	10.3						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 325,794.7 E 2,587,760.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-115				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 14.2				17. ELEVATION TOP OF HOLE -52.3			
8. Recovery, ft 18.3				18. TOTAL CORE RECOVERY FOR BORING 128 %			
9. Total Recovery, % 128.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-52.3	0.0		Light brown to gray fine sandy Silt to silty fine Sand	100	1 0.0 5.2		
-57.4	5.2						
-60.3	8.0		Gray to brown medium Sand with coarse gravel	100	2 5.2 8.0		
-62.5	10.3		Dark gray fine to medium Sand	100	3 8.0 10.3		
-66.5	14.3		Gray-green fine sandy Silt to silty fine Sand	100	4 10.3 14.3		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 322,670.2 E 2,585,964.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-119				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 14.2				17. ELEVATION TOP OF HOLE -51.9			
8. Recovery, ft 18.3				18. TOTAL CORE RECOVERY FOR BORING 129 %			
9. Total Recovery, % 129.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-51.9	0.0		Dark gray sandy Silt with trace shell fragments (10-15%)	100	1		
-52.7	0.8				0.0		
-52.9	1.0		Soft dark gray Organic Silt; no visible shells		1.5		
-53.4	1.5		Dark gray Gravel with trace silt; no visible shells	100	2		
			Dark gray fine Sand with dark gray silt-clay lenses; no visible shells		1.5		
					12.0		
-58.9	7.0						
			Brown fine sandy Silt with trace dark brown clay lenses; no visible shells				
-60.9	9.0						
			Dark brown to gray fine Sand with lenses of dark brown stiff clay; no shells				
-63.9	12.0						
			Dark brown fine Sand with trace dark brown stiff clay lenses	100	3		
					12.0		
-65.8	13.9				14.3		
-66.1	14.3		Dark brown soft silty Clay with traces of organics (tree roots)				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 323,115.1 E 2,586,858.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-120				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 12/18/2011 COMPLETED 12/18/2011	
7. Penetration, ft 16.2				17. ELEVATION TOP OF HOLE -51.8			
8. Recovery, ft 18.0				18. TOTAL CORE RECOVERY FOR BORING 115 %			
9. Total Recovery, % 115.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-51.8	0.0		Dark gray silty fine Sand	100	1		
-52.4	0.6				0.0		
-52.8	1.0		Dark gray coarse shell hash and small gravel, trace silt	100	1.0		
			Light to dark gray, fine to medium Sand		2		
					1.0		
-54.8	3.0				12.0		
			Light gray very fine Sand, trace Silt				
-57.8	6.0						
			Light gray fine Sand				
-63.8	12.0						
			Light gray to brown fine sandy Silt	100	3		
					12.0		
-67.9	16.2				16.2		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 323,559.5 E 2,587,755.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-121				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 10.8				17. ELEVATION TOP OF HOLE -51.4			
8. Recovery, ft 13.1				18. TOTAL CORE RECOVERY FOR BORING 130 %			
9. Total Recovery, % 130.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-51.9	0.4		Light brown fine sandy Silt; rare shell fragments (5%)	99	1		
				100	0.0		
			Dark brown stiff Clay; few wood fragments near bottom of section		0.4		
					2		
					0.4		
					6.0		
-57.4	6.0		Dark brown to light brown fine sandy Silt	100	3		
					6.0		
					8.4		
-59.8	8.4		Light gray fine to medium Sand with trace coarse gravel and trace dark brown Clay lenses	100	3		
-60.4	8.9				8.4		
			Dark gray medium Sand, trace fine gravel		10.7		
-61.7	10.3		Light to dark brown sandy Silt to silty fine Sand				
-62.2	10.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 321,774.2 E 2,586,406.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-122				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 15.8				17. ELEVATION TOP OF HOLE -51.6			
8. Recovery, ft 18.5				18. TOTAL CORE RECOVERY FOR BORING 117 %			
9. Total Recovery, % 117.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-52.1	0.5		Dark brown stiff Clay with traces of dark brown sand in lenses	100	1 0.0 5.0		
			Dark to light brown fine sandy Silt to silty fine Sand with dark brown clay lenses				
				100	2 5.0 10.0		
				100	3 10.0 15.8		
-67.3	15.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 331,622.8 E 2,583,757.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-126				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
7. Penetration, ft 16.2				STARTED 12/18/2011		COMPLETED 12/18/2011	
8. Recovery, ft 18.2				17. ELEVATION TOP OF HOLE -41.1			
9. Total Recovery, % 113.0				18. TOTAL CORE RECOVERY FOR BORING 113 %			
				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-41.4	0.3		Dark gray to dark brown Silt	84	1		
-41.6	0.5		Dark gray soft Clay		0.0		
			Dark gray silty fine Sand with trace shell fragments (15-25%)		6.3		
-47.5	6.3						
			Dark gray to light brown stiff sandy Silt to silty fine Sand; light gray clay filling burrows in Sand; no visible shells	100	2 6.3 11.5		
-52.6	11.5						
			Light gray-green stiff sandy Silt to silty fine Sand; no visible shells	121	3 11.5 16.2		
-57.3	16.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,723.8 E 2,584,198.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-129				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 16.2				17. ELEVATION TOP OF HOLE -44.7			
8. Recovery, ft 10.5				18. TOTAL CORE RECOVERY FOR BORING 65 %			
9. Total Recovery, % 65.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-45.1	0.4		Dark gray soft Clay	101	1		
			Dark green-gray sandy Silt to silty fine Sand with trace shell fragments (10-20%); shell content and size increases with depth in section (60-80% below 2 ft)		0.0 2.8		
-47.5	2.8						
			Dark brown stiff fine sandy Silt to silty fine Sand; trave gray to dark gray clay layers; no visible shells	100	2 2.8 10.5		
-55.2	10.5						

DRILLING LOG		DIVISION		INSTALLATION Area Y		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 332,058.4 E 2,586,887.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-132				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4	UNDISTURBED
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				16. DATE HOLE		STARTED 12/18/2011	COMPLETED 12/18/2011
7. Penetration, ft 16.2				17. ELEVATION TOP OF HOLE -44.7			
8. Recovery, ft 17.5				18. TOTAL CORE RECOVERY FOR BORING 105 %			
9. Total Recovery, % 105.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-44.9	0.3		Dark brown to dark gray-black very soft clay-silt	133	1		
			Dense gray shells and shell hash (40-50%), some gravel; trace dark brown fine sand and silt in matrix	100	0.0 0.3		
					2 0.3 2.3		
-47.0	2.3		Dark brown fine sandy silt to silty fine Sand, trace light gray to light brown sandy lenses filling old burrows	89	3 2.3 10.0		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 329,827.0 E 2,584,643.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-135				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -47.2			
8. Recovery, ft 17.0				18. TOTAL CORE RECOVERY FOR BORING 108 %			
9. Total Recovery, % 108.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-47.2	0.0		Dark brown to dark gray-black stiff fine sandy Silt	100	1		
-47.9	0.7				0.0		
					0.7		
-48.8	1.6		Dark gray to brown shells (50-70%) and gravel with fine sandy silt matrix	100	2		
					0.7		
					1.6		
			Dark brown to green silty fine Sand to sandy Silt, trace (5-10%) shell fragments; occasional gray fine sand and silt in burrows; dark brown stiff clay laminae in lower two feet	100	3		
					1.6		
					8.0		
				100	4		
					8.0		
					16.0		
-63.2	16.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,719.8 E 2,586,437.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-136				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -47.6			
8. Recovery, ft 18.0				18. TOTAL CORE RECOVERY FOR BORING 112 %			
9. Total Recovery, % 112.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-47.6	0.0		Light brown fine sandy Silt lens over coarse shells (40-60%) and pebbles in dark gray sandy silt matrix Dark brown silty fine Sand to sandy Silt with numerous soft gray clay lenses; trace shell fragments (5-10%)	100	1		
-48.8	1.2				0.0		
					1.2		
				100	2		
					1.2		
					7.0		
				100	3		
					7.0		
					15.9		
-63.5	15.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 330,265.1 E 2,587,775.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-141				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 11.9				17. ELEVATION TOP OF HOLE -48.4			
8. Recovery, ft 12.7				18. TOTAL CORE RECOVERY FOR BORING 105 %			
9. Total Recovery, % 105.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-48.4	0.0		Light gray dense Shells and shell hash (50-70%) with small pebbles; silt and fine sand matrix	100	1		
-49.5	1.2		transition zone from shell- gravel unit to underlying gray sandy Silt		0.0		
-50.2	1.8		Light gray fine sandy Silt to silty fine Sand with trace shell hash and large shells (15-25%)	100	2		
-55.1	6.8		Dark gray shell hash and shells (50-70%) in fine sandy silt matrix		1.8		
-55.8	7.4		Dark gray green fine sandy Silt to silty fine Sand with some light gray-brown lenses of same grain size distribution	100	7.4		
-60.3	11.9				11.9		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,001.2 E 2,588,649.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-153				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 14.2				17. ELEVATION TOP OF HOLE -51.9			
8. Recovery, ft 17.0				18. TOTAL CORE RECOVERY FOR BORING 120 %			
9. Total Recovery, % 120.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-51.9	0.0		Light gray fine sandy Silt with white shell hash and medium to large shell fragments (50-80%)	102	1 0.0 5.2		
-57.0	5.2						
-59.9	8.0		Light gray shell hash (40-50%) with sandy silt matrix	100	2 5.2 9.0		
-60.9	9.0		Transitional layer from shell hash on top to sandy silt and silty fine sand below				
-66.0	14.2		Dark gray-green silty fine sand to sandy Silt, with some shell hash (20-40%) in layers	102	3 9.0 14.2		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,444.9 E 2,589,546.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-154				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/19/2011		COMPLETED 12/19/2011	
7. Penetration, ft 14.2				17. ELEVATION TOP OF HOLE -51.3			
8. Recovery, ft 16.5				18. TOTAL CORE RECOVERY FOR BORING 116 %			
9. Total Recovery, % 116.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-51.3	0.0		Light brown sandy silt with shell hash and few medium shells (40-60%)	100	1		
-52.2	0.9		Dark brown Silt with medium to large shell fragments (50-80%)		0.0 3.0		
-54.3	3.0		Dark brown Silt with medium to large shell fragments (50-80%)	100	2		
-56.3	5.0		Dark brown Silt with medium to large shell fragments (50-80%)		3.0 9.8		
-58.2	6.9		Light gray Shell hash and shells(60-80%) in sandy silt matrix	100	3		
-61.1	9.8		Dark gray to light gray shell hash (60-80%) trace silt in matrix		9.8 13.6		
-62.9	11.6		Dark gray sandy Silt with trace (10-20%) shell hash; few larger shells 11-11.6 feet	100	4		
-64.9	13.6		Dark gray to brown sandy Silt with shell hash and small to medium shells (20-30%)		13.6 14.2		
-65.5	14.2		Gray-green sandy Silt with trace (5%) small shell fragments	100	4		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 322,660.9 E 2,588,204.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-156				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 14.8				17. ELEVATION TOP OF HOLE -52.1			
8. Recovery, ft 17.5				18. TOTAL CORE RECOVERY FOR BORING 118 %			
9. Total Recovery, % 118.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-52.3	0.3		Dark brown sandy silt with shells and shell hash (60-80%)	100	1		
-52.7	0.7				0.0		
			Dark gray to brown soft sandy Clay and sandy silt with some shell fragments (20%)	100	0.7		
			Light to dark brown silty Shell hash and shells (60-80%)		2		
					0.7		
-55.2	3.2				4.8		
			Dark brown sandy Silt with shell hash and trace medium shell fragments (40%)				
-56.8	4.8						
			Gray sandy Shell hash and Shells (60-80%) in sandy silt matrix	100	3		
-58.3	6.3				4.8		
			Dark gray sandy Silt with shell hash and some shells (10-20%)		8.3		
-59.2	7.1						
			Shell hash and shells(60-80%) in dark gray silty fine sand matrix				
-60.1	8.0						
-60.4	8.3						
			Dark gray sandy Silt to silty fine Sand with medium to large shells (40-60%)	100	4		
			Dark brown to gray-green sandy Silt to silty fine Sand with 5% shell fragments		8.3		
					14.8		
-66.8	14.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 323,550.8 E 2,589,989.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-157				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 11.0				17. ELEVATION TOP OF HOLE -52.8			
8. Recovery, ft 13.2				18. TOTAL CORE RECOVERY FOR BORING 120 %			
9. Total Recovery, % 120.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-53.3	0.5		Gray shells and shell hash with silty fine sand matrix	100	1 0.0 2.2		
-55.0	2.2		Dark gray to brown sandy silt with shells and shell hash (40-60%)				
-57.8	5.0		Dark brown dense sandy Silt with trace shell hash (10-15%)	100	2 2.2 5.0		
-61.5	8.7		Dark brown shell hash and shells in sandy silt matrix (30-40%)	100	3 5.0 8.7		
-63.7	10.9		Light brown to gray dense shells and shell hash in sandy silt matrix (40-50%)	100	4 8.7 10.9		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 321,321.6 E 2,587,744.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-158				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 15.0				17. ELEVATION TOP OF HOLE -52.9			
8. Recovery, ft 18.5				18. TOTAL CORE RECOVERY FOR BORING 123 %			
9. Total Recovery, % 123.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-52.9	0.1		Dark gray to black sandy Silt	100	1		
-53.4	0.6				0.0		
			Black to dark gray soft silty Clay Dark to light gray fine Sandy Silt with shell hash in burrows (0.75-1.25')		2.3		
-55.1	2.3						
			Light gray Shell hash and shells (60-80%) in sandy silt matrix.	100	2		
					2.3		
-58.5	5.7				8.7		
-59.1	6.3		Large shells and shell hash (70-90%) in silt matrix				
			Dark gray to brown sandy Silt with shell hash (20-30%)				
-61.5	8.7						
			Gray Shells and shell hash in sandy silt matrix	100	3		
					8.7		
-63.8	10.9				10.9		
			Light brown to dark gray sandy Silt with trace (5-15%) shell fragments at top, with increasing shell content below 12 feet (50-60%).	100	4		
					10.9		
-66.0	13.1				15.0		
			Dark brown to dark green-gray sandy Silt with trace (5-10%) shell hash				
-67.9	15.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Y		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 322,210.1 E 2,589,536.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD 88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Y-160				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 15.2				17. ELEVATION TOP OF HOLE -52.3			
8. Recovery, ft 17.0				18. TOTAL CORE RECOVERY FOR BORING 112 %			
9. Total Recovery, % 112.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-52.7	0.4		Dark gray sandy Silt with trace shells fragments (5-10%)	100	1 0.0 1.7		
-54.0	1.7		Dark gray sandy Silt and soft Clay matrix with dense shell fragments (40-60%); 1 rock to 2.5" in diameter and some small gravel	100	2 1.7 4.5		
-56.8	4.5		Light gray to dark gray medium sandy Silt with trace shell hash (5-10%); some clay filled burrows in sandy silt unit	100	3 4.5 11.0		
-63.3	11.0		Light brown to gray medium Shell hash and medium to large Shells (20-30%) in silty fine sandy matrix	100	4 11.0 15.0		
-67.3	15.0		Dark brown Shell hash and medium to large shells (30-40%) in sandy silty matrix				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 321,709.8 E 2,562,509.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-165				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH			
7. Penetration, ft 15.1				16. DATE HOLE		STARTED 12/16/2011 COMPLETED 12/16/2011	
8. Recovery, ft 14.2				17. ELEVATION TOP OF HOLE -42.6			
9. Total Recovery, % 94.0				18. TOTAL CORE RECOVERY FOR BORING 94 %			
				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-42.8	0.3		Dark gray to black sandy stiff Silt with trace (5-10%) shell fragments	100	1 0.0		
-43.6	1.0		Dark gray to brown soft sticky Silt with trace (5-10%) shell hash		1.6		
-44.2	1.6		Dark gray sandy Silt to silty fine Sand, with some shell hash (20-30%)	100	2 1.6		
			Dark gray to light brown fine sandy Silt to silty fine Sand, trace (10%) shell hash decreasing down section; grades with fine to medium Sand, trace silt, between 2.33 and 2.75 ft.		7.4		
-50.0	7.4						
-50.7	8.1		Light brown gravel (1-2' diameter) in fine to medium sand matrix				
			Light brown to light gray fine to medium Sand with trace Silt; light green-gray clay lenses at 5" intervals	100	3 8.1		
-54.0	11.4				11.4		
-54.2	11.7		Dak gray to dark brown sandy Silt - Clay	100	4 11.4		
			Dark gray to light brown fine to medium Sand; dark brown stiff clay lens @12.17 ft		14.2		
-56.7	14.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 323,032.7 E 2,569,560.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-166				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 15.1				17. ELEVATION TOP OF HOLE -44.0			
8. Recovery, ft 17.8				18. TOTAL CORE RECOVERY FOR BORING 119 %			
9. Total Recovery, % 119.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-44.0	0.0		Dark gray fine sandy Silt to silty fine Sand; trace shell fragments (5-10%)	101	1		
-44.6	0.6				0.0		
-45.0	1.0		Dark gray shell hash (70%) and trace pebbles in sandy silt matrix	99	0.6		
-45.9	1.9		Dark gray clayey Silt with trace fine sand; trace shell fragments (10-15%)	100	2		
-46.0	2.0				0.6		
			Gray shell hash (80%) in silt matrix		1.0		
					3		
-47.4	3.4		Dark gray stiff clayey Silt with trace fine sand and pebbles; trace shell hash (20%)		3.4		
					1.0		
			Dark brown very stiff Clay with light brown to dark gray fine to medium sandy Silt lenses; light gray soft silt and shell hash filled burrows @ 3.58-3.83 feet	100	4		
					3.4		
					15.0		
-59.0	15.0						

