

REFERENCE: U-2525C

PROJECT: 34821

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2525C	1	76

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY GUILFORD
PROJECT DESCRIPTION GREENSBORO EASTERN LOOP
FROM US 29 NORTH OF GREENSBORO TO SR
2303 (LAWNDALE DRIVE)
SITE DESCRIPTION SITE #4 - DUAL BRIDGES (STR. #5
& #6) ON I-85 BYPASS (-L-) OVER LEES
CHAPEL RD. (-Y1-) CPT AND DMT TESTING

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-75	CPT AND DMT REPORT

PERSONNEL
C. CHILDREY
B. RAMSEYER

INVESTIGATED BY T. WELLS
DRAWN BY T. WELLS
CHECKED BY X. BARRETT
SUBMITTED BY KLEINFELDER, INC.
DATE JANUARY 2017

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Prepared in the Office of:



KLEINFELDER
Bright People. Right Solutions.
7343 WEST FRIENDLY AVE, SUITE B
GREENSBORO, NC 27410
ENGINEERING FIRM LICENSE NO. F-1143



DocuSigned by:
Thomas R. Wells 2/7/2017
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SIGNATURE DATE

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 1 OF 2)

SOIL DESCRIPTION										GRADATION									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS									
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										MINERALOGICAL COMPOSITION									
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1-A2, A-4, A-5, A-6, A-7										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.									
SYMBOL										COMPRESSIBILITY									
% PASSING #10, #40, #200										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50									
MATERIAL PASSING #40 LL, PI										PERCENTAGE OF MATERIAL									
GROUP INDEX										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL									
USUAL TYPES OF MAJOR MATERIALS										TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE									
GEN. RATING AS SUBGRADE										GROUND WATER									
EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR POOR UNSUITABLE										▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ▽ STATIC WATER LEVEL AFTER 24 HOURS ▽PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA ○ SPRING OR SEEP									
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES SOIL SYMBOL SPT DMT VST PMT TEST BORING ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING INFERRED SOIL BOUNDARY CORE BORING INFERRED ROCK LINE MONITORING WELL ALLUVIAL SOIL BOUNDARY PIEZOMETER INSTALLATION									
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS									
U.S. STD. SIEVE SIZE OPENING (MM) 4, 10, 40, 60, 200, 270										UNDECUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDECUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK									
GRAIN SIZE										ABBREVIATIONS									
SOIL MOISTURE - CORRELATION OF TERMS										AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICACEOUS WEA. - WEATHERED CL - CLAY MOD. - MODERATELY ? - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7/2 - DRY UNIT WEIGHT CSE. - COARSE PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST S - BULK e - VOID RATIO SD. - SAND, SANDY SD. - SAND, SANDY F - FINE SL. - SILT, SILTY SLI. - SLIGHTLY SS - SPLIT SPOON FOSS. - FOSSILIFEROUS TCR - TRICONE REFUSAL ST - SHELBY TUBE FRAC. - FRACTURED, FRACTURES w - MOISTURE CONTENT RS - ROCK FRAGS. - FRAGMENTS RT - RECOMPACTED TRIAXIAL HI. - HIGHLY V - VERY CBR - CALIFORNIA BEARING RATIO									
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT									
PLASTICITY INDEX (PI) DRY STRENGTH										DRILL UNITS: CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST, CONETEC 15 TON ADVANCING TOOLS: CLAY BITS, 6' CONTINUOUS FLIGHT AUGER, 8' HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: -B, -H, -N HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST									
COLOR										DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.									

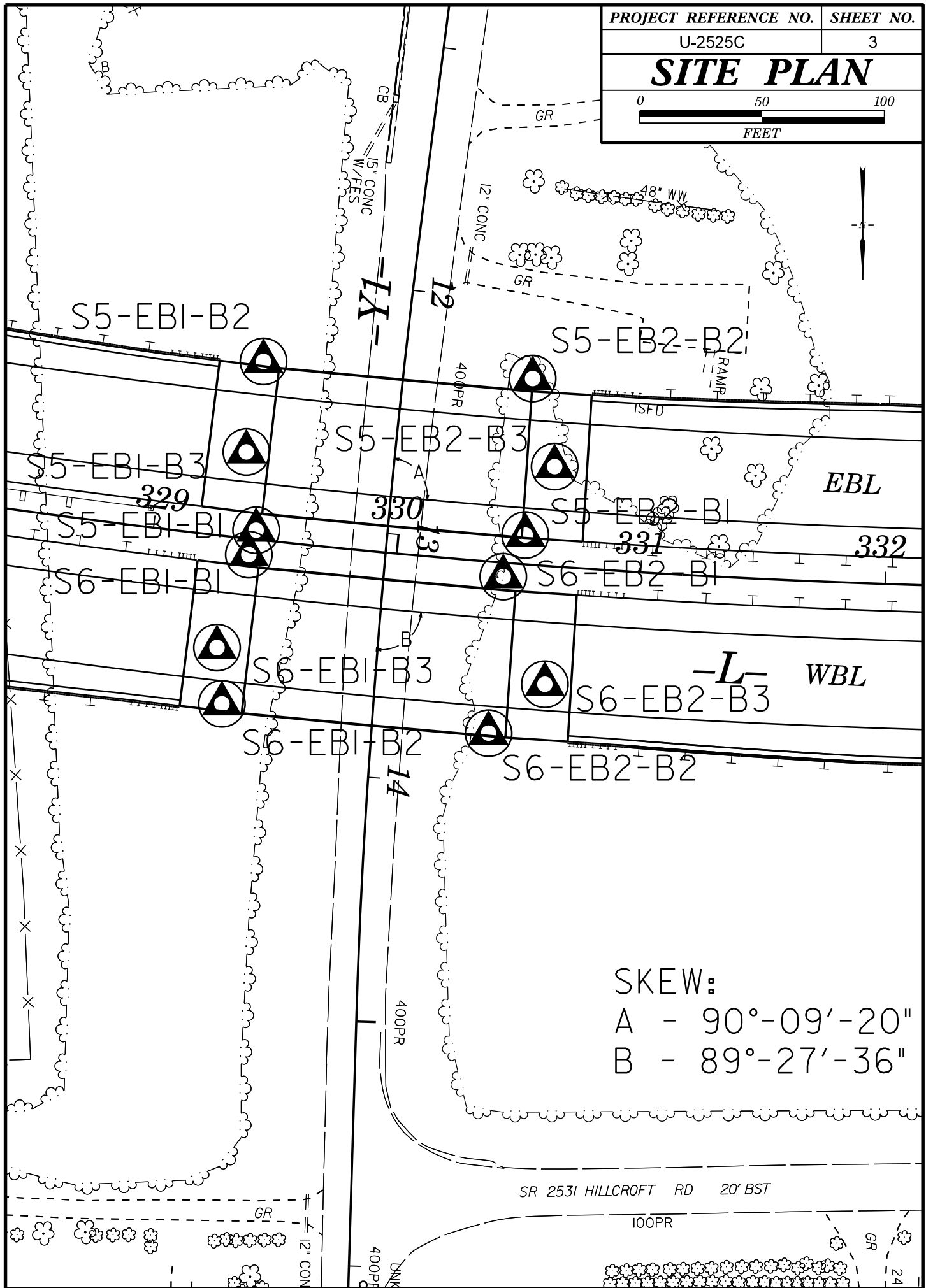
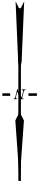
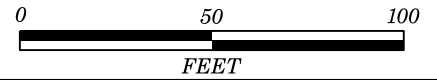
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 2 OF 2)

ROCK DESCRIPTION		TERMS AND DEFINITIONS
<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>
WEATHERING		
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>	
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i>	
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i>	
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	
ROCK HARDNESS		
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	
SOFT	CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	
FRACTURE SPACING		BEDDING
INDURATION		
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
		BENCH MARK: N/A
		ELEVATION: N/A FEET
		NOTES:
		TOP OF CPT AND DMT ELEVATIONS OBTAINED FROM PROJECT TIN FILE (U2525C_LS_TIN.TIN) RECEIVED ON SEPTEMBER 14, 2016
		DATE: 8-15-14

SITE PLAN



SKEW:

A - 90°-09'-20"

B - 89°-27'-36"

SR 2531 HILLCROFT RD 20' BST

100PR

PRESENTATION OF SITE INVESTIGATION RESULTS

U-2525 C Site #4 – Greensboro, NC

Prepared for:

Kleinfelder

ConeTec Job No: 16-54112

Project Start Date: 19-DEC-2016

Project End Date: 21-DEC-2016

Report Date: 3-JAN-2017



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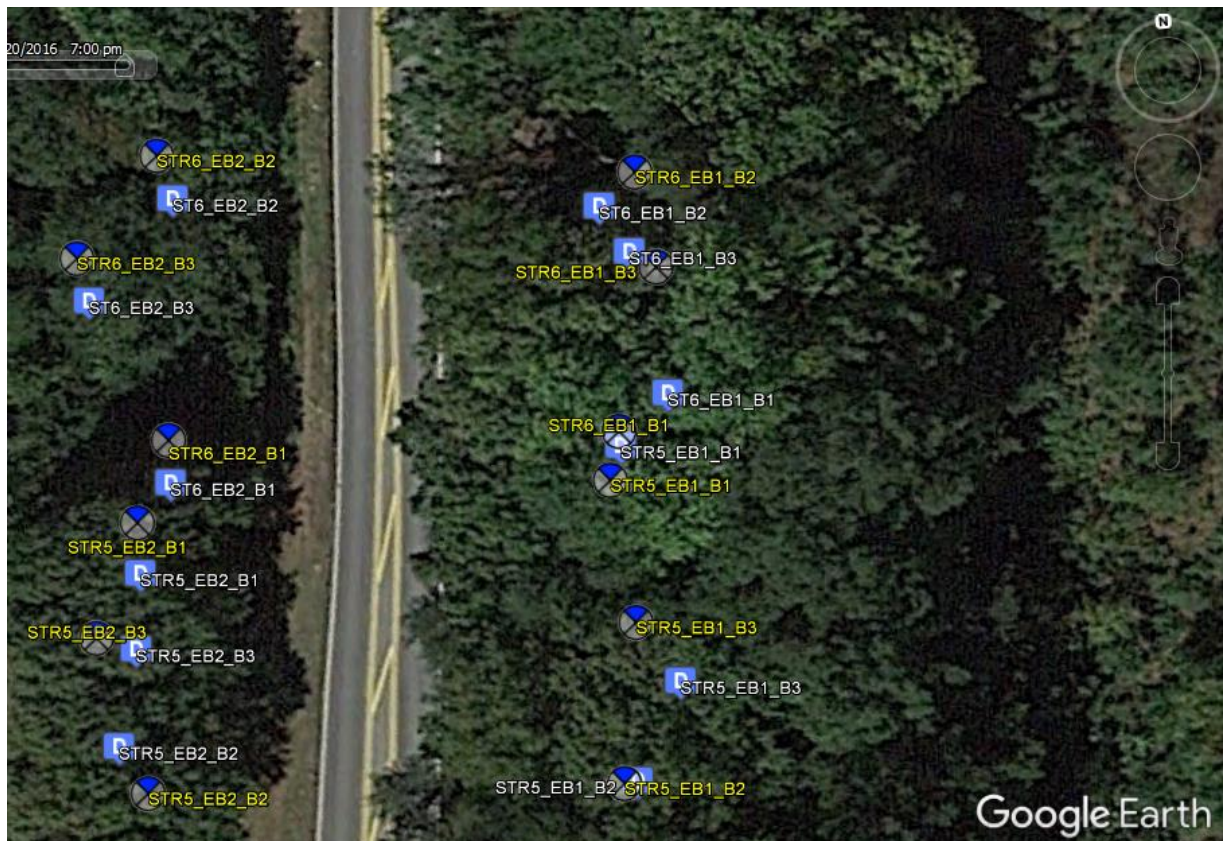
Introduction

The enclosed report presents the results of the site investigation program conducted by ConeTec Inc. for Kleinfelder at the U-2525 C Site #4 in Greensboro, NC. The program consisted of 12 cone penetration tests (CPTu) and 12 flat plate dilatometer tests (DMT) at locations selected and labeled under the direction of Kleinfelder personnel. The purpose of the program was to evaluate existing site conditions.

Project Information

Project	
Client	Kleinfelder
Project	U-2525 C Site #4 Energy Center
ConeTec project number	16-54112

A map from Google Earth including the CPTu and DMT test locations is presented below.



Rig Description	Deployment System	Test Type
25 Ton CPT Truck Rig	Integrated CPT Ramset	CPTu, DMT

Coordinates		
Test Type	Collection Method	EPSG Number
CPTu, DMT	Handheld GPS	4326

Cone Penetration Test (CPT)	
Depth reference	Depths are referenced to the existing ground surface at the time of each test.
Tip and sleeve data offset	0.1 meter This has been accounted for in the CPT data files.

Cone Penetrometers Used for this Project						
Cone Description	Cone Number	Cross Sectional Area (cm ²)	Sleeve Area (cm ²)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
367:T1500F15U500	AD367	15	225	1500	15	500
Cone AD367 was used for all CPTu soundings						

Interpretation Tables	
Additional information	<p>The Soil Behaviour Type (SBT) classification chart (Robertson et al., 1986 presented by Lunne, Robertson and Powell, 1997) was used to classify the soil for this project. A detailed set of CPT interpretations were generated and are provided in Excel format files in the release folder. The CPT interpretations are based on values of corrected tip (q_t), sleeve friction (f_s) and pore pressure (u_2) averaged over every point.</p> <p>Soils were classified as either drained or undrained based on the Soil Behaviour Type (SBT) classification chart (Robertson et al., 1986 presented by Lunne, Robertson and Powell, 1997)</p>

Flat Plate Dilatometer Test (DMT)	
Depth reference	Depths are referenced to the existing ground surface at the time of each test.
Phreatic surface determination	The phreatic surface is assumed not to be encountered within sounding exploration depth.

Limitations

This report has been prepared for the exclusive use of Kleinfelder (Client) for the project titled "U-2525 C Site #4". The report's contents may not be relied upon by any other party without the express written permission of ConeTec Inc. (ConeTec). ConeTec has provided site investigation services, prepared the factual data reporting, and provided geotechnical parameter calculations consistent with current best practices. No other warranty, expressed or implied, is made.

The information presented in the report document and the accompanying data set pertain to the specific project, site conditions and objectives described to ConeTec by the Client. In order to properly understand the factual data, assumptions and calculations, reference must be made to the documents provided and their accompanying data sets, in their entirety.

The cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd. of Richmond, British Columbia, Canada.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and a geophone sensor for recording seismic signals. All signals are amplified down hole within the cone body and the analog signals are sent to the surface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in both 10 cm² and 15 cm² tip base area configurations in order to maximize signal resolution for various soil conditions. The specific piezocone used for each test is described in the CPT summary table presented in the first Appendix. The 15 cm² penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm² piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross sectional area (typically 44 mm diameter over a length of 32 mm with tapered leading and trailing edges) located at a distance of 585 mm above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a 60 degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u₂" position (ASTM Type 2). The filter is 6 mm thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meet or exceed those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

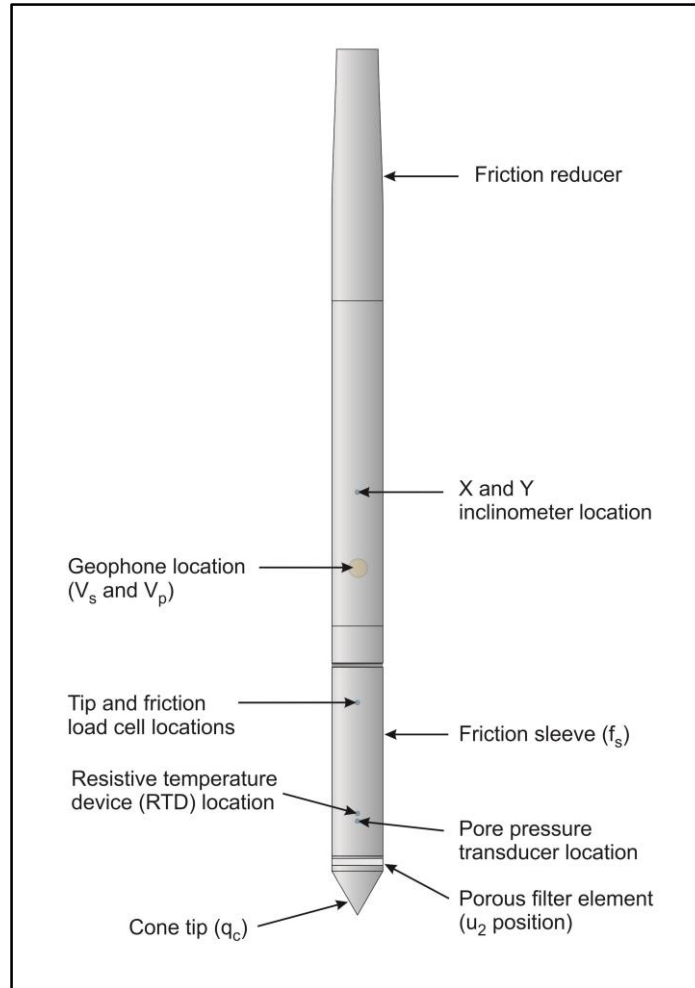


Figure CPTu. Piezocone Penetrometer (15 cm²)

The ConeTec data acquisition systems consist of a Windows based computer and a signal conditioner and power supply interface box with a 16 bit (or greater) analog to digital (A/D) converter. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording intervals are either 2.5 cm or 5.0 cm depending on project requirements; custom recording intervals are possible. The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPT operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with either glycerin or silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of 2 cm/s, within acceptable tolerances. Typically one meter length rods with an outer diameter of 1.5 inches are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil or glycerin under vacuum pressure prior to use
- Recorded baselines are checked with an independent multi-meter
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson (1990) and Robertson (2009). It should be noted that it is not always possible to accurately identify a soil type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behavior type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al, 1986:

$$q_t = q_c + (1-a) \cdot u_2$$

where: q_t is the corrected tip resistance

q_c is the recorded tip resistance

u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)

a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (R_f) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high

friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of interpretation files were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the interpretation methods used is also included in the data release folder.