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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,420.6 E 2,573,316.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-168				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 14.8				17. ELEVATION TOP OF HOLE -44.9			
8. Recovery, ft 16.0				18. TOTAL CORE RECOVERY FOR BORING 108 %			
9. Total Recovery, % 108.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-44.9	0.0		Gray fine sandy Silt with trace (5%) shell hash, few large shell fragments; increase in clay and shell content (10%) with depth	100	1 0.0 3.8		
-46.9	2.0		Gray pebble and shell hash mixture, trace silt, trace gravel to 0.5" diameter				
-48.7	3.8						
-49.4	4.5		Transition zone from fine to medium light brown/gray silty sand to dark brown very stiff clay	125	2 3.8 7.8		
-52.8	7.8		Dark brown very stiff Clay, some organics (tree roots)				
-55.3	10.4		Dark to light brown fine silty Sand to sandy Silt	99	3 7.8 10.4		
-59.7	14.8		Light brown to gray medium Sand with wood pieces (roots) at 11.5-11.9 and 12.4 to 14.2 ft)	100	4 10.4 14.8		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 325,102.7 E 2,575,195.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-169				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 15.1				17. ELEVATION TOP OF HOLE -45.6			
8. Recovery, ft 17.2				18. TOTAL CORE RECOVERY FOR BORING 113 %			
9. Total Recovery, % 113.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-46.0	0.4		Light brown coarse Sand with shell hash (20-30%)	100	1		
-46.2	0.6				0.0		
-46.4	0.8		Dark gray to black very soft Clay		4.3		
-46.8	1.2		Dark gray to light brown medium Sand and trace shell hash (5%)				
-47.3	1.7						
-48.0	2.4		Gray-green silty fine Sand; rare shell hash (5-10%)				
-48.6	3.0		Dark gray to light gray medium Sand, with soft dark gray clay lens at 1.33 ft				
-49.9	4.3		Gray-green sandy Silt with rare small shell fragments (5%)				
-50.7	5.1		Dark gray coarse shells (70-80%) and pebbles, some shell fragments in fine sandy silt matrix	100	2		
				100	4.3		
			Dark to light gray silty Clay with trace shell hash (5%); lens of light brown coarse sand at 4.33 ft		3		
			Dark brown fine sandy Silt with dark brown stiff Clay lenses, trace shell hash (5%); light gray soft clay-filled burrow at 5 ft.		5.1		
			Dark gray very coarse Shell hash (40%) with coarse sand and pebbles		9.6		
-55.2	9.6						
			Dark gray to light brown coarse Sand with small lenses of stiff dark brown clay; trace pebbles (5%)	100	4		
					9.6		
					15.2		
-60.8	15.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 325,791.6 E 2,577,075.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-170				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
						STARTED 12/16/2011 COMPLETED 12/16/2011	
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -44.4			
8. Recovery, ft 17.5				18. TOTAL CORE RECOVERY FOR BORING 109 %			
9. Total Recovery, % 109.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-44.4	0.0		Dark gray sandy Silt-Clay; rare shell fragments (1-5%)	100	1		
-45.1	0.8				0.0		
-45.8	1.4		Dark gray shell hash (10-20%) with pebbles; trace silt in matrix	100	0.8		
			Dark brown stiff Clay with light brown to gray very fine silt-clay; grades with lenses of gray medium sand below 10.5 ft.	100	2		
					0.8		
					1.4		
					3		
					1.4		
					13.8		
-58.1	13.8		Light gray medium to coarse Sand with pebbles in lenses	100	4		
-60.4	16.0				13.8		
					16.0		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,487.8 E 2,578,951.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-171				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -45.4			
8. Recovery, ft 17.7				18. TOTAL CORE RECOVERY FOR BORING 110 %			
9. Total Recovery, % 110.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-45.8	0.4		Light brown sandy Silt with trace (5%) shell hash	100	1 0.0 2.2		
-47.6	2.2		Dark gray sandy Silt with shell fragments (20%); layer of medium to coarse sand at 1 ft.				
-48.7	3.3		Dark gray Shells and shell fragments and pebbles; trace silt in matrix	100	2 2.2 4.4		
-49.8	4.4		Dark gray to light brown medium to coarse Sand with 20% pebbles and few shell fragments (10-15%)				
-50.1	4.7		Layers of light brown sandy Silt and dark brown stiff Clay; trace pebbles and shell hash	100	3 4.4 11.0		
-56.4	11.0		Light gray-green silty fine Sand to sandy Silt, trace dark gray clay filled burrows				
-61.4	16.0		Light brown to gray medium Sand; no shells	100	4 11.0 16.0		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 327,167.9 E 2,580,828.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-172				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 16.6				17. ELEVATION TOP OF HOLE -49.3			
8. Recovery, ft 19.0				18. TOTAL CORE RECOVERY FOR BORING 114 %			
9. Total Recovery, % 114.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-49.4	0.1		Dark brown soft silty Clay with shell hash (40-60%)	99	1		
-49.9	0.6		Dark brown stiff Clay; no shells		0.6		
-50.7	1.4		Dark gray pebbles (40%) in a sandy silt matrix: rare shell hash	100	1.4		
			Dark gray-green sandy Silt to silty fine Sand; few clay filled burrows		2		
					1.4		
					5.0		
				100	3		
					5.0		
					10.0		
					16.5		
-65.8	16.5						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 321,406.6 E 2,563,517.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-173				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 16.6				17. ELEVATION TOP OF HOLE -45.9			
8. Recovery, ft 17.5				18. TOTAL CORE RECOVERY FOR BORING 105 %			
9. Total Recovery, % 105.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-45.9	0.0	△ △ △	Dark gray sandy Silt with shell hash and small shell fragments (40-60%)	100	1		
-46.7	0.8	△ △ △			0.0		
-47.4	1.6	△ △ △	Dark gray sandy Silt with trace shell hash (5%)		7.0		
-47.6	1.8	△ △ △	Dark gray very stiff Clay				
-48.9	3.0	△ △ △	Dark gray sandy Silt with trace shell hash (5%)				
-49.2	3.3	△ △ △	Dark gray stiff to soft Clay, with lens of fine sandy silt				
			Dark green-gray sandy Silt				
-52.9	7.0	△ △ △					
-54.2	8.3	△ △ △	Dark gray to brown sandy Silt with small pebbles and rare shell hash (1-5%)	100	2		
					7.0		
-56.1	10.3	△ △ △	Light to dark brown medium sand with trace silt; trace dark brown clay lenses	100	3		
-57.1	11.3	△ △ △			8.3		
-57.3	11.4	△ △ △	Light to dark brown coarse sand with 20% pebbles		12.4		
-58.3	12.4	△ △ △	Dark brown very stiff silty Clay, rare pebbles				
			Light brown medium to coarse Sand				
-61.7	15.8	△ △ △	Dark gray-green very stiff Clay	100	4		
-62.1	16.3	△ △ △			12.4		
			Dark gray-green silty Clay		16.3		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 321,757.3 E 2,566,100.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-174				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 16.3				17. ELEVATION TOP OF HOLE -45.1			
8. Recovery, ft 18.3				18. TOTAL CORE RECOVERY FOR BORING 112 %			
9. Total Recovery, % 112.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-45.5	0.4		Dark gray sandy Silt with shell hash and shell fragments (40%); dark brown peat layer at bottom of section	100	1 0.0 7.8		
-47.1	2.0		Light gray fine to medium Sand with shells and shell hash in layers (40-60%)				
-49.2	4.1		Dark to light gray fine to medium Sand with large shells (50%)				
-52.9	7.8		Light gray fine to medium Sand, trace silt; occasional layers of large shells (30-40%)				
-55.1	10.0		Dark gray fine to medium Sand with soft dark gray clay layers	100	2 7.8 10.0		
-58.5	13.4		Dark gray-green Silt with little fine to medium Sand, trace soft clay lenses; wood fragment at 11.92 ft	100	3 10.0 13.4		
-61.3	16.3		Light brown to day gray medium Sand, trace silt, with dark gray soft clay layers; rare pebbles	100	4 13.4 16.3		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 322,687.4 E 2,568,624.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-175				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 15.4				17. ELEVATION TOP OF HOLE -44.1			
8. Recovery, ft 13.9				18. TOTAL CORE RECOVERY FOR BORING 90 %			
9. Total Recovery, % 90.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-44.4	0.3	△ △ △	Light gray to dark brown shells and shell hash (40-60%) in silty fine sand matrix	100	1		
-44.5	0.4	● ● ● ●			0.0		
-45.1	1.0	● ● ● ●	Dark gray very stiff Clay		1.0		
			Dark gray to black pebbly Gravel in silty sandy matrix; trace shell hash	100	2		
			Dark gray to dark brown still Clay; rare shell fragments in burrows		1.0		
					9.0		
-52.3	8.3						
-53.1	9.0		Black stiff Clay				
-53.4	9.3		Section of wood - possible large tree root				
-54.1	10.0		Dark red-brown stiff Clay, significant peat-like organic layers	100	3		
			Dark brown silty stiff Clay		9.3		
-55.1	11.0				11.0		
-55.7	11.6		Dark brown and light gray banded fine Sand	100	4		
			Dark red-brown silty stiff Clay		11.0		
-56.7	12.7				13.9		
			Light gray medium Sand				
-58.0	13.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 323,378.8 E 2,570,499.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-176				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 13.7				17. ELEVATION TOP OF HOLE -42.2			
8. Recovery, ft 18.0				18. TOTAL CORE RECOVERY FOR BORING 131 %			
9. Total Recovery, % 131.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-42.2 -42.8	0.0 0.6		Light brown fine to medium Sand and shells and shell fragments (60-80%)	100	1 0.0 1.6		
-43.5 -43.8	1.3 1.6		Dark gray Silt with fine Sand, trace shell hash (1-5%)				
-44.8	2.6		Dark gray shell hash and pebbles (80%), trace sandy silt as matrix	100	2 1.6 2.6		
-45.9	3.7		Dark gray stiff Clay with shelly silt in burrows	100	3 2.6 9.0		
-46.6	4.4		Dark gray-green Silt with fine sand, 30% shell hash and some pebbles (10%)				
-51.2	9.0		Layers of sandy Silt and stiff brown Clay				
-56.0	13.8		Dark brown stiff Clay with layers of light brown fine to medium Sand; few shell hash layers (10-30%)	100	4 9.0 13.8		
			Dark brown stiff Clay; wood fragments at bottom of section				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,063.6 E 2,572,380.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-177				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 16.2				17. ELEVATION TOP OF HOLE -43.0			
8. Recovery, ft 20.0				18. TOTAL CORE RECOVERY FOR BORING 124 %			
9. Total Recovery, % 124.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-43.0	0.0		Dark gray shell hash and shells and pebbles (50%); large rocks from 1.08-1.5 ft	100	1 0.0 1.8		
-44.5	1.5		Dark gray-green sandy Silt with trace shell hash	100	2		
-44.8	1.8		Dark brown stiff Clay		1.8		
-45.0	2.0		Dark gray green sandy Silt with shell hash (20%)		3.1		
-45.1	2.2		Light brown to dark gray fine Sand	99	3		
-45.2	2.3		Dark brown stiff Clay		3.1		
-45.9	2.9		Dark gray-green Silt with fine sand; trace coarse gravel		4.2		
-46.1	3.1		Dark gray-green fine to medium Sand with 40% pebbles	101	4		
-47.1	4.2		Dark red-brown stiff Clay; wood fragments at bottom of section		5.1		
-48.1	5.1		Light brown to gray silty Sand, coarsening downward to a fine to medium Sand, few pebbles below 15 ft.	100	5 5.1 16.2		
-58.5	15.5		Dark gray green Silt with some fine Sand				
-59.1	16.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1		
				Area Z		OF 1 SHEETS		
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in				
2. LOCATION (Coordinates or Station) N 324,762.4 E 2,574,256.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88				
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore				
4. HOLE NO. (As shown on drawing title and file number) Z-178				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED		
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES				
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE		
				STARTED 12/16/2011		COMPLETED 12/16/2011		
7. Penetration, ft 16.1				17. ELEVATION TOP OF HOLE -43.5				
8. Recovery, ft 20.0				18. TOTAL CORE RECOVERY FOR BORING 125 %				
9. Total Recovery, % 125.0				19. GEOLOGIST S. Miller				
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 weathering, etc., if significant) g		
-43.9	0.3		Dark gray sandy Silt with rare shell fragments (1-5%)	102	1			
-44.0	0.5				0.0			
-44.6	1.1		Dark gray shell hash (60%) with sandy silt matrix					2.1
-44.8	1.3							
-45.5	1.9		Dark gray-green sandy Silt					
-45.6	2.1		Dark gray sandy Silt with shell hash (50%)	100	2			
-45.7	2.2		Dark gray silty soft Clay with shell hash and shells (20-30%) and rock pieces		2.1			
-45.8	2.3		Gray shells (50%) and pebbles in silt matrix		12.9			
			Dark brown stiff Clay					
			Dark gray shell hash (50%) with pebbles in silt matrix					
			Dark brown stiff Clay with lenses of silty gray fine sand					
-56.5	12.9							
			Light gray Silt with some fine to medium sand and lenses of yellow-brown stiff Clay	97	3			
					12.9			
					15.4			
-59.0	15.4							
-59.6	16.1		Dark gray-green sandy Silt, trace shell hash(1-5%)	101	4			
					15.4			
					16.1			

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 325,450.3 E 2,576,137.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-179				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 10.5				17. ELEVATION TOP OF HOLE -43.7			
8. Recovery, ft 10.0				18. TOTAL CORE RECOVERY FOR BORING 96 %			
9. Total Recovery, % 96.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-44.0	0.3		Dark gray fine to medium Sand, trace silt, trace shell hash (1-5%)	100	1		
-44.5	0.8		Dark gray soft Clay		0.0		
			Dark gray-green sandy Silt with little shell hash (5%)		3.1		
-45.7	2.0		Dark gray shell hash (90%) and pebbles; large shells at bottom of section				
-46.2	2.5		Dark gray silty Clay with shell hash (80%) and small pebbles	100	2		
-46.8	3.1		Light gray to brown fine to medium Sand with shell hash (10%); some stiff clay lenses		3.1		
					5.5		
-49.2	5.5		Dark brown stiff Clay with lenses of dark brown very fine sandy silt	100	3		
-50.4	6.8		Dark brown silty medium Sand with pebbles and rock fragments (30%)	100	4		
-50.9	7.3		Gray to brown medium to coarse Sand with fine to medium gravel (40%)		6.8		
					10.1		
-53.8	10.1						

DRILLING LOG		DIVISION	INSTALLATION Area Z		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan			10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,133.3 E 2,578,013.4			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey			12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) : Z-180			13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 3 :			
5. NAME OF DRILLER C. Dill			14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.			15. WATER DEPTH			
7. Penetration, ft 9.9			16. DATE HOLE : STARTED : COMPLETED 12/17/2011 : 12/17/2011			
8. Recovery, ft 9.5			17. ELEVATION TOP OF HOLE -45.5			
9. Total Recovery, % 96.0			18. TOTAL CORE RECOVERY FOR BORING 96 %			
			19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
-45.8	0.3	[Pattern]	Dark gray shell hash and large shells (50%) in sandy silt matrix	100	1	
			Dark gray green fine Sandy Silt with trace (5%) shell hash; some fine to medium gravel	100	0.0 0.3 2 0.3 2.4	
-47.9	2.4	[Pattern]	Dark brown stiff Clay, trace shells and silt in burrows; some wood fragments	100	3 2.4 9.5	
-55.0	9.5	[Pattern]				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,828.3 E 2,579,891.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-181				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 16.6				17. ELEVATION TOP OF HOLE -45.9			
8. Recovery, ft 16.8				18. TOTAL CORE RECOVERY FOR BORING 101 %			
9. Total Recovery, % 101.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-46.4	0.5		Red-brown shell hash and shells (90%), some fine gravel in sandy silt matrix	100	1 0.0 2.0		
-47.9	2.0		Dark gray to black shell hash and shells (80%), few pebbles in silty fine to medium Sand matrix				
-49.4	3.5		Dark gray-green sandy Silt and soft Clay; trace shell hash (5%); layer of coarse gravel at 2.58 ft	100	2 2.0 3.5		
-60.7	14.8		Light gray sandy Silt, trace dark gray clay in burrow fills; dark gray silty fine to medium Sand layer at 4 ft; trace wood fragments	100	3 3.5 14.8		
-62.5	16.6		Light brown to gray silty medium Sand with brown color banding 15.5-16.33 ft	92	4 14.8 16.6		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS			
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in					
2. LOCATION (Coordinates or Station) N 325,692.0 E 2,573,912.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88					
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore					
4. HOLE NO. (As shown on drawing title and file number) Z-185				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED			
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES					
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE			
				STARTED 12/17/2011		COMPLETED 12/17/2011			
7. Penetration, ft 16.2				17. ELEVATION TOP OF HOLE -41.1					
8. Recovery, ft 19.3				18. TOTAL CORE RECOVERY FOR BORING 97 %					
9. Total Recovery, % 119.0				19. GEOLOGIST S. Miller					
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g			
-41.1	0.0		Dark gray sandy Silt with trace (1-5%) shell hash	100	1 0.0 3.1				
-42.5	1.4		Dark gray coarse Gravel in sandy silt matrix						
-42.8	1.7								
-44.0	2.9		Dark gray-green fine sandy Silt with trace shell hash (5%)						
-44.2	3.1		Dark gray stiff Clay	100	2 3.1 4.9				
			Dark gray-green fine sandy Silt, with gravel and shell hash (10-40%); increasing clay content with depth in section						
-46.0	4.9		Dark brown stiff Clay, some light brown silty layers throughout	100	3 4.9 10.0				
				100	4 10.0 16.3				
-57.4	16.3								

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,037.8 E 2,574,849.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-186				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
7. Penetration, ft 14.6				STARTED 12/17/2011		COMPLETED 12/17/2011	
8. Recovery, ft 15.5				17. ELEVATION TOP OF HOLE -41.4			
9. Total Recovery, % 106.0				18. TOTAL CORE RECOVERY FOR BORING 106 %			
				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-41.4	0.0		Dark gray sandy Silt, dark gray soft clay lens at 0.25 ft; trace shell hash (1-5%), except for one large shell at 0.92 ft	100	1 0.0 0.9		
-42.4	0.9		Dark gray-green sandy Silt with trace shell hash (5%); medium Sand and shell hash (50%) layer 2-2.25 ft; shell hash (90%) 4.25-4.58 ft; bottom of unit grades with coarser sand	100	2 0.9 5.6		
-47.0	5.6		Dark brown to gray fine sandy Silt to silty fine Sand; dark gray clay filling burrows with trace shell hash	100	3 5.6 10.2		
-51.6	10.2	Light brown fine to medium Sand, trace silt; large pebble at 10.58 ft; color transition near 11.75 feet to dark-light gray, less silt than top of section	99	4 10.2 14.6			
-56.1	14.6						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,167.1 E 2,575,538.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-191				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5	UNDISTURBED
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH			
7. Penetration, ft 12.7				16. DATE HOLE		STARTED 12/17/2011	COMPLETED 12/17/2011
8. Recovery, ft 15.3				17. ELEVATION TOP OF HOLE -47.6			
9. Total Recovery, % 119.0				18. TOTAL CORE RECOVERY FOR BORING 119 %			
				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-47.9	0.3		Light brown medium to coarse Sand with little shell hash (20%)	100	1		
-48.4	0.8				0.0		
			Dark gray medium to coarse Sand with trace silt and shell hash (10%)	100	0.8		
-49.4	1.8				2		
-49.7	2.2		Dark gray-green sandy Silt; little shell hash (5-10%); some dark gray-green clay lenses		0.8		
-50.1	2.6				2.2		
-50.7	3.2		Dark gray-green Silt with fine to medium Sand; trace shell fragments (1-5%); rare pebbles	100	3		
-51.0	3.4				2.2		
			Dark gray shell hash (80%); trace fine gravel in sandy silt matrix	100	3.2		
-52.0	4.4				4		
-52.6	5.1		Dark gray fine to medium Gravel; trace sandy silt		3.2		
			Transition from sandy gravel to stiff sandy silt and clay		10.6		
			Dark brown stiff Clay with lenses of brown silt				
			Gray to light brown fine to medium Sand with trace dark brown stiff clay lenses				
			Dark brown stiff Clay				
-58.1	10.6						
			Light brown to green Silt with very fine sand; coarsening downward to dark gray to light brown fine to medium Sand, trace silt	100	5		
-60.3	12.8				10.6		
					12.8		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 322,152.4 E 2,561,367.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-200				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/16/2011		COMPLETED 12/16/2011	
7. Penetration, ft 17.9				17. ELEVATION TOP OF HOLE -39.3			
8. Recovery, ft 17.3				18. TOTAL CORE RECOVERY FOR BORING 97 %			
9. Total Recovery, % 97.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-39.8	0.5		Dark gray to black Clay with fine sandy silt; trace (5%) shell hash	100	1		
-40.1	0.8		Large shell fragments (100%)		0.0		
			Gray Silt with fine to medium sand and shell fragments increasing with depth (50-90%)		2.8		
-42.1	2.8		Dark to light gray fine sandy Silt with trace (5%) shell hash; shell layer at 4.25 ft	100	2		
					2.8		
					5.2		
-44.5	5.2		Dark gray stiff Clay; medium to coarse sand in burrows at 13.58 ft	100	3		
					5.2		
					14.5		
-53.8	14.5		Dark to light gray medium to coarse Sand, trace silt	97	4		
					14.5		
					16.8		
-56.2	16.8		Dark gray fine to medium Gravel; trace sandy silt	99	5		
-56.6	17.3				16.8		
					17.3		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,629.0 E 2,573,568.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibrocure			
4. HOLE NO. (As shown on drawing title and file number) Z-213				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 15.0				17. ELEVATION TOP OF HOLE -34.1			
8. Recovery, ft 13.5				18. TOTAL CORE RECOVERY FOR BORING 90 %			
9. Total Recovery, % 90.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-34.5	0.3		Light brown fine to medium Sand, some silt	100	1		
			Dark gray sandy Silt		0.0 7.0		
-36.0	1.9		Dark gray soft Clay with 10-20% shell fragments				
-36.3	2.2		Dark gray to brown fine sandy Silt, with shell hash (40%) from 3.33 to 3.7 ft.				
-40.9	6.8						
-41.1	7.0		Dark gray semi-stiff Clay	100	2		
-42.1	7.9		Dark gray shell and shell fragments (40-80%) in silty sand matrix		7.0 9.2		
-43.3	9.2		Gray-green sandy silt and shell hash with fine gravel				
-45.9	11.8		Dark gray to light gray fine sandy Silt with shell hash and shell fragments increasing down section (15-40%)	100	3 9.2 11.8		
-47.6	13.5		Light gray shells and shell fragments in sandy silt matrix	100	4 11.8 13.5		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,974.5 E 2,574,504.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-214				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 16.9				17. ELEVATION TOP OF HOLE -36.5			
8. Recovery, ft 16.8				18. TOTAL CORE RECOVERY FOR BORING 97 %			
9. Total Recovery, % 97.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-36.5	0.0		Dark gray sandy Silt with trace (1-5%) shell fragments; layer of large shells at 1.5 ft; shell hash (70%) and gravel from 2.75-3.08 ft and at bottom of section	100	1 0.0 3.8		
-40.1	3.6						
-40.3	3.8		Dark gray stiff Clay	100	2 3.8		
-41.1	4.6		Dark gray to brown fine Gravel; trace shell hash (1-5%); trace medium to coarse Sand	100	4.6		
			Gray-green sandy Silt with trace shell hash (1-5%) and dark gray-green stiff clay layers; shell hash layer 6.58-6.67 ft; stiff clay layer 6.67-7.08 ft		3 4.6 7.3		
-43.9	7.3						
-44.3	7.8		Dark gray to black medium to coarse Sand, trace silt; trace shell hash (5%); little fine gravel (20%)	100	4 7.3 9.8		
-44.5	8.0		Gray-green sandy Silt				
-45.8	9.3		Dark gray sandy Silt with shell fragments increasing down section (40-95%)				
-46.4	9.8		Dark gray fine to medium Sand and shell hash (50); trace silt	100	5 9.8 16.8		
			Dark gray green sandy Silt with varying amounts of shell hash (5-40%); trace peat at 12.42-13.08 ft				
-53.3	16.8						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 327,325.2 E 2,575,443.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-215				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 17.6				17. ELEVATION TOP OF HOLE -32.1			
8. Recovery, ft 17.2				18. TOTAL CORE RECOVERY FOR BORING 98 %			
9. Total Recovery, % 98.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-32.1	0.0		Brown to dark gray sandy Silt with trace shell fragments (<5%)	100	1		
-32.9	0.8				0.0		
-33.1	1.0		Dark gray to black very soft Clay		4.0		
-33.7	1.6		Dark gray fine to medium Sand with trace silt and 5% shell hash				
			Dark gray to light gray fine sandy Silt, trace shell hash				
-35.1	2.9		Light gray silty fine Sand				
-36.1	4.0						
-36.3	4.2		Dark gray silty fine to medium sand with shell hash (80%) and small gravel	100	2		
			Dark gray-green sandy Silt with shell hash (5-30%)		4.0		
-38.1	6.0				9.2		
			Shell hash and shell fragments (90%) with trace dark gray green silt				
-39.2	7.1						
-39.6	7.4		Soft dark gray-green Clay				
			Dark gray fine sandy Silt with soft Clay layers containing shell hash and some larger shell fragments				
-41.3	9.2						
			Dark gray semi-stiff Clay	101	3		
-42.5	10.3				9.2		
			Dark gray silt and fine gravel with 30% shell hash matrix	100	4		
-43.4	11.3				10.3		
-43.5	11.3		Dark gray to black stiff Clay with bands of brown to gray coloring		11.6		
-43.6	11.5			100	5		
-43.7	11.6		Dark gray-green semi-stiff Clay		11.6		
-44.0	11.8		Dark gray to black stiff Clay with light brown to gray bands of silty Clay		17.2		
-44.1	12.0		Dark gray-green sandy Silt				
-44.2	12.1		Light gray silty very fine Sand				
			Dark gray to black stiff silty Clay				
			Dark gray-green Silt with fine to medium sand; rare shell hash lenses				
-49.3	17.2						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,387.5 E 2,575,788.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-231				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 12.5				17. ELEVATION TOP OF HOLE -42.5			
8. Recovery, ft 10.3				18. TOTAL CORE RECOVERY FOR BORING 80 %			
9. Total Recovery, % 80.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-42.5	0.0		Dark gray green silty fine to medium Sand, trace shell hash (1-10%)	100	1 0.0 4.2		
-46.0	3.6						
-46.2	3.8		Dark gray-green stiff Clay layer				
-46.6	4.2		Dark gray-green silty fine Sand, trace shell hash (10%)	359	2 4.2		
-47.8	5.3		Shell hash and small to medium gravel with trace gray-green silt		5.3		
			Light brown very fine Sand, trace burrows with layers of dark gray sandy Silt	100	3 5.3 10.3		
-52.3	9.8						
-52.5	10.0		Dark red-brown stiff Clay				
-52.5	10.1		Dark gray stiff Clay				
-52.8	10.3		Light to dark brown fine sandy Silt				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 326,732.4 E 2,576,727.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-232				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 14.1				17. ELEVATION TOP OF HOLE -43.6			
8. Recovery, ft 15.0				18. TOTAL CORE RECOVERY FOR BORING 106 %			
9. Total Recovery, % 106.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-43.6	0.0		Dark gray-green sandy Silt, trace shell hash (5%); shell pieces at 2.58 ft	98	1 0.0 3.8		
-47.5	3.8						
-48.3	4.7		Dark gray shell hash and pebbles with trace interbedded silt and clay lenses	99	2 3.8 4.7		
-52.1	8.4		Dark brown stiff Clay, trace soft silty clay in burrows; trace shell hash; trace wood fragments increasing with depth	100	3 4.7 8.4		
-52.3	8.7		Wood fragments in stiff dark red-brown Clay	33	4		
-52.8	9.2		Dark brown to black organic rich stiff silty Clay		8.7		
-53.8	10.2		Dark red-brown stiff very fine Silt		10.2		
-57.8	14.1		Light brown to gray very fine sandy Silt, coarsening with depth to fine to medium silty sand	99	5 10.2 14.1		

DRILLING LOG		DIVISION		INSTALLATION Area Z		SHEET 1 OF 1 SHEETS							
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in									
2. LOCATION (Coordinates or Station) N 327,071.9 E 2,577,666.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88									
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore									
4. HOLE NO. (As shown on drawing title and file number) Z-233				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED							
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES									
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH									
7. Penetration, ft 17.0				16. DATE HOLE		STARTED 12/17/2011 COMPLETED 12/17/2011							
8. Recovery, ft 17.9				17. ELEVATION TOP OF HOLE -41.4									
9. Total Recovery, % 105.0				18. TOTAL CORE RECOVERY FOR BORING 105 %									
				19. GEOLOGIST S. Miller									
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 weathering, etc., if significant) g	
-41.4		0.0				Dark brown to gray medium to coarse sand, trace silt, shell hash and shells (40-50%); pebble to 1.5-2" at 0.67 ft		100		1 0.0 0.8			
-42.1		0.8				Dark gray-green Silt with fine sand; trace shell hash (1-5%)		100		2 0.8 3.5			
-44.9		3.5				Dark gray green Silt with sand and fine gravel; some shell hash (50-70%)		100		3 3.5 5.8			
-46.0		4.6				Dark gray sandy Silt; trace soft clay		100		4 5.8 11.2			
-46.5		5.1				Dark gray to brown fine to medium Sand with gravel (40%)		100		5 11.2 17.0			
-47.2		5.8				Gray-green Silt with very fine sand		100		5 11.2 17.0			
-52.5		11.2				Dark gray to orange-brown Silt with fine sand; trace medium to coarse sand		100		5 11.2 17.0			
-54.0		12.6				Dark brown sandy Silt, grading to orange-brown color at 14.75 ft and gray at 15.75 ft; grain size increases with depth in section		100		5 11.2 17.0			
-58.4		17.0				Dark brown sandy Silt, grading to orange-brown color at 14.75 ft and gray at 15.75 ft; grain size increases with depth in section		100		5 11.2 17.0			
						Dark brown sandy Silt, grading to orange-brown color at 14.75 ft and gray at 15.75 ft; grain size increases with depth in section		100		5 11.2 17.0			