For additional information on CPTu interpretations, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

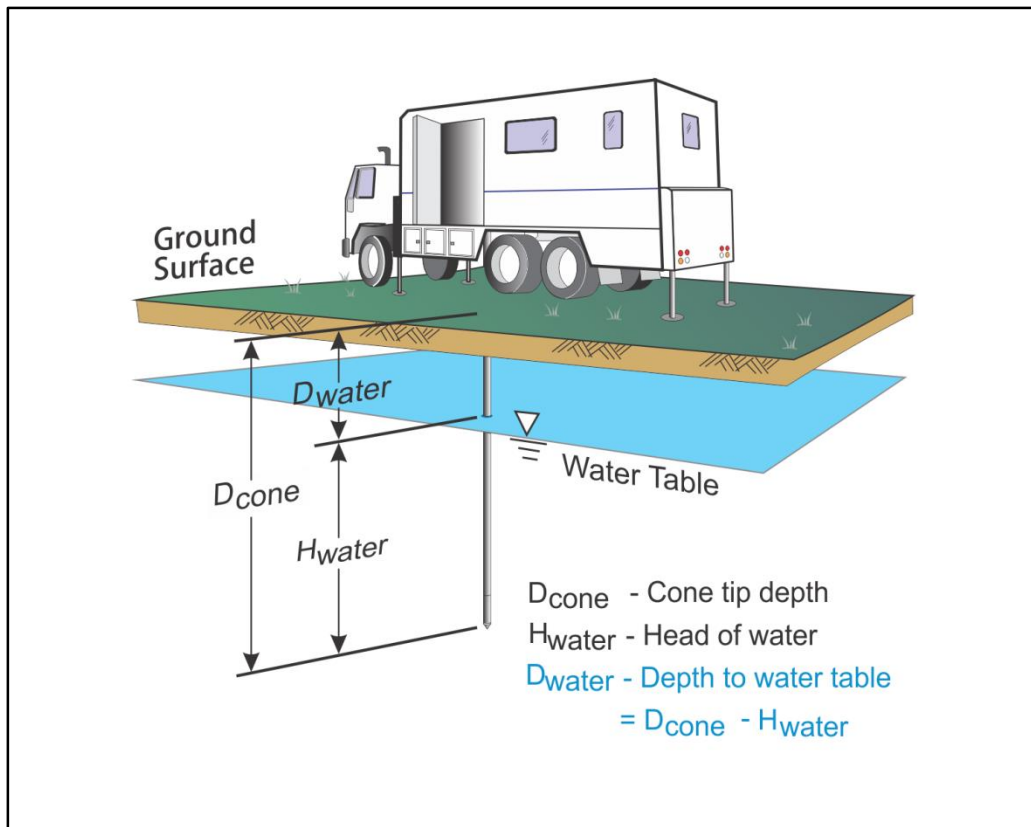


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behavior.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

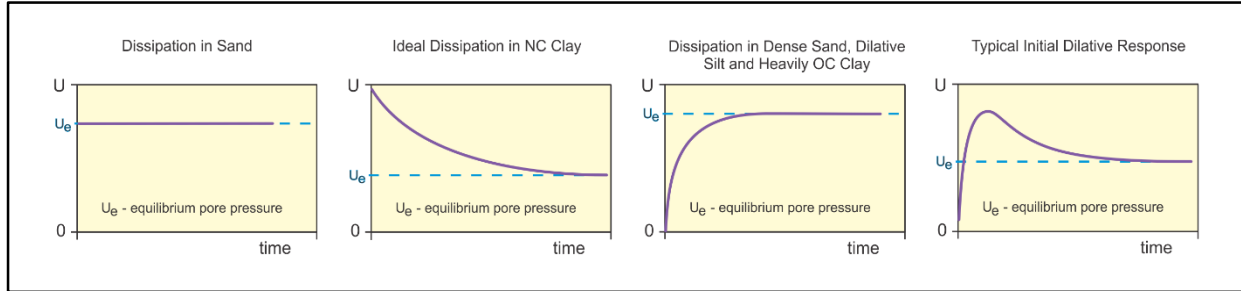


Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve of Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100} . In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100} . A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T^*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

- T^* is the dimensionless time factor (Table Time Factor)
- a is the radius of the cone
- I_r is the rigidity index
- t is the time at the degree of consolidation

Table Time Factor. T^* versus degree of dissipation (Teh and Houlsby, 1991)

Degree of Dissipation (%)	20	30	40	50	60	70	80
$T^* (u_2)$	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50} , dissipation tests must be taken to a pressure less than u_{50} . The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100} . To estimate u_{50} , both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby, 1991), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50} . In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r , the equilibrium pore pressure and the effect of an initial dilatatory response on calculating t_{50} , other methods should be applied to confirm the results for c_h .

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

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Flat plate dilatometer tests (DMT) are conducted using a flat steel blade with a thin, expandable, circular membrane mounted on one surface, a control unit and a compressed gas (typically nitrogen) supply. A photo of the system is presented in Figure DMT-1.

The dilatometer blade is connected to the up-hole control box by a pneumatic tube with an inner conductor wire. The tube is threaded through a set of steel push rods. The control unit has pressure gauges, an audio-visual signal, a gas flow control and vent valve. A syringe is used to quantify the stiffness of the blade membrane.

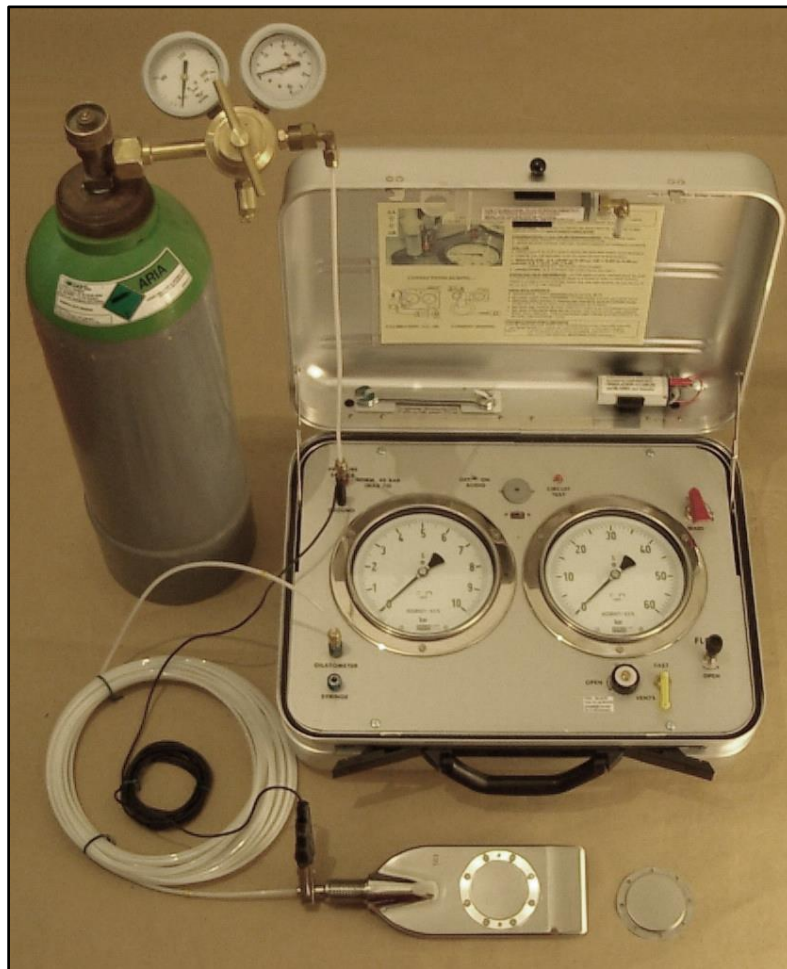


Figure DMT-1. Flat plate dilatometer system
(Marchetti, <http://www.marchetti-dmt.it/pagespictures/blade&case.htm>)

Prior to conducting a DMT profile, the blade membrane stiffness is recorded according to the current ASTM D6635 specifications and the system is assembled and tested for any leaks.

The dilatometer blade is pushed into the ground to the desired depth from surface or through a cased hole using a CPT rig or a drill rig. The blade is inflated using compressed gas and up to three pressure readings are recorded, the A reading at zero deflection (lift-off) and the B reading when a deflection of 1.1 mm has been achieved. An optional C reading representing the closing pressure can be recorded by slowly deflating the membrane soon after B is reached. The blade is advanced to subsequent depths

and the test procedures are repeated at each test depth, up to the sounding termination depth. After the blade is retracted membrane stiffness values are recorded.

The dilatometer operating procedures are performed in general accordance with the current ASTM D6635 standard.

The interpretation of the dilatometer data is based on the pressure related parameters p_0 and p_1 that are derived from the recorded A and B pressure values corrected for membrane stiffness and the gauge zero offset. Figure DMT-2 shows p_0 and p_1 .