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 327,418.9 E 2,578,603.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-234				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 16.2				17. ELEVATION TOP OF HOLE -42.7			
8. Recovery, ft 14.6				18. TOTAL CORE RECOVERY FOR BORING 91 %			
9. Total Recovery, % 91.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-42.7	0.0		Dark gray-green sandy Silt with shell hash(5%); pebbles and large shell at 0.5 ft	100	1 0.0 1.7		
-44.4	1.7		Dark gray-green Gravel and large shells, with trace sandy silt	100	2 1.7 3.5		
-44.8	2.1		Dark gray soft to semi-stiff Clay and sandy Silt with shell hash (40%) and trace gravel				
-46.2	3.5		Dark gray to brown medium to coarse Sand, trace silt, trace fine gravel	100	3 3.5 5.6		
-48.3	5.6		Dark gray-green Silt with fine to medium sand; trace gray soft clay in burrows with some shell hash	100	4 5.6 14.6		
-57.3	14.6						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 327,766.4 E 2,579,546.3				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-235				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 12/17/2011 COMPLETED 12/17/2011	
7. Penetration, ft 16.1				17. ELEVATION TOP OF HOLE -44.8			
8. Recovery, ft 18.0				18. TOTAL CORE RECOVERY FOR BORING 112 %			
9. Total Recovery, % 112.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-45.1	0.3		Dark gray very soft Clay	100	1		
-45.5	0.7		Dark gray to black Gravel and shell hash (80%) with trace silt and fine to medium sand		0.0		
			Dark gray-green sandy Silt with trace shell hash (5%)		2.8		
-47.1	2.3		Gray-green medium Gravel; trace shell hash (5%) and trace sandy silt				
-47.3	2.5		Dark gray stiff Clay	100	2		
-47.6	2.8		Dark gray to brown sandy Silt		2.8		
					5.5		
-50.3	5.5		Dark brown fine sandy Silt with shell hash (40-60%); shell content decreasing down section; grain size of sandy silt increases down section	100	3		
					5.5		
					10.0		
				100	4		
					10.0		
					16.1		
-60.9	16.1		Dark brown fine sandy Silt with shell hash (40-60%); shell content decreasing down section; grain size of sandy silt increases down section				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,501.4 E 2,576,480.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-255				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 13.4				17. ELEVATION TOP OF HOLE -49.2			
8. Recovery, ft 15.8				18. TOTAL CORE RECOVERY FOR BORING 112 %			
9. Total Recovery, % 112.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-49.6	0.4		Dark to light brown coarse Sand with shell hash and gravel (30-40%); trace silt	100	1		
-49.9	0.8				0.0		
-50.0	0.8		Light gray-green Silt with fine sand and fine gravel (60-70%); grades with shell hash from 0.58-0.75 ft	100	2		
-50.2	1.0		Dark gray soft Clay, trace shell fragments (1-5%)		1.0		
			Dark gray medium to coarse Sand with gravel (30%)		4.8		
			Dark brown stiff Clay; dark gray sandy silt and small shell fragments filling burrows				
-54.0	4.8						
-54.7	5.6		Light gray Silt with fine Sand	100	3		
			Yellow gray stiff silty Clay		4.8		
-56.2	7.0				7.0		
			Light brown medium sand, trace silt	100	4		
					7.0		
-60.2	11.1				11.1		
			Dark brown stiff silty Clay	100	5		
-61.7	12.6				11.1		
-62.6	13.4		Dark brown to light gray medium to coarse sand; grain size increases with depth in section		13.4		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,854.6 E 2,577,422.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-256				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -46.3			
8. Recovery, ft 17.3				18. TOTAL CORE RECOVERY FOR BORING 109 %			
9. Total Recovery, % 109.0				19. GEOLOGIST S. Miller			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-46.3	0.0		Dark gray-green sandy Silt; trace shell hash (5-10%); trace coarse gravel; coarse shell fragment and gravel layer - 2.33 to 3.0 ft; still clay layer 3.25-3.4 ft	100	1 0.0 4.8		
-51.0	4.8						
-53.8	7.6		Light to dark gray medium to coarse Sand; trace silt; grades with 20-30% gravel from 5.5-5.92 ft	100	2 4.8 7.6		
-56.9	10.7		Light brown to dark gray shell hash (60-80%); silty fine sand matrix	100	3 7.6 10.7		
-62.3	16.0		Light brown to dark gray Silt with fine sand; grain size increases down section; shell hash present below 14.33 ft (5-10%)	100	4 10.7 16.0		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 325,178.1 E 2,578,360.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-257				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 17.0				17. ELEVATION TOP OF HOLE -46.8			
8. Recovery, ft 19.1				18. TOTAL CORE RECOVERY FOR BORING 114 %			
9. Total Recovery, % 114.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-47.2	0.4		Light brown fine to medium Sand; some silt; trace shell fragments (5-10%)	100	1		
-47.7	0.8				0.0		
			Dark gray to black large shells (80%) and rock fragments in medium sand, trace silt matrix		2.8		
-49.2	2.4		Dark gray green Silt with some sand and trace shell hash (1-5%)				
-49.4	2.5		Dark gray soft Clay				
-49.7	2.8		Dark gray-green fine to medium Gravel (80%) and shell hash (10%) with trace fine to medium sand as matrix.	100	2		
					2.8		
					4.5		
-51.3	4.5		Dark gray to brown medium to coarse Sand, trace silt and gravel; trace soft dark gray clay	100	3		
			Light to dark gray-brown medium to very coarse Sand, trace fine gravel (1-5%)		4.5		
					11.3		
-56.0	9.2		Light brown to dark gray medium to coarse Sand, some silt; one rock fragment at 10.92 feet				
-58.1	11.3						
-58.7	11.9		Light brown Silt and fine sand	100	4		
					11.3		
			Dark gray-green-brown Silt and fine Sand; trace medium sand from 14.58 to 15.5 feet		17.0		
-63.8	17.0						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 325,544.5 E 2,579,294.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-258				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 5 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 15.0				17. ELEVATION TOP OF HOLE -46.8			
8. Recovery, ft 18.5				18. TOTAL CORE RECOVERY FOR BORING 123 %			
9. Total Recovery, % 123.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-47.3	0.5		Light brown to dark gray fine to medium Sand, some shell hash (30%), trace silt	100	1		
-47.9	1.1		Dark gray silty fine Sand		0.0		
-48.1	1.3		Dark gray to black shells and shell hash in medium sand matrix		3.5		
-49.5	2.7		Dark gray-green sandy silt interbedded with shell hash layers and stiff dark gray clay				
-50.3	3.5		Interbedded dark gray-green silty sand interbedded with dark gray clay, dark brown clay and small to medium gravel	100	2		
			Dark brown stiff Clay		3.5		
-52.9	6.1				6.1		
			Dark red-brown stiff Clay with layers of organics (peat); trace silt lenses	100	3		
-54.3	7.5		Light to dark brown silty Clay with small lenses of very fine silt		6.1		
-56.3	9.4				9.4		
-57.0	10.2		Dark brown to dark gray Silt with medium sand and little fine gravel (10-20%)	100	4		
			Light gray medium to coarse Sand with some fine to medium gravel (10-20%)		9.4		
-58.3	11.5				11.5		
-58.7	11.8		Light brown fine sandy Silt	100	5		
			Dark gray-green fine sandy Silt, trace black organic lenses @ 12.25 ft		11.5		
-60.3	13.5				15.1		
			Light brown Silt with fine to medium sand, trace fine gravel				
-61.9	15.1						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS		
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in				
2. LOCATION (Coordinates or Station) N 325,889.1 E 2,580,233.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88				
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore				
4. HOLE NO. (As shown on drawing title and file number) Z-259				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED		
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES				
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE		
				STARTED 12/17/2011		COMPLETED 12/17/2011		
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -47.5				
8. Recovery, ft 18.3				18. TOTAL CORE RECOVERY FOR BORING 114 %				
9. Total Recovery, % 114.0				19. GEOLOGIST S. Miller				
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 weathering, etc., if significant) g		
-47.8	0.3		Light brown to gray Silt with fine to medium sand and shell hash (5%); trace gravel	100	1			
			Dark gray green sandy Silt, trace medium sand; with shell hash (6-80%) and fine gravel		0.0 2.0			
-49.5	2.0		Dark gray soft Clay and light brown very fine sandy silt; trace (5%) shell fragments	100	2			
-50.3	2.8		Light brown very fine sandy Silt; trace soft to stiff dark brown clay lenses		2.0 11.5			
-59.0	11.5		Dark gray to light brown Silt, trace medium sand	100	3			
					11.5 15.4			
-62.9	15.4							
-63.6	16.1		Dark brown to light brown fine to medium Sand, trace silt	101	4			
					15.4 16.1			

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 323,220.7 E 2,575,885.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-276				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH			
7. Penetration, ft 14.0				16. DATE HOLE		STARTED 12/18/2011 COMPLETED 12/18/2011	
8. Recovery, ft 18.3				17. ELEVATION TOP OF HOLE -47.0			
9. Total Recovery, % 131.0				18. TOTAL CORE RECOVERY FOR BORING 131 %			
				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-47.3	0.3		Red-brown to dark gray fine to medium Sand, trace silt, and shell hash (80%); trace fine gravel	97	1		
-47.9	0.9			0.0			
-48.5	1.5			0.9			
				2			
			Dark gray Silt with fine to medium Sand	104	2		
				0.9			
				1.5			
				3			
-49.6	2.6		Dark gray- green Silt with fine sand; shell hash and gravel (80%)	100	0.9		
				1.5			
				13.5			
			Dark brown stiff Clay with lenses of dark to light gray silt				
			Dark brown stiff Clay; light brown silt lenses in bottom few inches of section				
-60.5	13.5						
-60.9	13.9		Light gray to light brown very fine Silt	99	4		
					13.5		
					13.9		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 323,571.0 E 2,576,822.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-277				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 18.1				17. ELEVATION TOP OF HOLE -48.8			
8. Recovery, ft 18.6				18. TOTAL CORE RECOVERY FOR BORING 103 %			
9. Total Recovery, % 103.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-49.1	0.3		Dark gray green sandy Silt	99	1		
			Dark gray shells and shell hash (80%) with 5-10% gravel in silty fine sand matrix		0.0		
-50.2	1.4				1.4		
-50.6	1.8		Dark gray-green sandy Silt with 5-20% shells interlayered with stiff dark brown Clay	97	2		
-50.7	1.9			100	1.4		
-51.2	2.4		Dark brown stiff Clay		1.9		
			Dark brown to gray fine sandy Silt		3		
			Gray fine to very coarse Sand, trace silt		1.9		
					12.0		
-60.3	11.5						
-60.8	12.0		Light gray green silty Clay				
-61.1	12.3		Gray medium Sand layers and light gray-green fine clayey sandy Silt	100	4		
			Dark gray to light green Silt with fine to medium Sand; clay lenses from 15.25-16.5 ft		12.0		
					18.5		
-67.3	18.5						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 323,912.6 E 2,577,764.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-278				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 12/17/2011 COMPLETED 12/17/2011	
7. Penetration, ft 15.5				17. ELEVATION TOP OF HOLE -48.0			
8. Recovery, ft 20.0				18. TOTAL CORE RECOVERY FOR BORING 103 %			
9. Total Recovery, % 130.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-48.0	0.0		Dark brown stiff Clay with trace wood pieces	100	1 0.0 7.0		
-54.0	6.0		Dark brown to black Clay with organic fragments (peat)				
-55.0	7.0						
-58.4	10.3		Dark gray fine to medium silty Sand, coarsening down section to very coarse sand and trace fine gravel	100	2 7.0 10.3		
-58.7	10.7		Very coarse gravel with rock fragments in very coarse sand matrix	100	3 10.3 11.8		
-59.8	11.8		Dark gray green fine sandy Silt				
-63.5	15.5		Dark to light brown fine sandy Silt with shell hash decreasing down section (10-15%)	100	4 11.8 15.5		

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 324,259.8 E 2,578,702.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-279				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/17/2011		COMPLETED 12/17/2011	
7. Penetration, ft 16.0				17. ELEVATION TOP OF HOLE -47.0			
8. Recovery, ft 15.0				18. TOTAL CORE RECOVERY FOR BORING 113 %			
9. Total Recovery, % 93.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-47.0	0.0		Dark gray-green Silt with fine to medium Sand and shell hash (20-30%)	101	1		
-47.6	0.7				0.0		
-48.5	1.6		Dark gray-green Silt with fine sand, trace (5%) shell hash		1.6		
-49.5	2.5			2			
			Dark gray-green shell hash and medium gravel (80-90%); trace dark gray green Silt with fine sand	98	1.6		
				2.5			
			Dark gray-green to brown sandy Silt, trace dark brown semi-stiff to stiff clay	100	3		
				2.5			
				5.8			
-52.8	5.9						
			Light brown fine sandy Silt with shells and shell fragments (30-40%)	100	4		
				5.8			
-56.5	9.5				14.9		
			Dark brown Silt with very fine Sand, trace shell hash (5%)				
-58.5	11.5						
			Dark brown to light brown Silt with fine sand and shell hash (30-50%)				
-61.9	14.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 322,284.7 E 2,576,230.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-298				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 14.0				17. ELEVATION TOP OF HOLE -46.9			
8. Recovery, ft 16.5				18. TOTAL CORE RECOVERY FOR BORING 118 %			
9. Total Recovery, % 118.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-46.9	0.0		Orange-brown medium to coarse Sand, some shell hash (20%); trace gravel (5%)	100	1		
-47.9	1.0			0.0			
-48.5	1.6		Dark gray fine to medium silty Sand, trace shell fragments (5%); gravel lens at bottom of section	101	2		
				89	1.0		
					1.6		
					3		
			Dark brown stiff Clay, trace light brown silt in lenses		1.6		
					10.4		
-57.3	10.4						
			Transition zone with stiff dark brown clay grading to light brown fine to medium Sand, trace silt	101	4		
-59.7	12.8				10.4		
					14.0		
-60.5	13.6		Dark brown medium Sand with 10-20% gravel				
-60.9	14.0						
			Brown silty fine Sand				

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 322,630.3 E 2,577,166.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-299				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH			
7. Penetration, ft 14.3				16. DATE HOLE		STARTED 12/18/2011 COMPLETED 12/18/2011	
8. Recovery, ft 18.5				17. ELEVATION TOP OF HOLE -49.4			
9. Total Recovery, % 130.0				18. TOTAL CORE RECOVERY FOR BORING 130 %			
				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-49.9	0.5		Light gray to brown Silt with fine to medium sand; trace shell hash (1-5%)	100	1		
-50.3	0.9			100	0.0		
-50.6	1.2		Dark brown stiff Clay with shell hash (50%); some fine sandy silt in lenses		0.5		
-50.7	1.3		Dark brown stiff Clay		2		
-51.6	2.2		Dark gray-green shell hash and gravel (90%) in silt matrix		0.5		
-52.6	3.2		Dark brown stiff silty Clay		4.3		
-53.7	4.3		Transition from stiff Clay to dark gray-brown Silt with fine sand				
			Dark brown Silt with fine to medium sand; trace dark brown clay in laminae	100	3		
			Dark brown stiff Clay with wood fragments at 11.17 ft		4.3		
					12.1		
-61.5	12.1						
			Layers of dark brown stiff Clay and dark brown silt to silty fine sand	99	4		
-63.7	14.3				12.1		
					14.3		

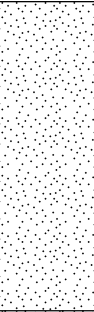
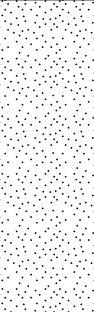
DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 322,970.3 E 2,578,106.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-300				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 4 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 16.2				17. ELEVATION TOP OF HOLE -49.7			
8. Recovery, ft 16.9				18. TOTAL CORE RECOVERY FOR BORING 105 %			
9. Total Recovery, % 105.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-50.2	0.5		Light brown silty fine Sand; trace shell fragments (<5%)	97	1		
-50.7	0.9				0.0		
-50.9	1.2		Dark brown silty fine to medium Sand; trace medium to large shell fragments (<5%)	106	1.2		
-51.5	1.8		Dark brown to light gray Sand, trace silt	100	2		
			Dark brown stiff Clay with dark gray sandy silt lenses		1.2		
-52.5	2.8		Transition from dark brown- black silty Clay to dark gray fine sandy Silt		1.8		
			Light brown to gray Silt with fine sand; becoming slightly coarser with depth		9.5		
-56.4	6.7						
			Light to dark gray medium to coarse Sand, trace silt, trace fine gravel				
-59.2	9.5						
			Dark gray-green sandy Silt	100	4		
					9.5		
					16.3		
-66.0	16.3						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1	
				Area Z		OF 1 SHEETS	
1. PROJECT Bogue Banks Master Beach Nourishment Plan				10. SIZE AND TYPE OF BIT 3.5 in			
2. LOCATION (Coordinates or Station) N 323,320.2 E 2,579,045.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NAVD-88			
3. DRILLING AGENCY Alpine Ocean Seismic Survey				12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore			
4. HOLE NO. (As shown on drawing title and file number) Z-301				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 3 UNDISTURBED	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 12/18/2011		COMPLETED 12/18/2011	
7. Penetration, ft 16.6				17. ELEVATION TOP OF HOLE -47.8			
8. Recovery, ft 18.0				18. TOTAL CORE RECOVERY FOR BORING 108 %			
9. Total Recovery, % 108.0				19. GEOLOGIST S. Miller			
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 weathering, etc., if significant) g	
-48.1	0.3		Light gray Silt with fine sand; trace shell hash (<5%)	100	1		
-48.8	1.0		Dark gray shell hash (80%) and gravel in fine sandy silt matrix		0.0		
-49.2	1.3		Dark brown to gray sandy Silt		1.6		
-49.4	1.6		Dark gray medium to coarse Sand and fine to medium Gravel	100	2		
-50.3	2.4		Dark gray to light brown Silt with fine to medium Sand		1.6		
			Light brown Silt with fine to medium sand; increasing fine gravel content with depth		12.7		
-52.3	4.5		Dark brown to black medium to coarse Sand, trace silt; little fine gravel				
-53.5	5.7		Dark gray Silt with fine sand				
-54.8	6.9		Dark gray to black fine to coarse Sand; trace silt; trace fine gravel				
-56.3	8.5		Light brown to gray medium to very coarse Sand, trace silt and fine gravel				
-58.6	10.8		Light to dark gray fine to very coarse Sand; trace silt; rare fine gravel				
-60.5	12.7		Light brown Silt with fine sand	100	3		
					12.7		
					16.6		
-64.4	16.6						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Inlet				10. SIZE AND TYPE OF BIT 3in			
2. LOCATION (Coordinates or Station) Bogue Inlet, North Carolina N 332,679.1 E 2,568,064.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL)			
3. DRILLING AGENCY Alpine				12. MANUFACTURER'S DESIGNATION OF DRILL Mini-Vibracore			
4. HOLE NO. (As shown on drawing title and file number) BI-1				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED 0	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE	
				STARTED 4/10/2012		COMPLETED 4/10/2012	
7. Penetration, ft 5.2				17. ELEVATION TOP OF HOLE -4.5			
8. Recovery, ft 5.2				18. TOTAL CORE RECOVERY FOR BORING 100 %			
9. Total Recovery, % 100.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-4.5	0.0		Gray medium Sand with 25% shell hash	100	1		
					0.0		
					3.0		
-7.5	3.0		Gray medium to coarse Sand, 15% shell hash	100	2		
					3.0		
					5.2		
-9.7	5.2						

ENG FORM MAR 71	1836 PREVIOUS EDITIONS ARE OBSOLETE.	PROJECT Boque Inlet	HOLE NO. BI-2
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DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Inlet				10. SIZE AND TYPE OF BIT 3in			
2. LOCATION (Coordinates or Station) Bogue Inlet, North Carolina N 330,774.3 E 2,568,710.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL)			
3. DRILLING AGENCY Alpine				12. MANUFACTURER'S DESIGNATION OF DRILL Mini-Vibracore			
4. HOLE NO. (As shown on drawing title and file number) BI-3				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED 0	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 4/10/2012 COMPLETED 4/10/2012	
7. Penetration, ft 6.2				17. ELEVATION TOP OF HOLE -4.9			
8. Recovery, ft 5.6				18. TOTAL CORE RECOVERY FOR BORING 100 %			
9. Total Recovery, % 90.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-4.9	0.0		Brown- gray medium Sand, 29% shell hash	100	1 0.0 2.8		
-7.7	2.8		Brown- gray medium Sand, 25% shell hash	100	2 2.8 5.6		
-10.5	5.6						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Inlet				10. SIZE AND TYPE OF BIT 3in			
2. LOCATION (Coordinates or Station) Bogue Inlet, North Carolina N 329,825.2 E 2,569,032.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL)			
3. DRILLING AGENCY Alpine				12. MANUFACTURER'S DESIGNATION OF DRILL Mini-Vibracore			
4. HOLE NO. (As shown on drawing title and file number) BI-4				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED 0	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 4/10/2012 COMPLETED 4/10/2012	
7. Penetration, ft 4.9				17. ELEVATION TOP OF HOLE -6.6			
8. Recovery, ft 4.9				18. TOTAL CORE RECOVERY FOR BORING 100 %			
9. Total Recovery, % 100.0				19. GEOLOGIST C. Dill			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
-6.6	0.0		Gray fine Sand; < 5% shell fragments	100	1 0.0 2.3		
-8.9	2.3			Gray fine Sand; < 10% shell fragments	100		
-11.5	4.9						

DRILLING LOG		DIVISION		INSTALLATION		SHEET 1 OF 1 SHEETS	
1. PROJECT Bogue Inlet				10. SIZE AND TYPE OF BIT 3in			
2. LOCATION (Coordinates or Station) Bogue Inlet, North Carolina N 328,880.3 E 2,569,357.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL)			
3. DRILLING AGENCY Alpine				12. MANUFACTURER'S DESIGNATION OF DRILL Mini-Vibracore			
4. HOLE NO. (As shown on drawing title and file number) BI-5				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 2 UNDISTURBED 0	
5. NAME OF DRILLER C. Dill				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. WATER DEPTH		16. DATE HOLE STARTED 4/10/2012 COMPLETED 4/10/2012	
7. Penetration, ft 5.6				17. ELEVATION TOP OF HOLE -6.6			
8. Recovery, ft 5.6				18. TOTAL CORE RECOVERY FOR BORING 100 %			
9. Total Recovery, % 100.0				19. GEOLOGIST C. Dill			
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 weathering, etc., if significant) g	
-6.6	0.0		Gray to brown fine Sand; 7% shell hash	100	1 0.0 2.5		
-9.1	2.5						
			Gray to brown fine Sand; 9% shell hash	100	2 2.5 5.6		
-12.2	5.6						