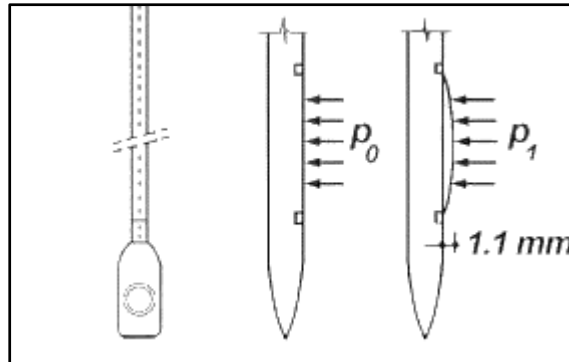


Figure DMT-2. Flat plate dilatometer p_0 and p_1
(Marchetti, <http://www.marchetti-dmt.it/>)

The A reading is the pressure required to lift-off the membrane while the B reading is the pressure required to move the center of the membrane by 1.1 mm. The C pressure measurement is the pressure at which the membrane returns to the A position and is used to estimate equilibrium pore pressures in sand. The A and B pressure readings are corrected by the membrane stiffness values at the respective membrane deflections that are recorded before and after each test location.

The empirical correlations use the parameters p_0 , p_1 and p_2 derived from the A, B and C readings accounting for membrane stiffness and gauge offset. These parameters provide the basic values needed in the empirical correlations developed by Marchetti et al. (2001). The equations for these parameters are presented in the relevant appendix.

The p_0 , p_1 and p_2 parameters are used to calculate the DMT indices, material index (I_D), horizontal stress index (K_D), and dilatometer modulus (E_D). Soil type is inferred from the material index. Clays generally have a material index of less than 0.6. The material index for silts is generally between 0.6 and 1.8, while sands generally exhibit a material index greater than 1.8. While K_D and E_D have limited direct use in geotechnical design, they are critical for determining parameters that are required for most design calculations such as earth pressure coefficient (K_0), undrained shear strength (S_u), and over consolidation ratio (OCR).

A summary of the tests including coordinates and estimated phreatic surface, along with plots and tabular results are provided in the relevant appendices. The calculated geotechnical parameters presented are based on published empirical correlations and are provided only as a first approximation. No warranty, expressed or implied, is made to the accuracy of these estimated geotechnical parameters.

References

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Foti, D., Lancellotta, R., Marchetti, D., Monaco, P., and Totani, P., 2006, "Interpretation of SDMT tests in a transversely isotropic medium", Proceedings from the Second International Conference on the Flat Dilatometer, Washington, DC., April 2-5.

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The appendices listed below are included in the report:

- Cone Penetration Test Summary and Standard Cone Penetration Test Plots
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots
- Flat Plate Dilatometer Test Summary, Plots, and Tabular Results

Cone Penetration Test Summary and
Standard Cone Penetration Test Plots



Job No: 16-54112
Client: Kleinfelder
Project: U-2525 C Site #4
Start Date: 19-Dec-2016
End Date: 21-Dec-2016

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface ¹ (ft)	Final Depth (ft)	Northing ² (feet)	Easting (feet)	Refer to Notation Number
STR5_EB1_B1	16-54112_CP STR5_EB1_B1	19-Dec-2016	367:T1500F15U500		34.0	874653	1777563	1
STR5_EB1_B2	16-54112_CP STR5_EB1_B2	19-Dec-2016	367:T1500F15U500		28.5	874584	1777560	1
STR5_EB1_B3	16-54112_CP STR5_EB1_B3	19-Dec-2016	367:T1500F15U500		30.5	874621	1777567	1
STR5_EB2_B1	16-54112_CP STR5_EB2_B1	19-Dec-2016	367:T1500F15U500		28.1	874655	1777453	1
STR5_EB2_B2	16-54112_CP STR5_EB2_B2	19-Dec-2016	367:T1500F15U500		29.0	874591	1777450	1
STR5_EB2_B3	16-54112_CP STR5_EB2_B3	19-Dec-2016	367:T1500F15U500		29.9	874627	1777441	1
STR6_EB1_B1	16-54112_CP STR6_EB1_B1	19-Dec-2016	367:T1500F15U500		32.8	874663	1777566	1
STR6_EB1_B2	16-54112_CP STR6_EB1_B2	19-Dec-2016	367:T1500F15U500		33.0	874724	1777577	1
STR6_EB1_B3	16-54112_CP STR6_EB1_B3	19-Dec-2016	367:T1500F15U500		32.8	874701	1777579	1
STR6_EB2_B1	16-54112_CP STR6_EB2_B1	19-Dec-2016	367:T1500F15U500		27.6	874672	1777462	1
STR6_EB2_B2	16-54112_CP STR6_EB2_B2	19-Dec-2016	367:T1500F15U500		27.9	874736	1777468	1
STR6_EB2_B3	16-54112_CP STR6_EB2_B3	19-Dec-2016	367:T1500F15U500		27.9	874716	1777445	1
Totals	12 soundings				361.9			

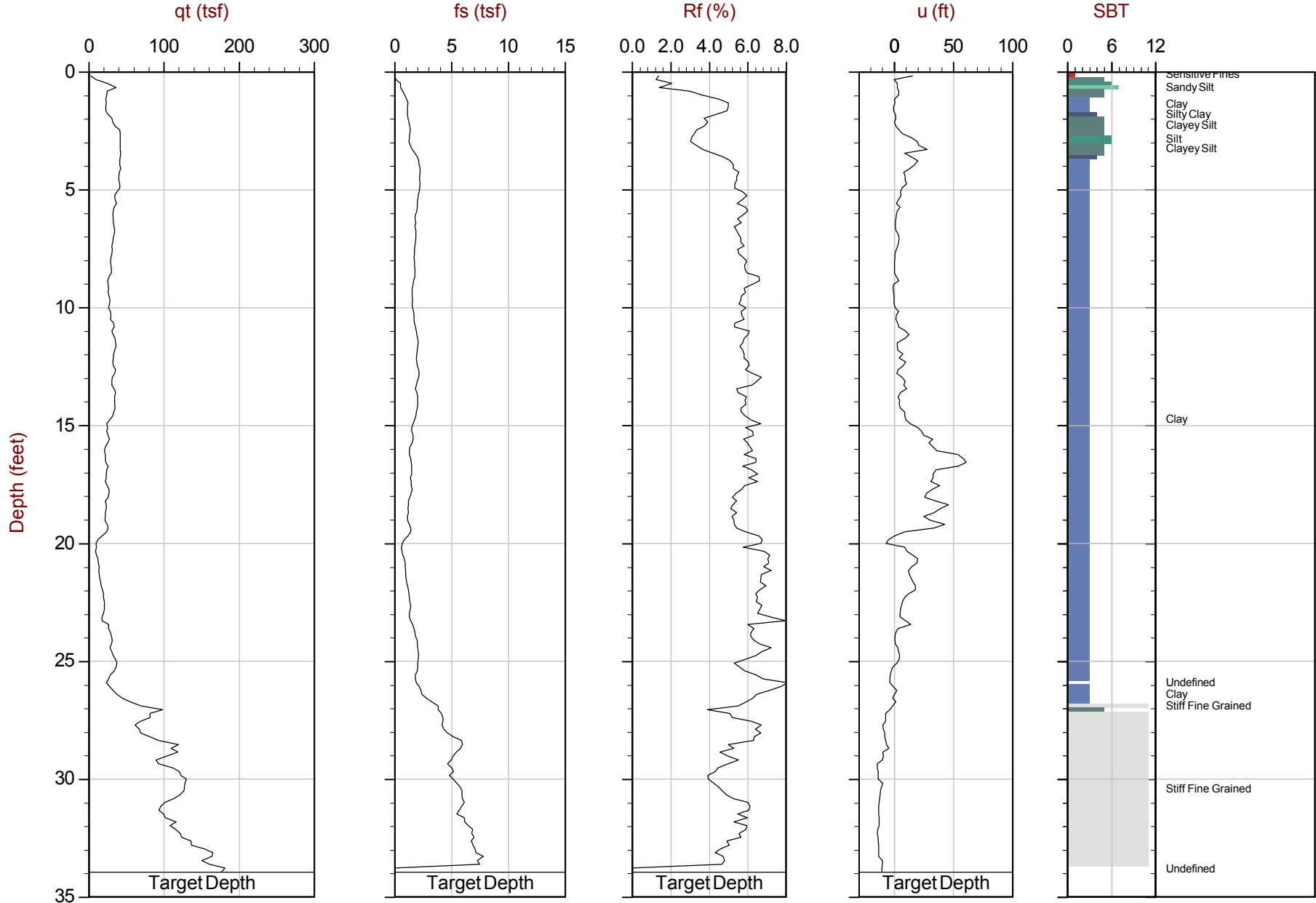
1. Phreatic surface is assumed not to be encountered within exploration depth.
2. State Plane System 3200 - North Carolina. Coordinates were provided by client.