APPENDIX 4

CORE PHOTOGRAPHS

ODMDS Cores
Area Y Cores
Area Z Cores
Bogue Inlet Cores

ODMDS Core 1
0 – 5 feet



ODMDS Core 1
5 – 10 feet



ODMDS Core 1
10 – 15 feet



ODMDS Core 1
15 – 18.25 feet



ODMDS Core 2
0 – 5 feet



ODMDS Core 2
5 – 10 feet



ODMDS Core 2
10 – 15 feet



ODMDS Core 2
15 – 18.83 feet



ODMDS Core 3
0 – 5 feet



ODMDS Core 3
5 – 10 feet



ODMDS Core 3
10 – 15 feet



ODMDS Core 3
15 – 16.75 feet



ODMDS Core 4
0 – 5 feet



ODMDS Core 4
5 – 10 feet



ODMDS Core 4
10 – 15 feet



ODMDS Core 4
15 – 16.75 feet



ODMDS Core 5
0 – 5 feet



ODMDS Core 5
5 – 10 feet



ODMDS Core 5
10 – 15 feet



ODMDS Core 5
15 – 17.75 feet



ODMDS Core 6
0 – 5 feet



ODMDS Core 6
5 – 10 feet



ODMDS Core 6
10 – 15 feet



ODMDS Core 6
15 – 19 feet



ODMDS Core 7
0 – 5 feet



ODMDS Core 7
5 – 10 feet



ODMDS Core 7
10 – 13.75 feet



ODMDS Core 8
0 – 5 feet



ODMDS Core 8
5 – 10 feet



ODMDS Core 8
10 – 15 feet



ODMDS Core 8
15 – 19 feet



ODMDS Core 9
0 – 5 feet



ODMDS Core 9
5 – 10 feet



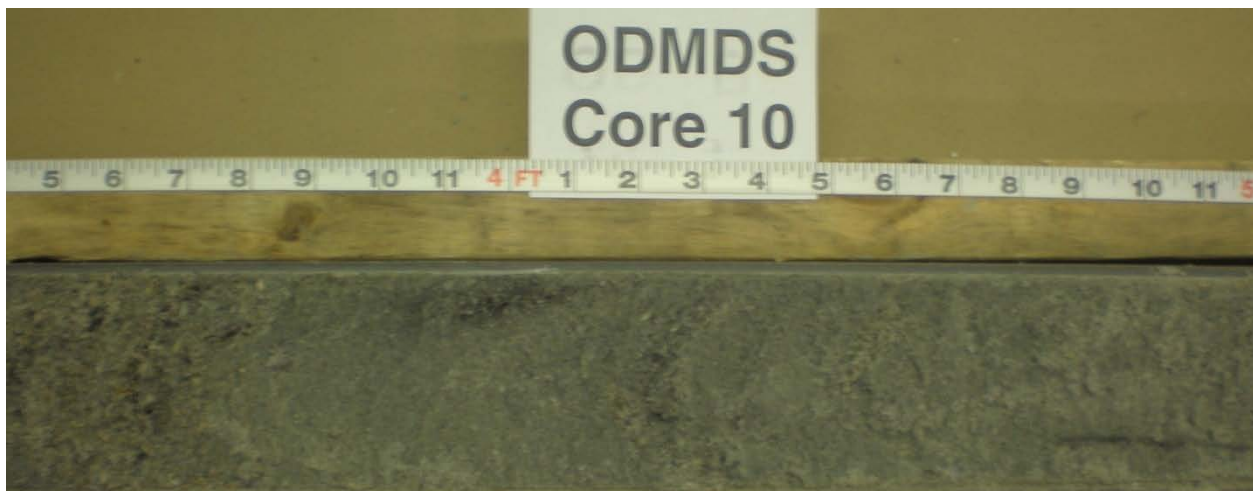
ODMDS Core 9
10 – 15 feet



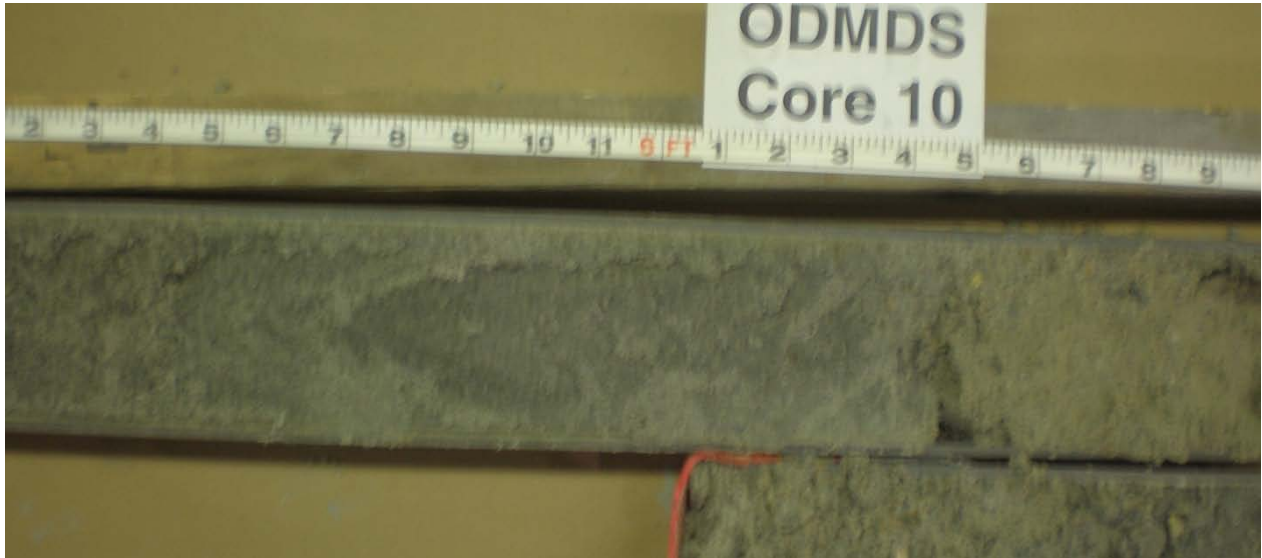
ODMDS Core 9
15 – 18.42 feet



ODMDS Core 10
0 – 5 feet



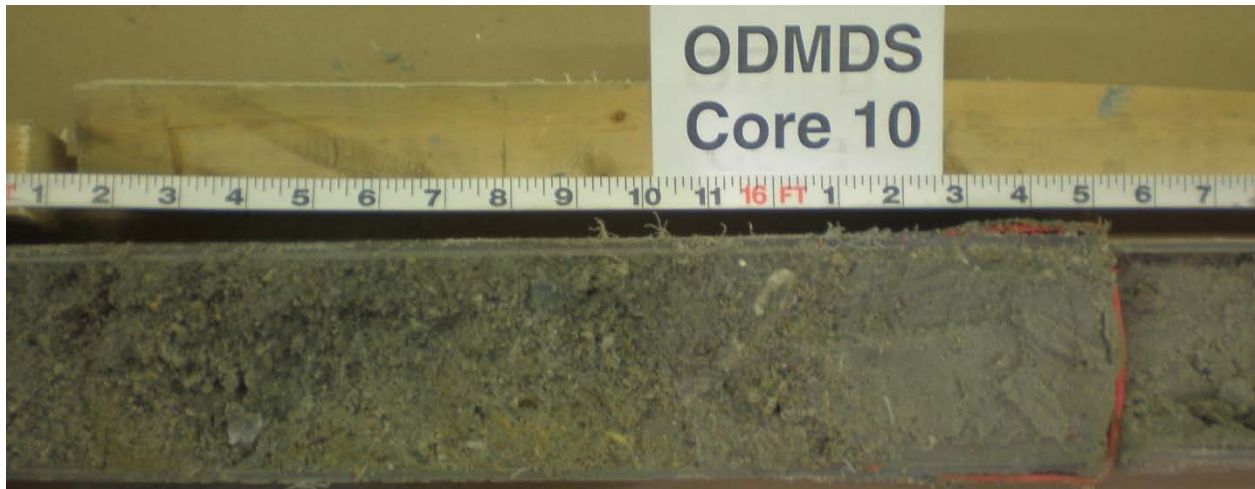
ODMDS Core 10
5 – 10 feet



ODMDS Core 10
10 – 15 feet



ODMDS Core 10
15 – 19.83 feet



ODMDS Core 11
0 – 5 feet



ODMDS Core 11
5 – 10 feet



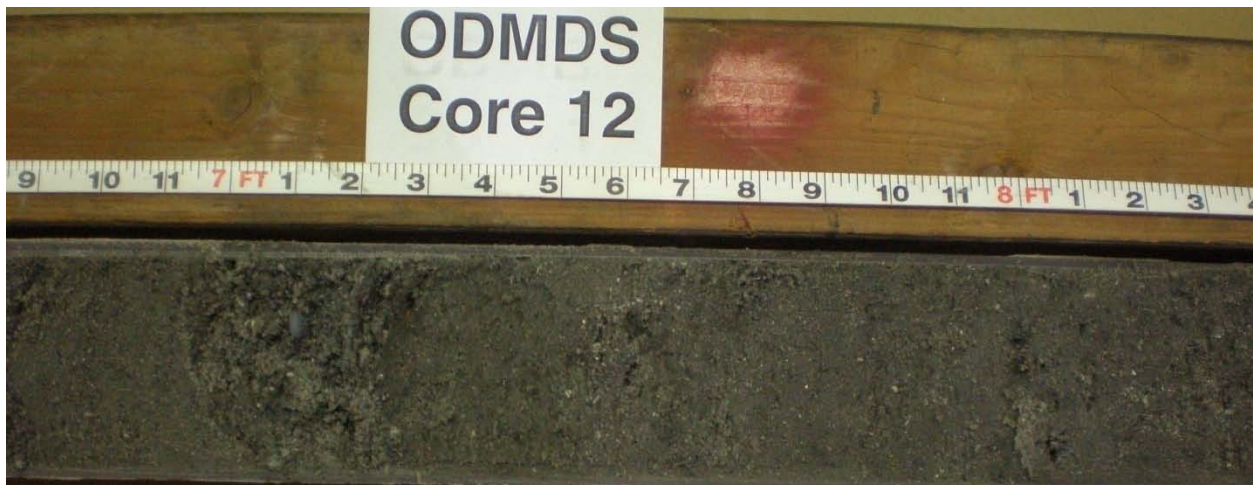
ODMDS Core 11
10 – 15 feet



ODMDS Core 12
0 – 5 feet



ODMDS Core 12
5 – 10 feet



ODMDS Core 12
10 – 15 feet



ODMDS Core 12
15 – 18 feet



ODMDS Core 13
0 – 5 feet



ODMDS Core 13
5 – 10 feet



ODMDS Core 13
10 – 15 feet



ODMDS Core 13
15 – 18.17 feet



ODMDS Core 14
0 – 5 feet



ODMDS Core 14
5 – 10 feet



ODMDS Core 14
10 – 11.92 feet



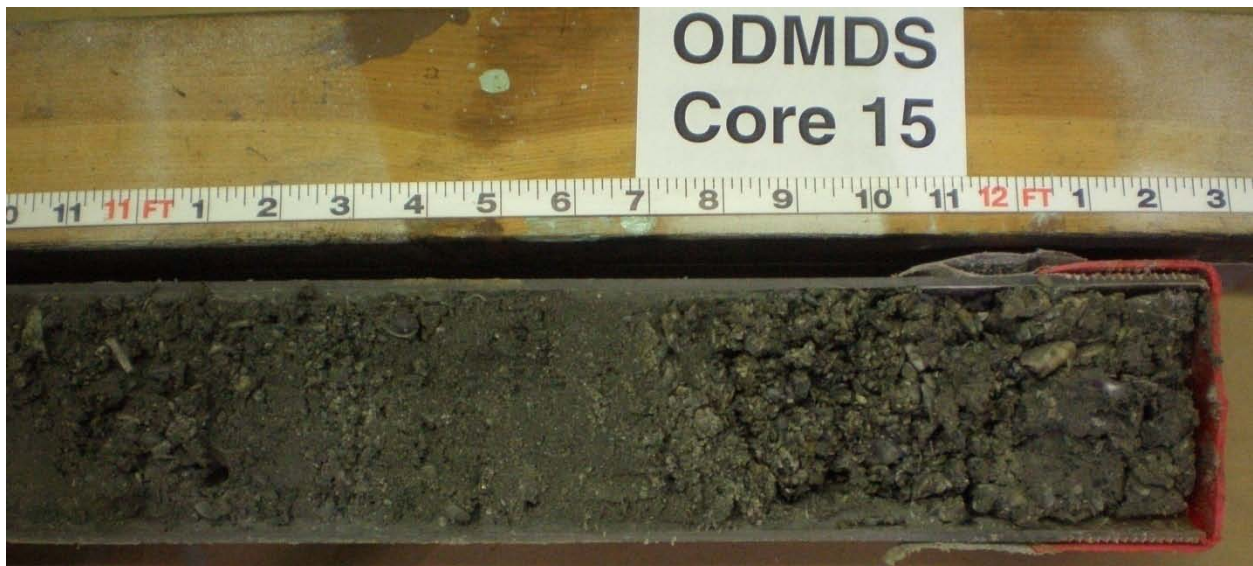
ODMDS Core 15
0 – 5 feet



ODMDS Core 15
5 – 10 feet



ODMDS Core 15
10 – 12.25 feet



ODMDS Core 16
0 – 5 feet



ODMDS Core 16
5 – 10 feet



ODMDS Core 16
10 – 15 feet



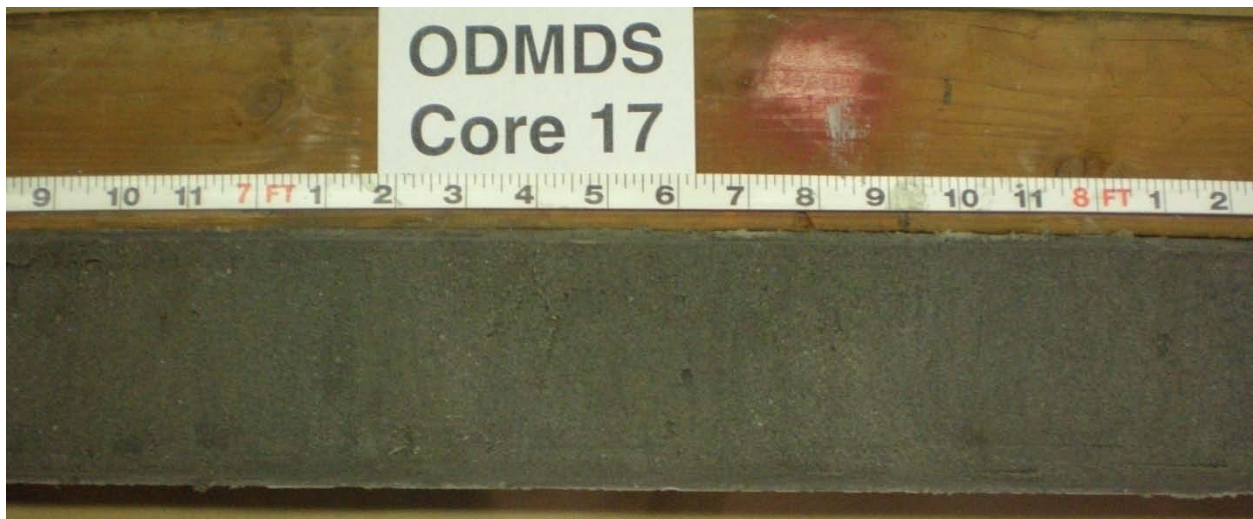
ODMDS Core 16
15 – 18.17 feet



ODMDS Core 17
0 – 5 feet



ODMDS Core 17
5 – 10 feet



ODMDS Core 17
10 – 15 feet



ODMDS Core 17
15 – 17.58 feet



ODMDS Core 18
0 – 5 feet



ODMDS Core 18
5 – 10 feet



ODMDS Core 18
10 – 15 feet



ODMDS Core 18
15 – 17.83 feet



ODMDS Core 19
0 – 5 feet



ODMDS Core 19
5 – 10 feet



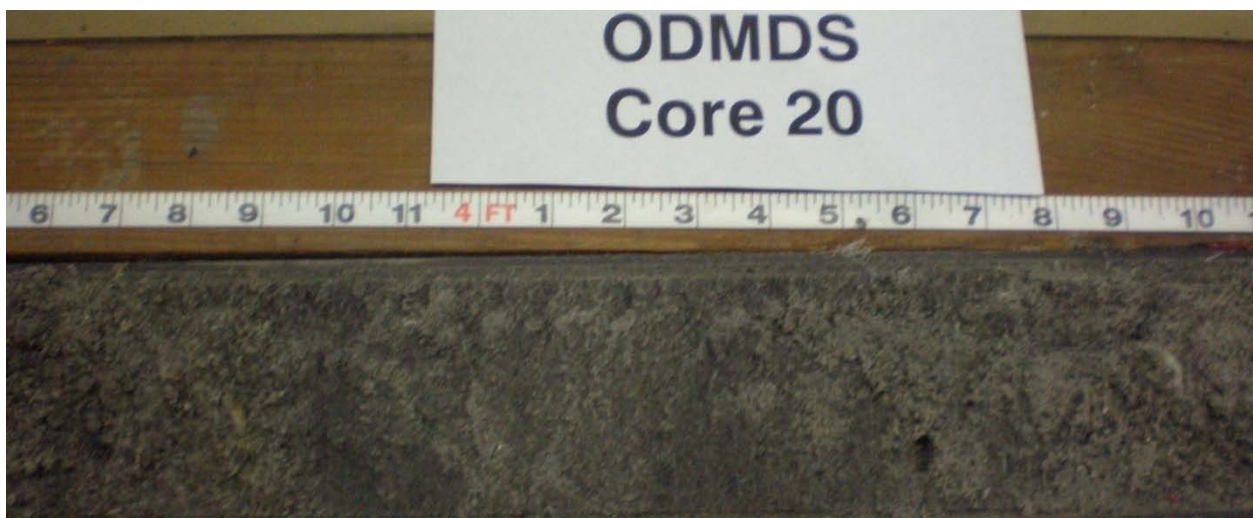
ODMDS Core 19
10 – 15 feet



ODMDS Core 19
15 – 19.25 feet



ODMDS Core 20
0 – 5 feet



ODMDS Core 20
5 – 10 feet



ODMDS Core 20
10 – 13.83 feet



ODMDS Core 21
0 – 5 feet



ODMDS Core 21
5 – 10 feet



ODMDS Core 21
10 – 15.92 feet



ODMDS Core 22
0 – 5 feet



ODMDS Core 22
5 – 10 feet



ODMDS Core 22
10 – 15 feet



ODMDS Core 22
15 – 19 feet



ODMDS Core 23
0 – 5 feet



ODMDS Core 23
5 – 10 feet



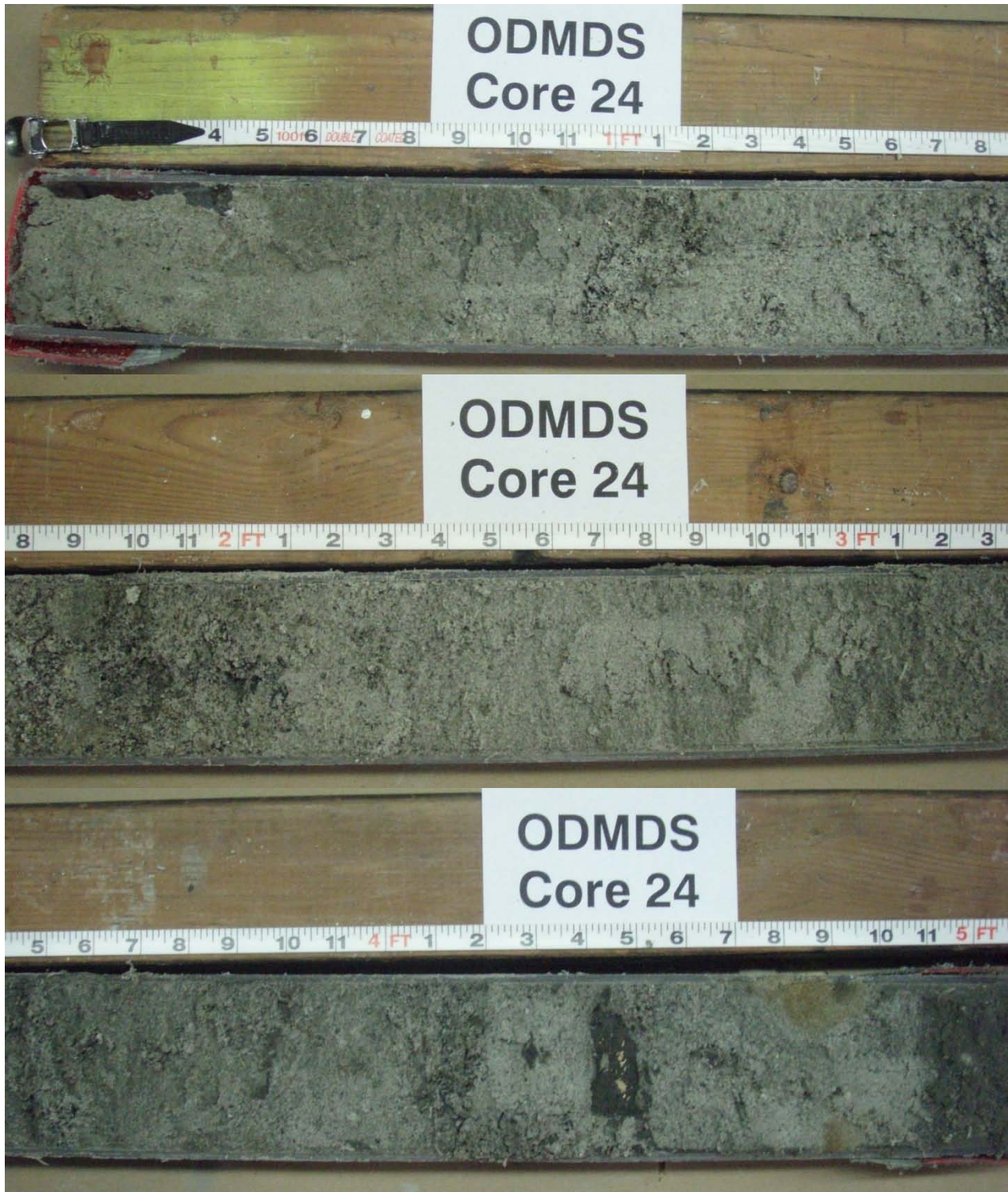
ODMDS Core 23
10 – 15 feet



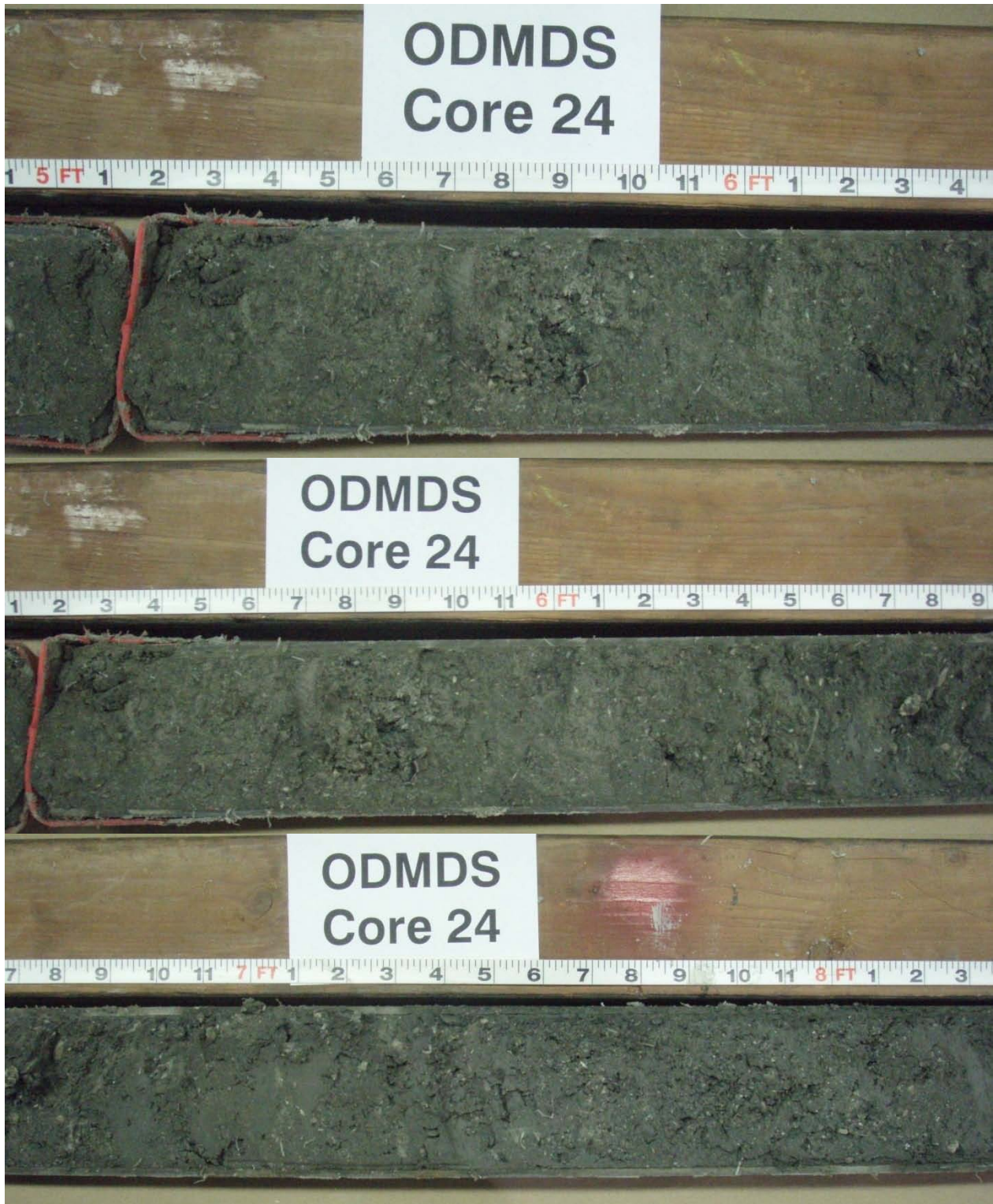
ODMDS Core 23
15 – 17.17 feet



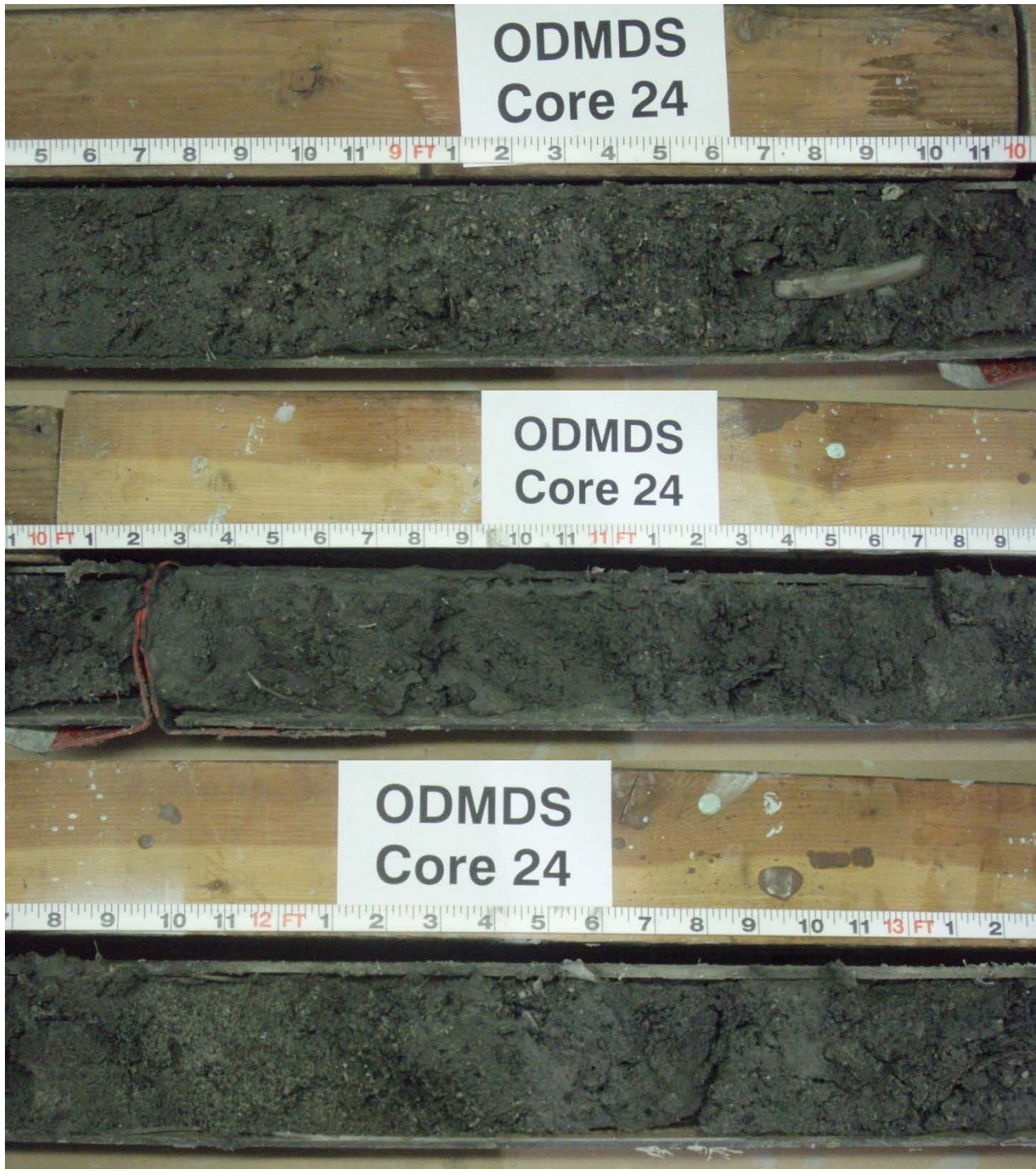
ODMDS Core 24
0 – 5 feet



ODMDS Core 24
5 – 8 feet



ODMDS Core 24
8 – 13 feet



ODMDS Core 24
12.42 – 13.75 feet



ODMDS Core 25
0 – 5 feet



ODMDS Core 25
5 – 10 feet



ODMDS Core 25
10 – 15 feet



ODMDS Core 25
15 – 19.42 feet



ODMDS Core 26
0 – 5 feet



ODMDS Core 26
5 – 10 feet



ODMDS Core 26
10 – 13.75 feet



ODMDS Core 27
0 – 5 feet



ODMDS Core 27
5 – 10 feet



ODMDS Core 27
10 – 15 feet



ODMDS Core 27
15 – 16.75 feet



ODMDS Core 28
0 – 5 feet



ODMDS Core 28
5 – 10 feet



ODMDS Core 28
10 – 12.58 feet



ODMDS Core 29
0 – 5 feet



ODMDS Core 29
5 – 10 feet



ODMDS Core 29
10 – 15 feet



ODMDS Core 29
15 – 15.83 feet



ODMDS Core 30
0 – 5 feet



ODMDS Core 30
5 – 10 feet



ODMDS Core 30
10 – 15 feet



ODMDS Core 30
15 – 18.83 feet



ODMDS Core 31
0 – 5 feet



ODMDS Core 31
5 – 10 feet



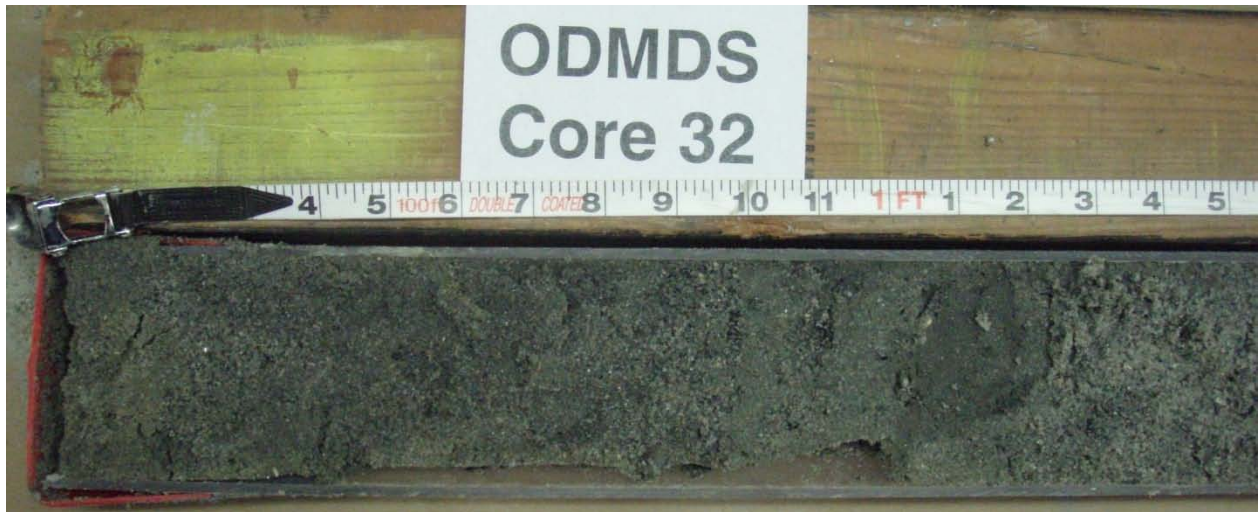
ODMDS Core 31
10 – 15 feet



ODMDS Core 31
15 – 17.83 feet



ODMDS Core 32
0 – 5 feet



ODMDS Core 32
5 – 10 feet



ODMDS Core 32
10 – 15 feet



ODMDS Core 32
15 – 17.42 feet



ODMDS Core 33
0 – 5 feet



ODMDS Core 33
5 – 10 feet



ODMDS Core 33
10 – 15 feet



ODMDS Core 33
15 – 16.33 feet



ODMDS Core 34
0 – 5 feet



ODMDS Core 34
5 – 10 feet



ODMDS Core 34
10 – 12.50 feet



ODMDS Core 35
0 – 5 feet



ODMDS Core 35
5 – 10 feet



ODMDS Core 35
10 – 11.83 feet



ODMDS Core 36
0 – 5 feet



ODMDS Core 36
5 – 10 feet



ODMDS Core 36
10 – 15 feet



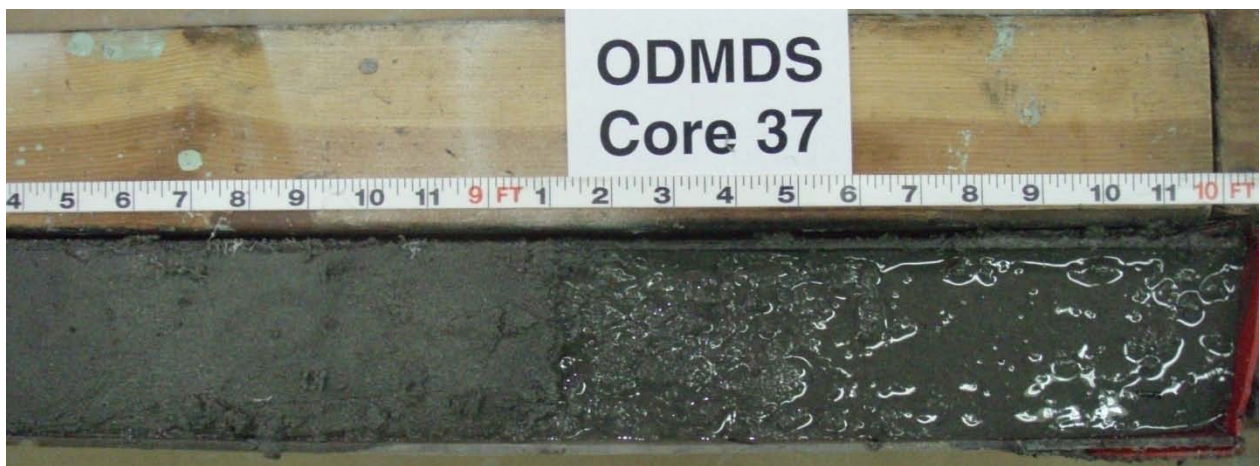
ODMDS Core 36
14.42 – 15.58 feet



ODMDS Core 37
0 – 5 feet



ODMDS Core 37
5 – 10 feet



ODMDS Core 37
10 – 14.83 feet