Kleinfelder

Job No: 16-54112
Date: 12:19:16 15:17
Site: U-2525 C Site #4

Sounding: STR5_EB1_B1
Cone: 367:T1500F15U500

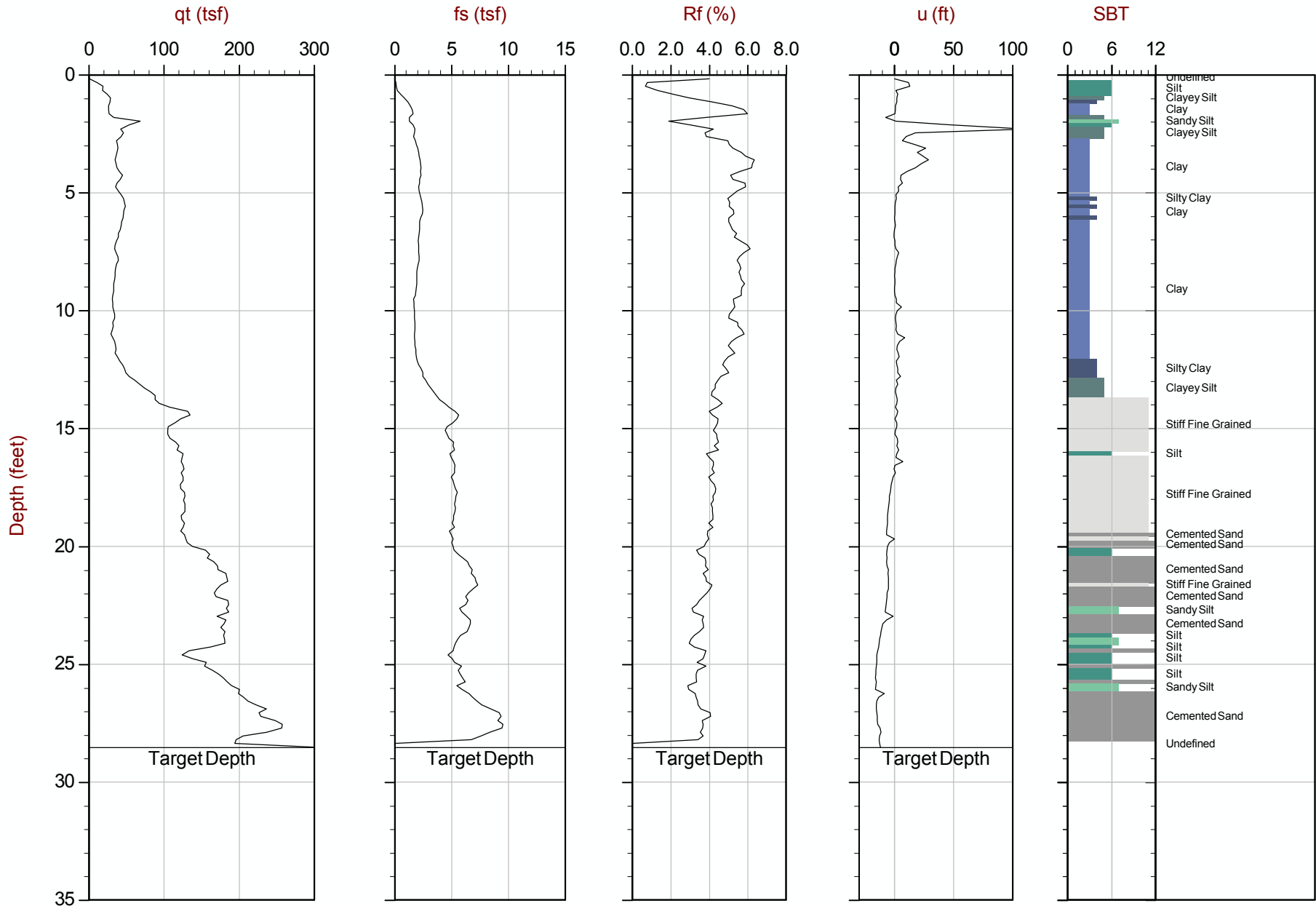


Max Depth: 10.350 m / 33.96 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 16-54112_CPSTR5_EB1_B1.COR
Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
Coords: N: 874653 E: 1777563 Elev: 876.9

△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

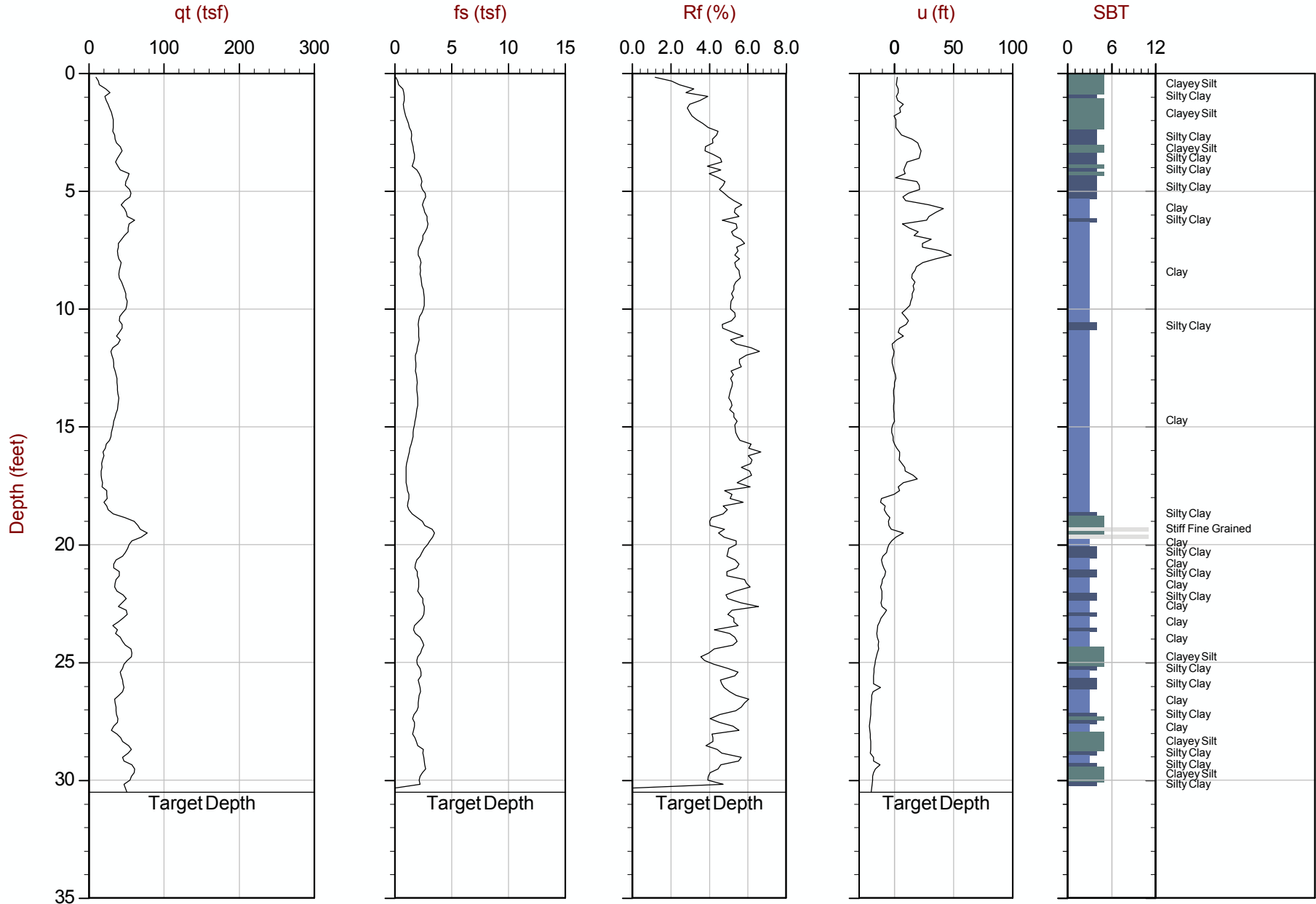


Max Depth: 8.700 m / 28.54 ft
 Depth Inc: 0.050 m / 0.164 ft
 Avg Int: Every Point

File: 16-54112_CPSTR5_EB1_B2.COR
 Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
 Coords: N: 874584 E: 1777560 Elev: 874.1

△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
 The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Max Depth: 9.300 m / 30.51 ft
 Depth Inc: 0.050 m / 0.164 ft
 Avg Int: Every Point

File: 16-54112_CPSTR5_EB1_B3.COR
 Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
 Coords: N: 874621 E: 1777567 Elev: 875.8