ODMDS Core 38
0 – 5 feet



ODMDS Core 38
5 – 10 feet



ODMDS Core 38
10 – 13.75 feet



ODMDS Core 39
0 – 5 feet



ODMDS Core 39
5 – 10 feet



ODMDS Core 39
10 – 15 feet



ODMDS Core 39
15 – 17.75 feet



ODMDS Core 40
0 – 5 feet



ODMDS Core 40
5 – 10 feet



ODMDS Core 40
10 – 15 feet



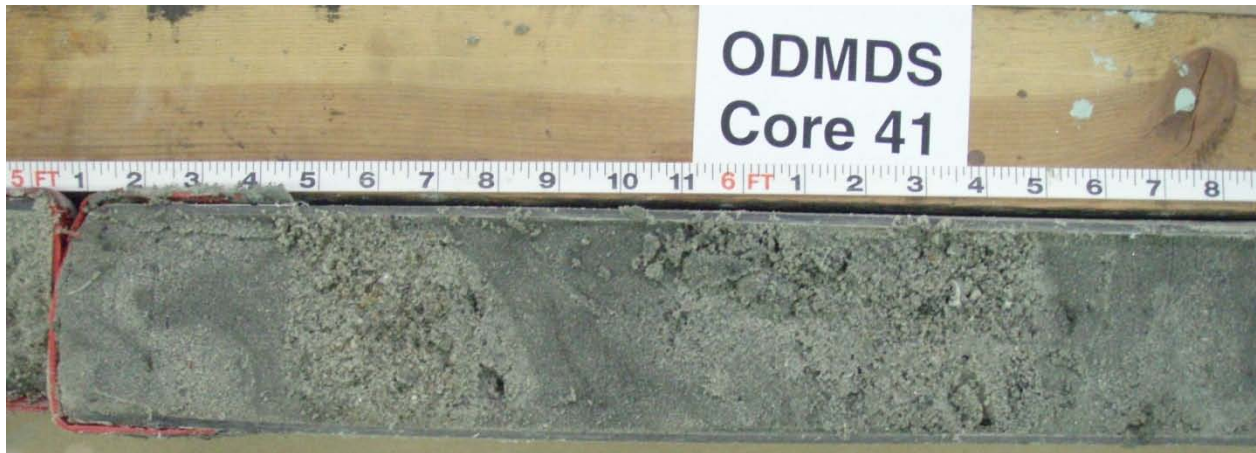
ODMDS Core 40
15 – 18.25 feet



ODMDS Core 41
0 – 5 feet



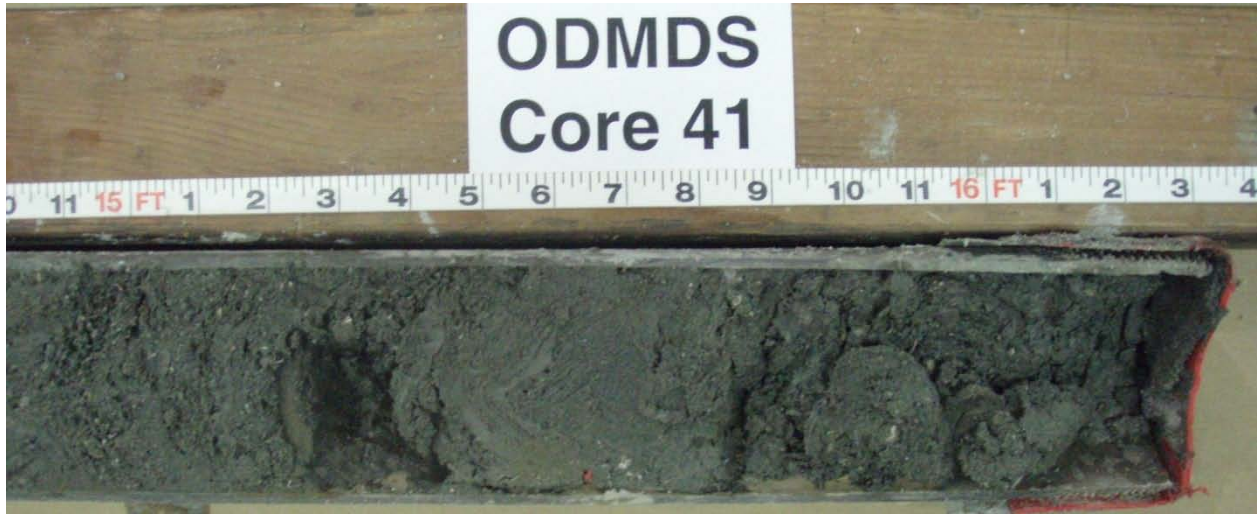
ODMDS Core 41
5 – 10 feet



ODMDS Core 41
10 – 15 feet



ODMDS Core 41
15 – 16.25 feet



ODMDS Core 42
0 – 5 feet



ODMDS Core 42
5 – 10 feet



ODMDS Core 42
10 – 13.75 feet



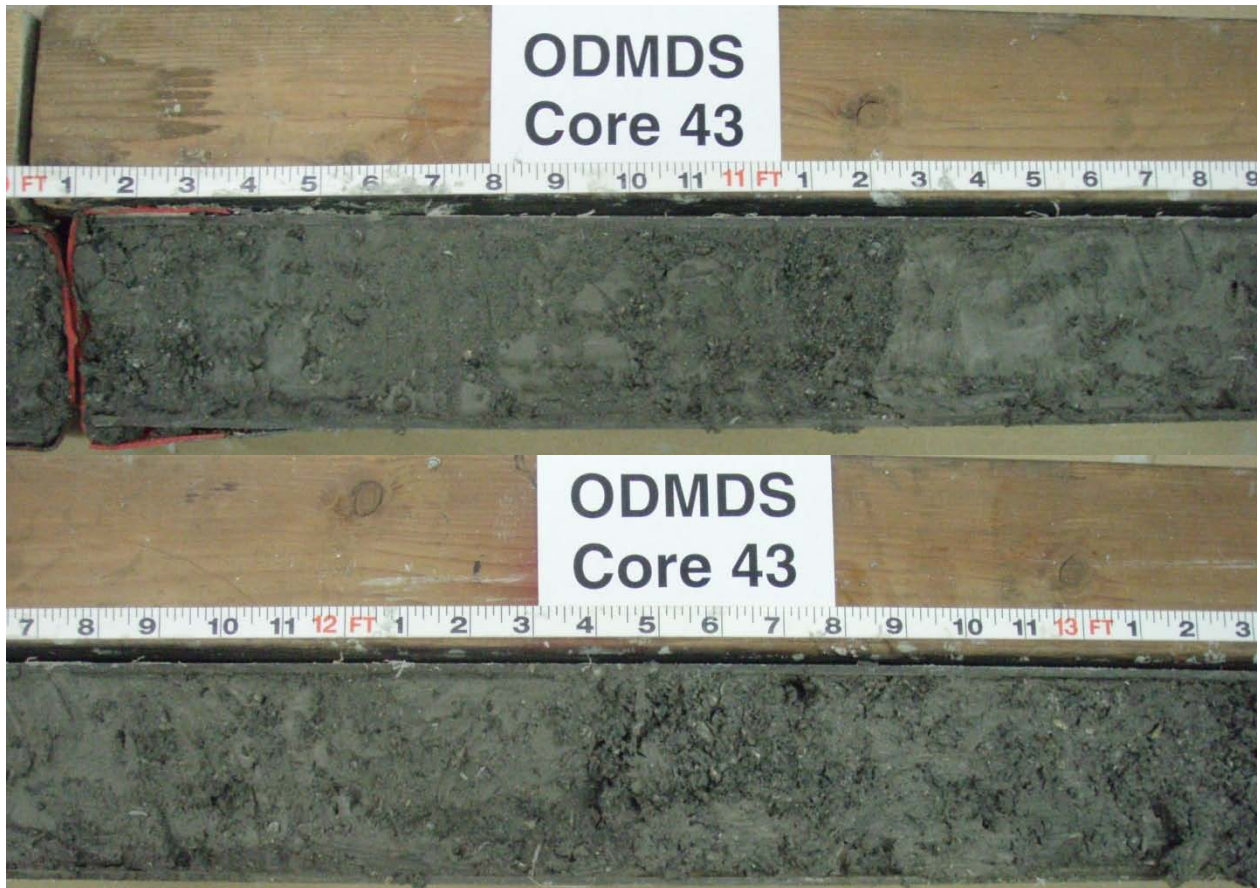
ODMDS Core 43
0 – 5 feet



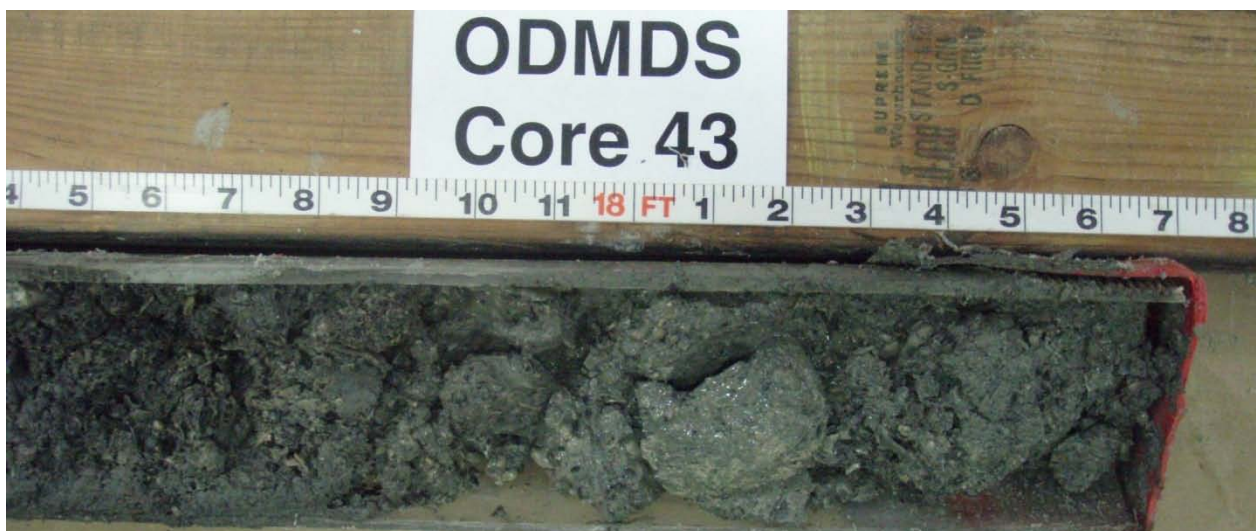
ODMDS Core 43
5 – 10 feet



ODMDS Core 43
10 – 15 feet



ODMDS Core 43
15 – 18.58 feet



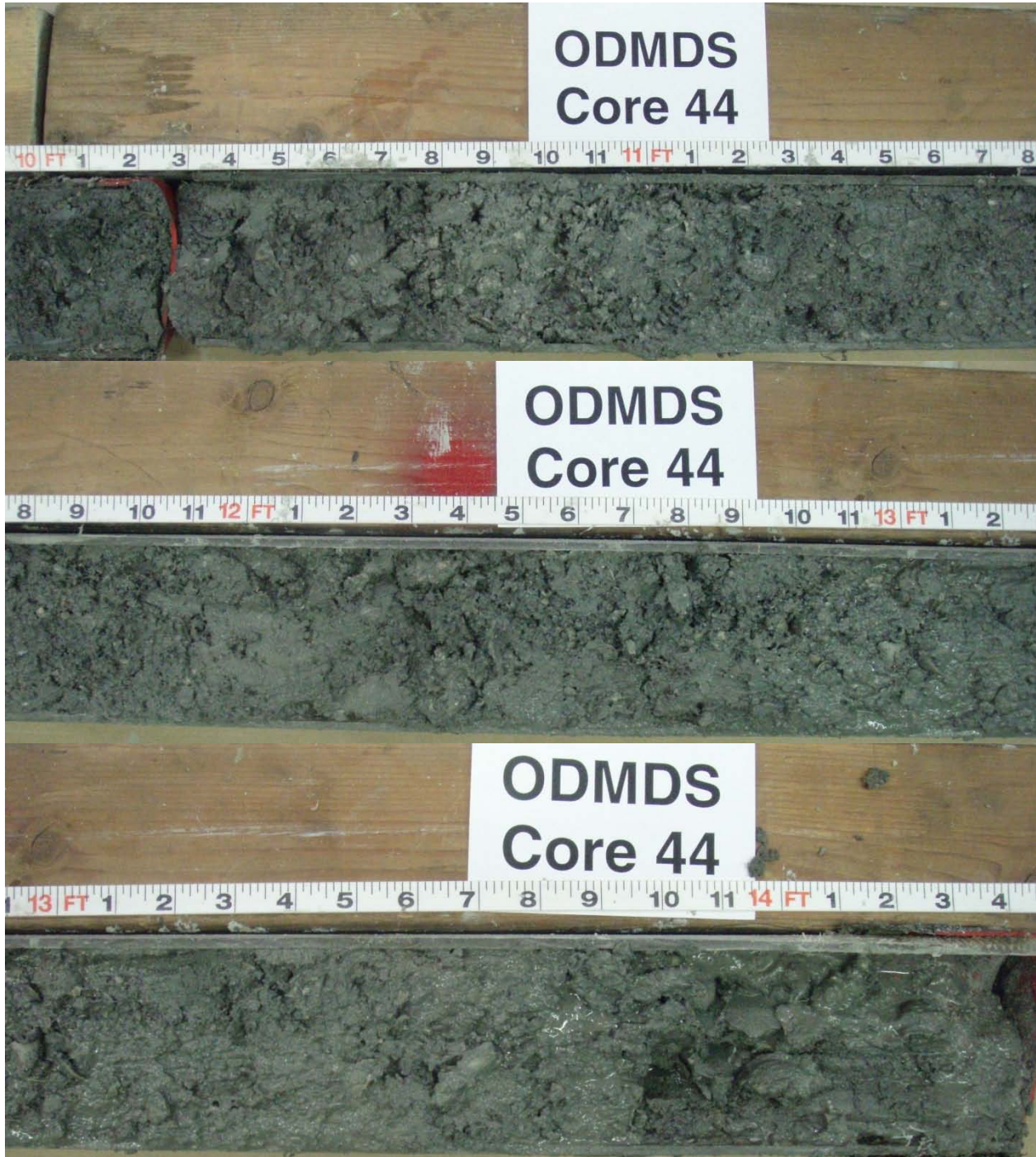
ODMDS Core 44
0 – 5 feet



ODMDS Core 44
5 – 10 feet



ODMDS Core 44
10 – 14.33 feet



ODMDS Core 45
0 – 5 feet



ODMDS Core 45
5 – 10 feet



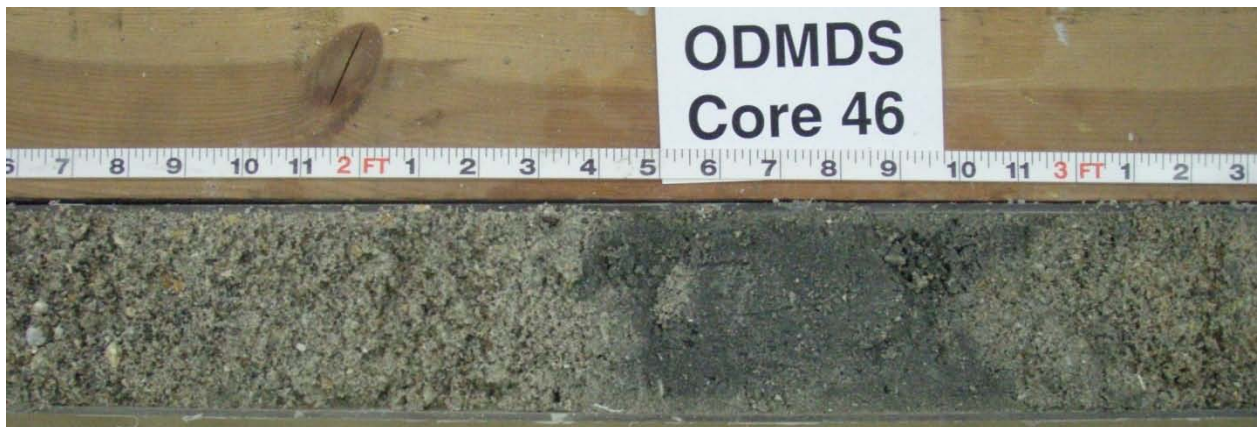
ODMDS Core 45
10 – 15 feet



ODMDS Core 45
15 – 18.75 feet



ODMDS Core 46
0 – 5 feet



ODMDS Core 46
5 – 10 feet



ODMDS Core 46
10 – 14.67 feet



ODMDS Core 46
14.17 – 15.25 feet



ODMDS Core 47
0 – 5 feet



ODMDS Core 47
5 – 10 feet



ODMDS Core 47
10 – 15 feet



ODMDS Core 47
15 – 18 feet



ODMDS Core 48
0 – 5 feet



ODMDS Core 48
5 – 8.83 feet



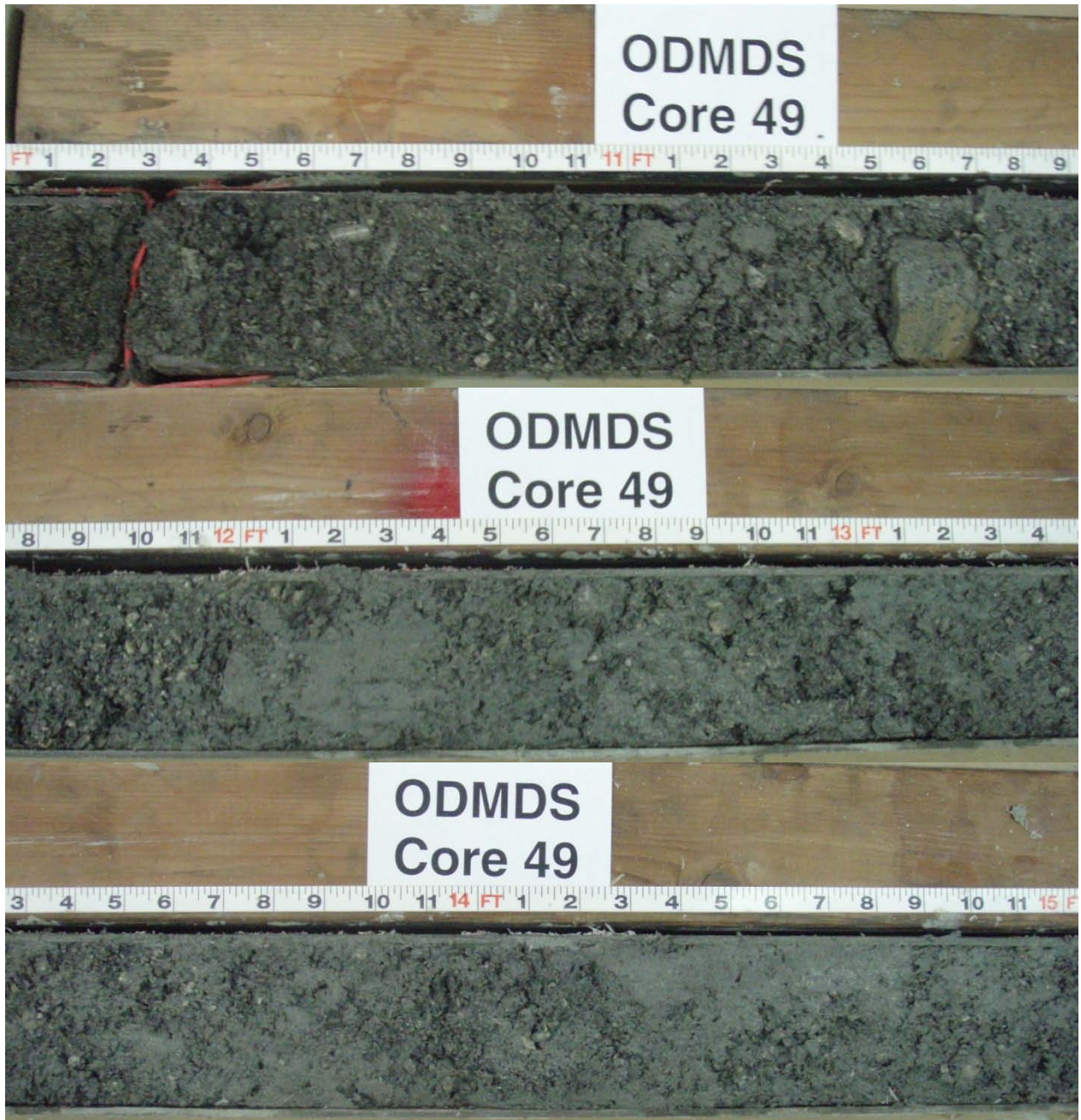
ODMDS Core 49
0 – 5 feet



ODMDS Core 49
5 – 10 feet



ODMDS Core 49
10 – 15 feet



ODMDS Core 49
15 – 16.42 feet



ODMDS Core 50
0 – 5 feet



ODMDS Core 50
5 – 10 feet



ODMDS Core 50
10 – 15 feet



ODMDS Core 50
15 – 19.25 feet



ODMDS Core 51
0 – 5 feet



ODMDS Core 51
5 – 10 feet



ODMDS Core 51
10 – 15 feet



ODMDS Core 51
15 – 17.33 feet



ODMDS Core 52
0 – 5 feet



ODMDS Core 52
5 – 10 feet



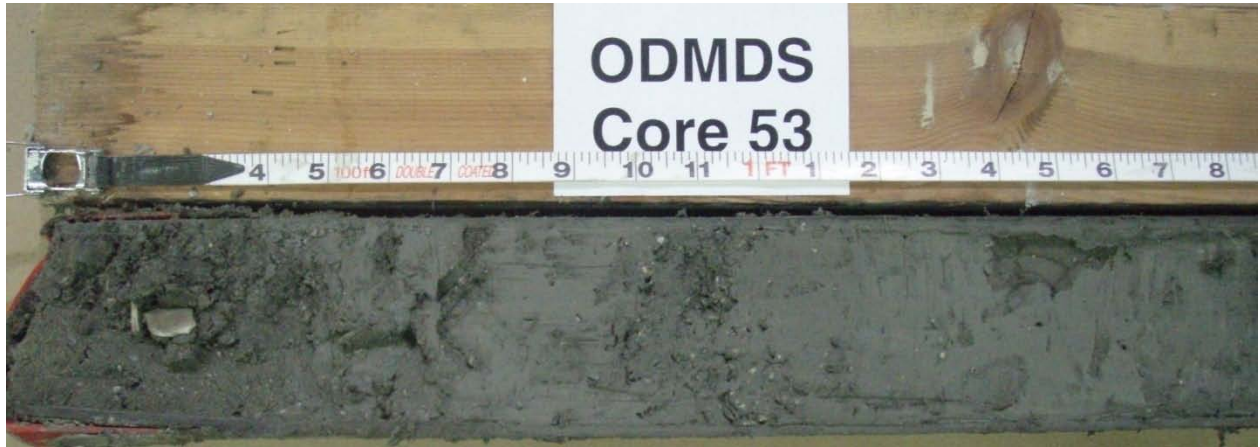
ODMDS Core 52
10 – 15 feet



ODMDS Core 52
15 – 18.33 feet



ODMDS Core 53
0 – 5 feet



ODMDS Core 53
5 – 10 feet



ODMDS Core 53
10 – 15 feet



ODMDS Core 53
15 – 17.50 feet



ODMDS Core 54
0 – 5 feet



ODMDS Core 54
5 – 10 feet



ODMDS Core 54
10 – 15 feet



ODMDS Core 54
15 – 18 feet



ODMDS Core 54
17.33 – 18.58 feet



ODMDS Core 55
0 – 5 feet



ODMDS Core 55
5 – 10 feet