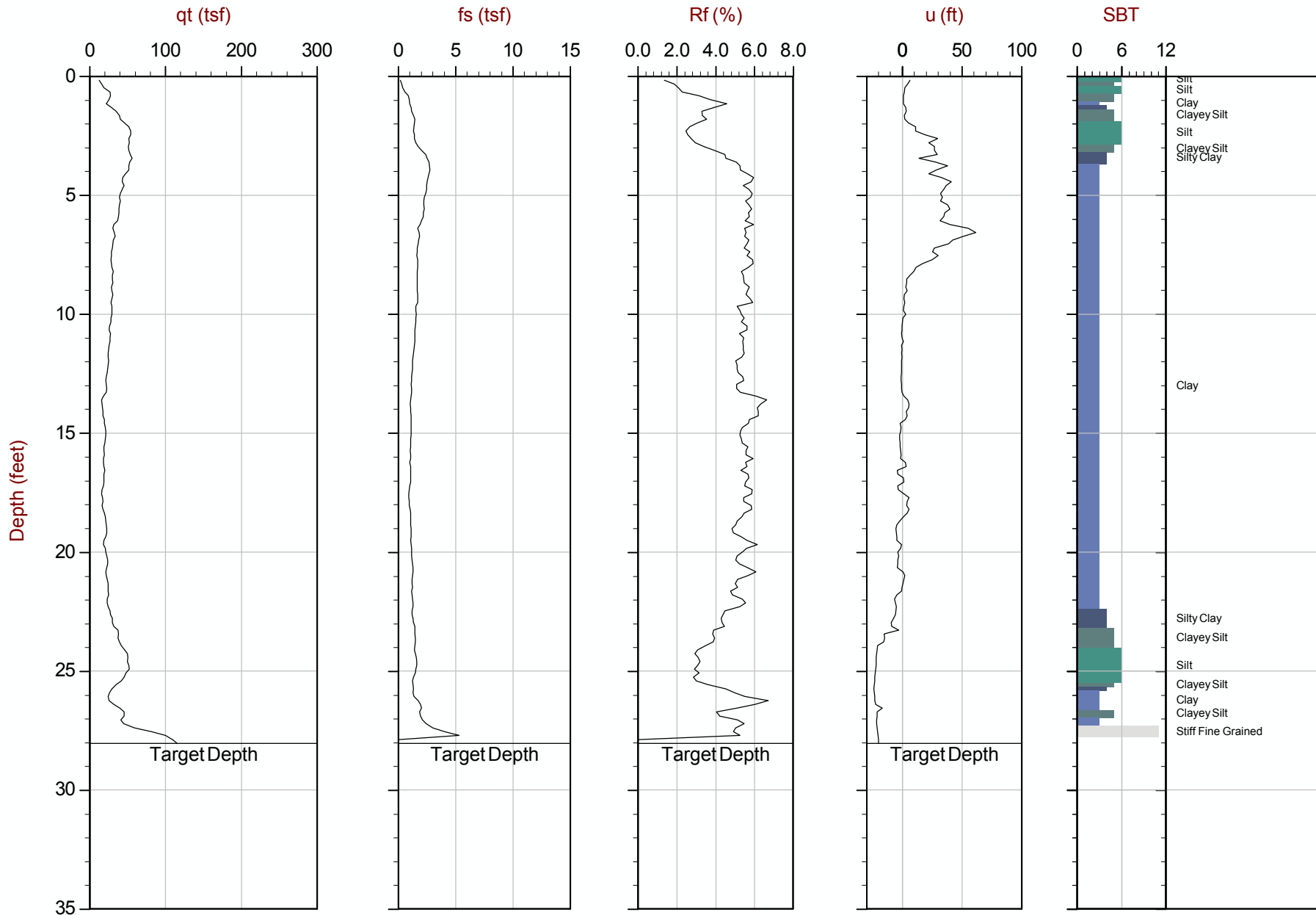
△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
 The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Kleinfelder

Job No: 16-54112
Date: 12:19:16 10:36
Site: U-2525 C Site #4

Sounding: STR5_EB2_B1
Cone: 367:T1500F15U500

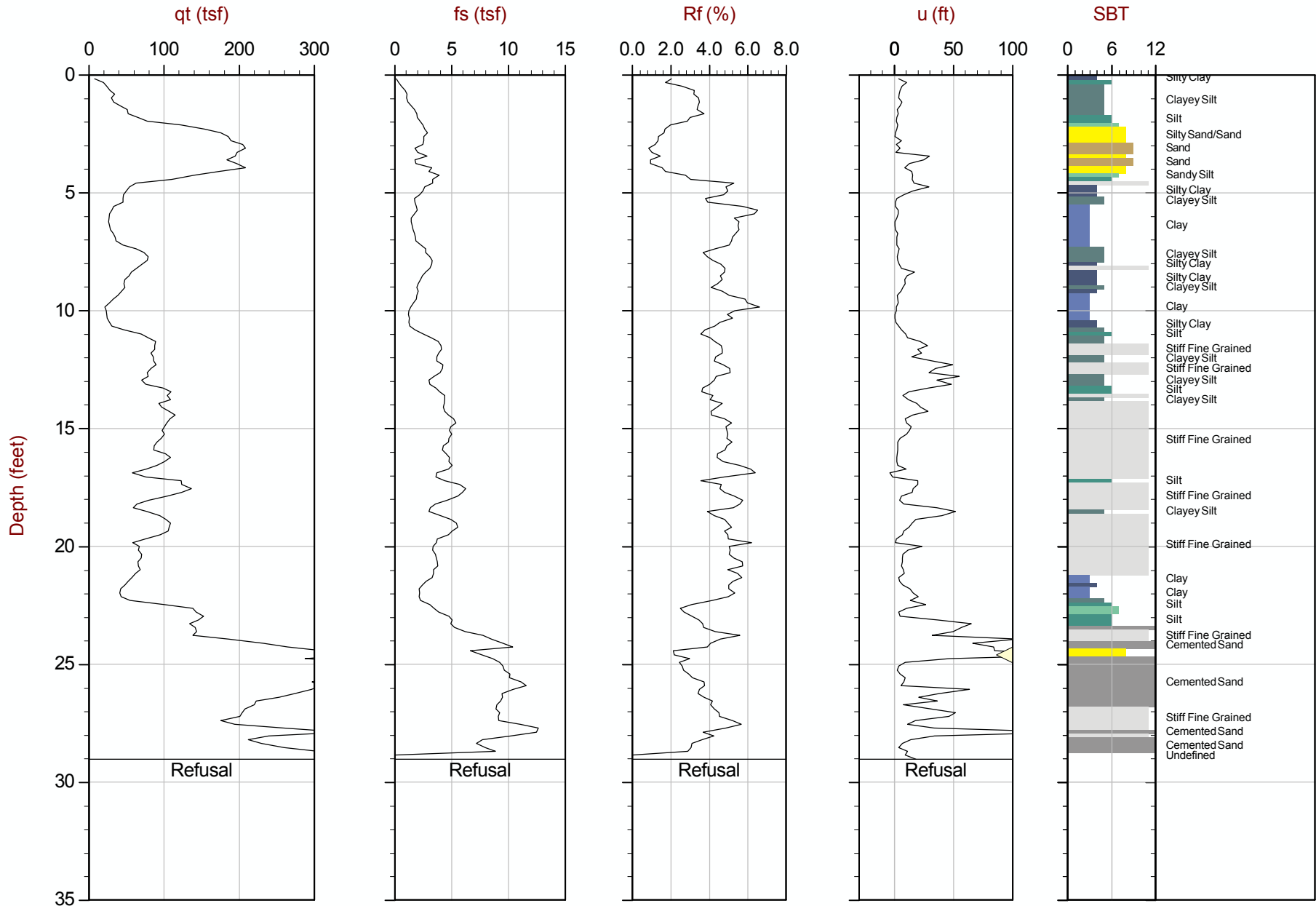


Max Depth: 8.550 m / 28.05 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 16-54112_CPSTR5_EB2_B1.COR
Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
Coords: N: 874655 E: 1777453 Elev: 873.0

△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

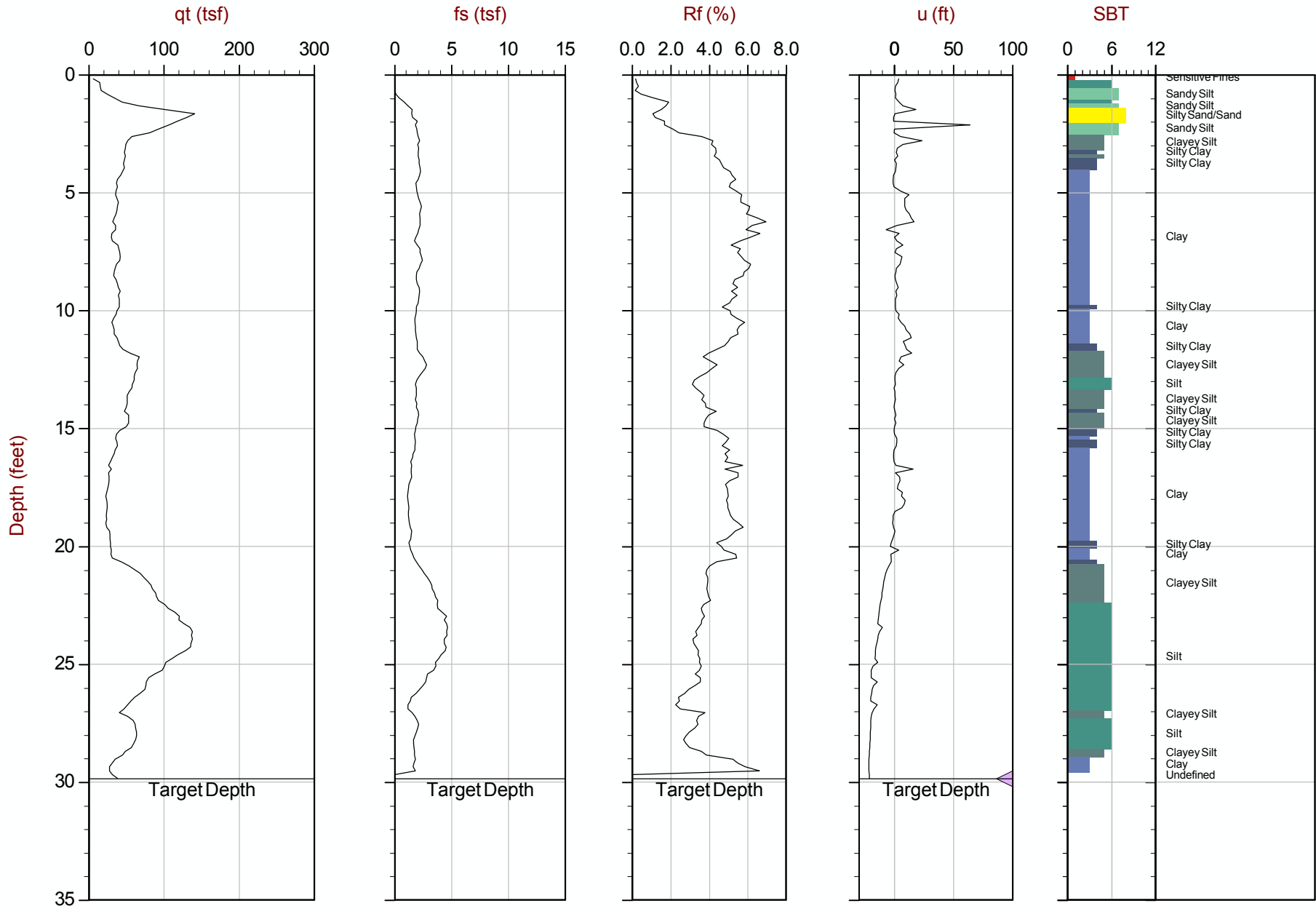


Max Depth: 8.850 m / 29.04 ft
 Depth Inc: 0.050 m / 0.164 ft
 Avg Int: Every Point

File: 16-54112_CPSTR5_EB2_B2.COR
 Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
 Coords: N: 874591 E: 1777450 Elev: 874.0

△ Dissipation with estimated U_{eq} value △ Dissipation, equilibrium not achieved
 The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Max Depth: 9.100 m / 29.86 ft
 Depth Inc: 0.050 m / 0.164 ft
 Avg Int: Every Point

File: 16-54112_CPSTR5_EB2_B3.COR
 Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
 Coords: N: 874627 E: 1777441 Elev: 873.4

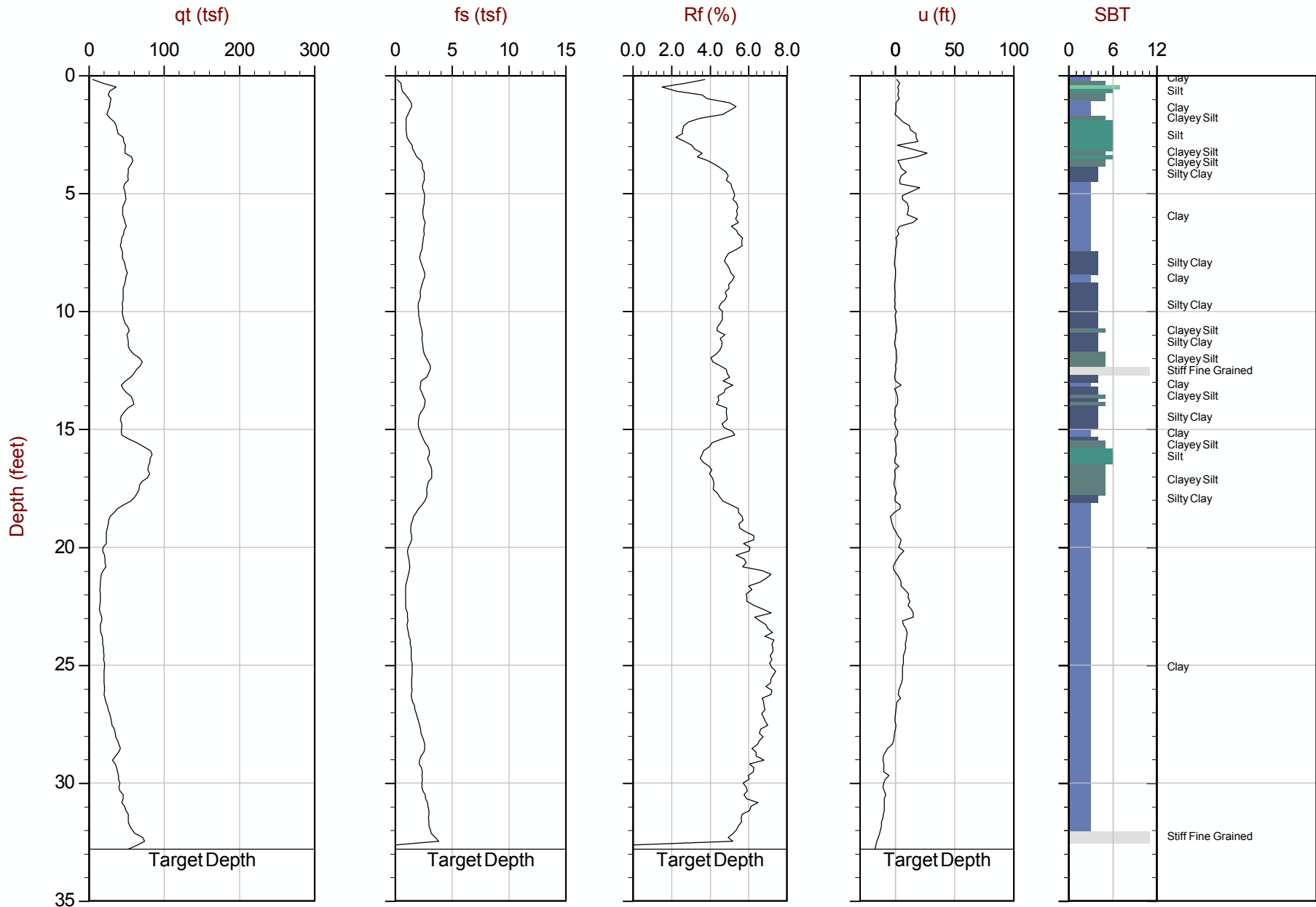
△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
 The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Kleinfelder

Job No: 16-54112
Date: 12:19:16 14:47
Site: U-2525 C Site #4

Sounding: STR6_EB1_B1
Cone: 367:T1500F15U500



Max Depth: 10.000 m / 32.81 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 16-54112_CPSTR6_EB1_B1.COR
Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
Coords: N: 874663 E: 177566 Elev: 877.3

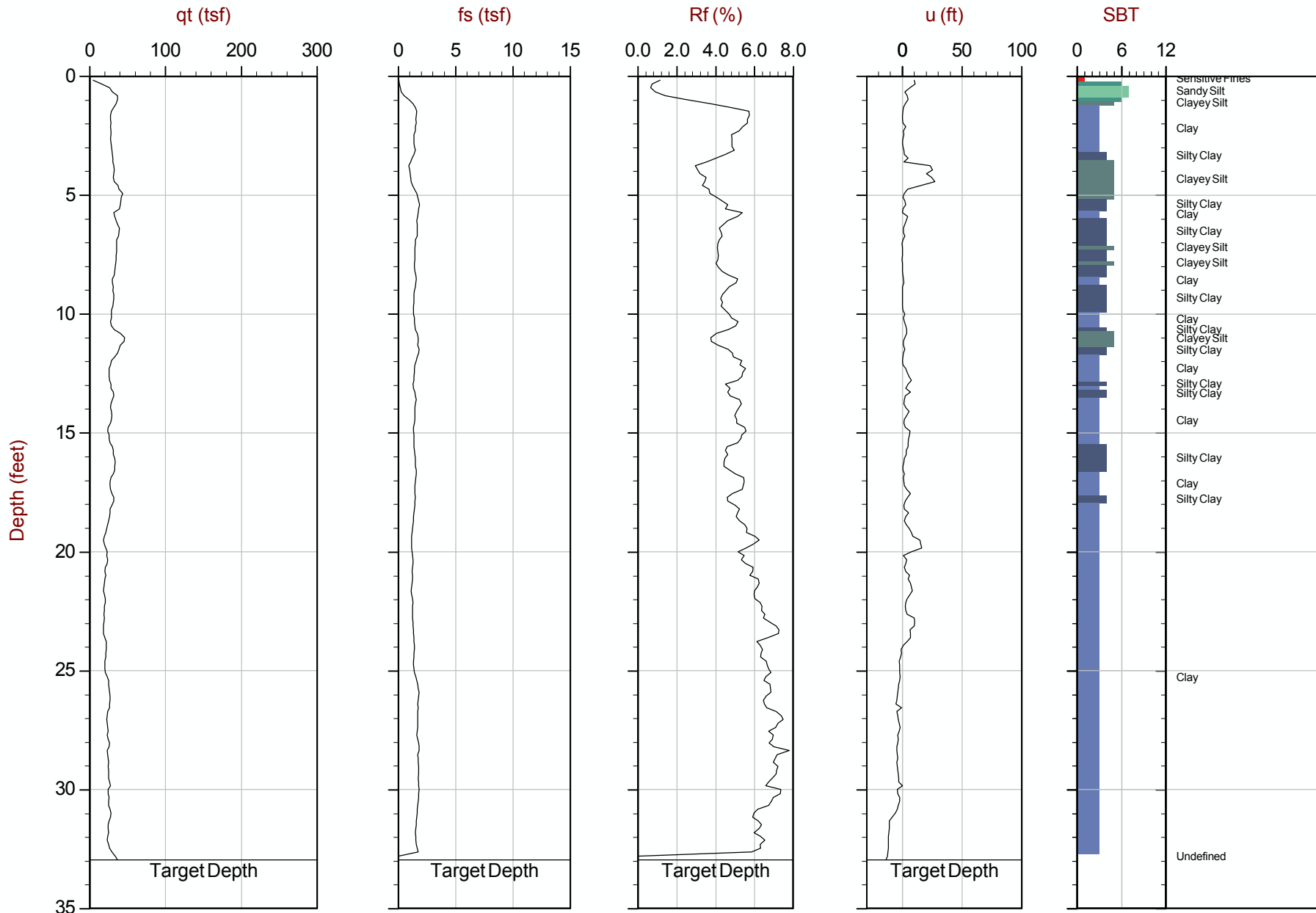
△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Kleinfelder

Job No: 16-54112
Date: 12:19:16 13:26
Site: U-2525 C Site #4

Sounding: STR6_EB1_B2
Cone: 367:T1500F15U500



Max Depth: 10.050 m / 32.97 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 16-54112_CPSTR6_EB1_B2.COR
Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
Coords: N: 874724 E: 1777577 Elev: 877.4

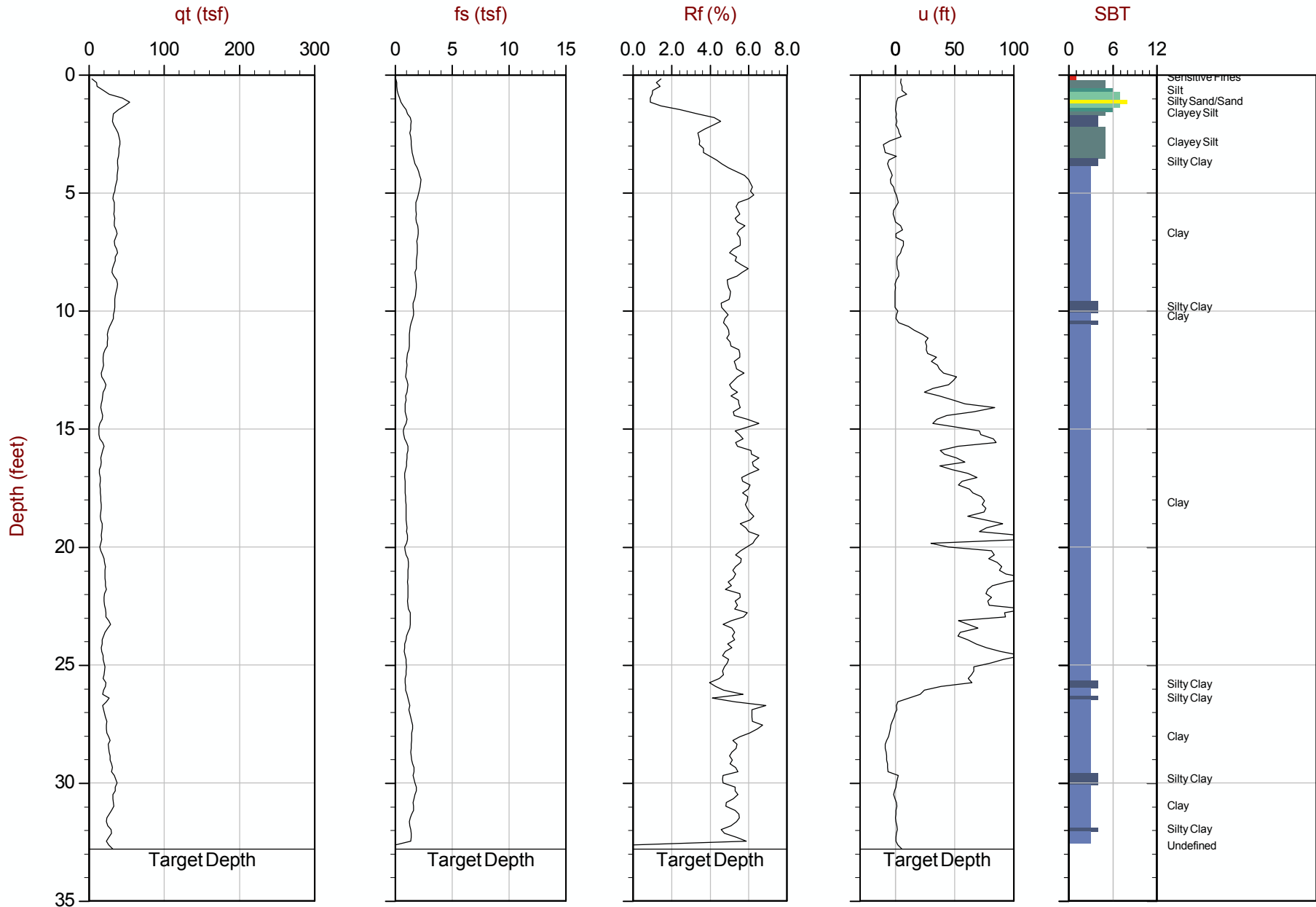
△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Kleinfelder

Job No: 16-54112
Date: 12:19:16 14:07
Site: U-2525 C Site #4

Sounding: STR6_EB1_B3
Cone: 367:T1500F15U500

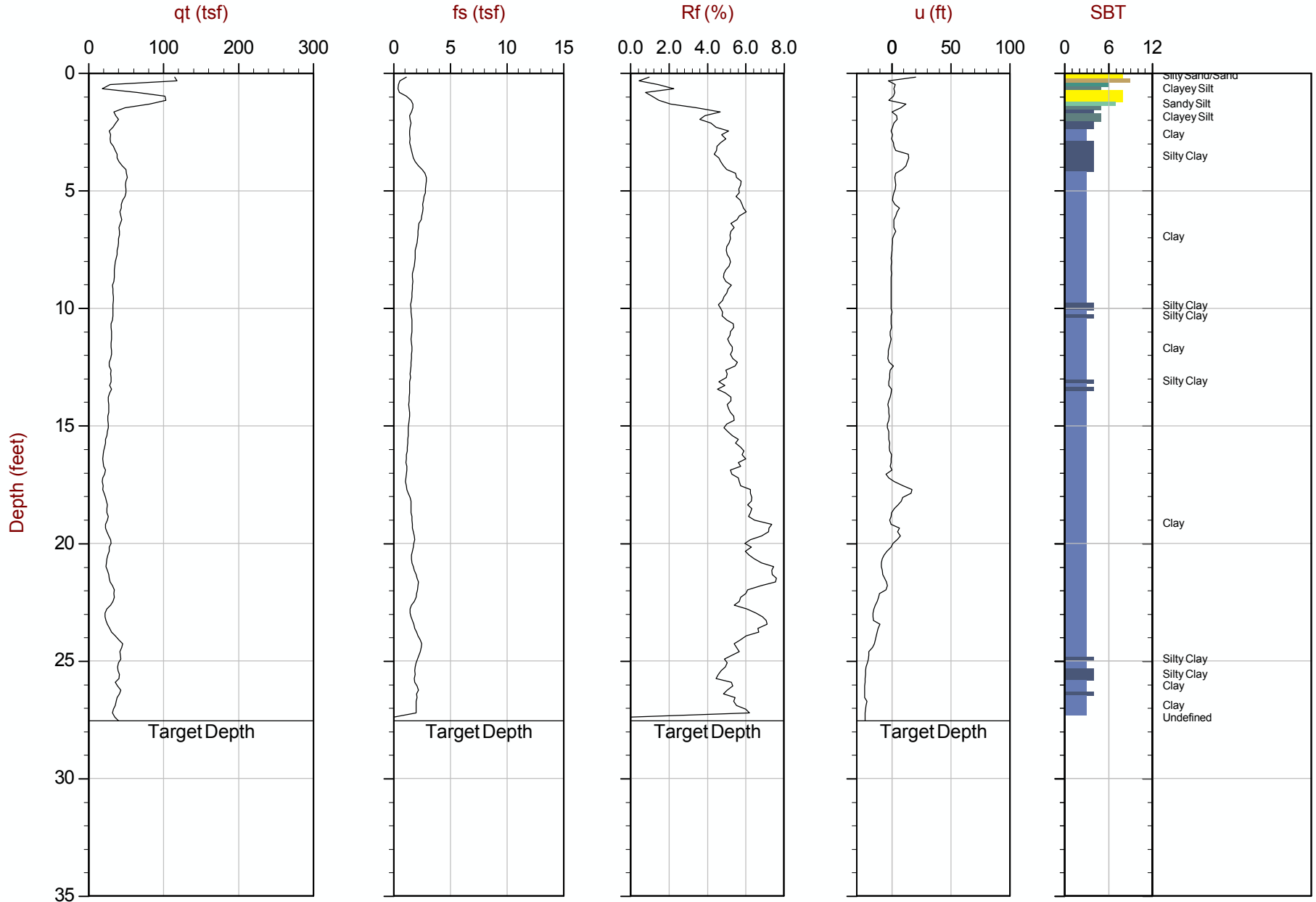


Max Depth: 10.000 m / 32.81 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 16-54112_CPSTR6_EB1_B3.COR
Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
Coords: N: 874701 E: 1777579 Elev: 877.4

△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

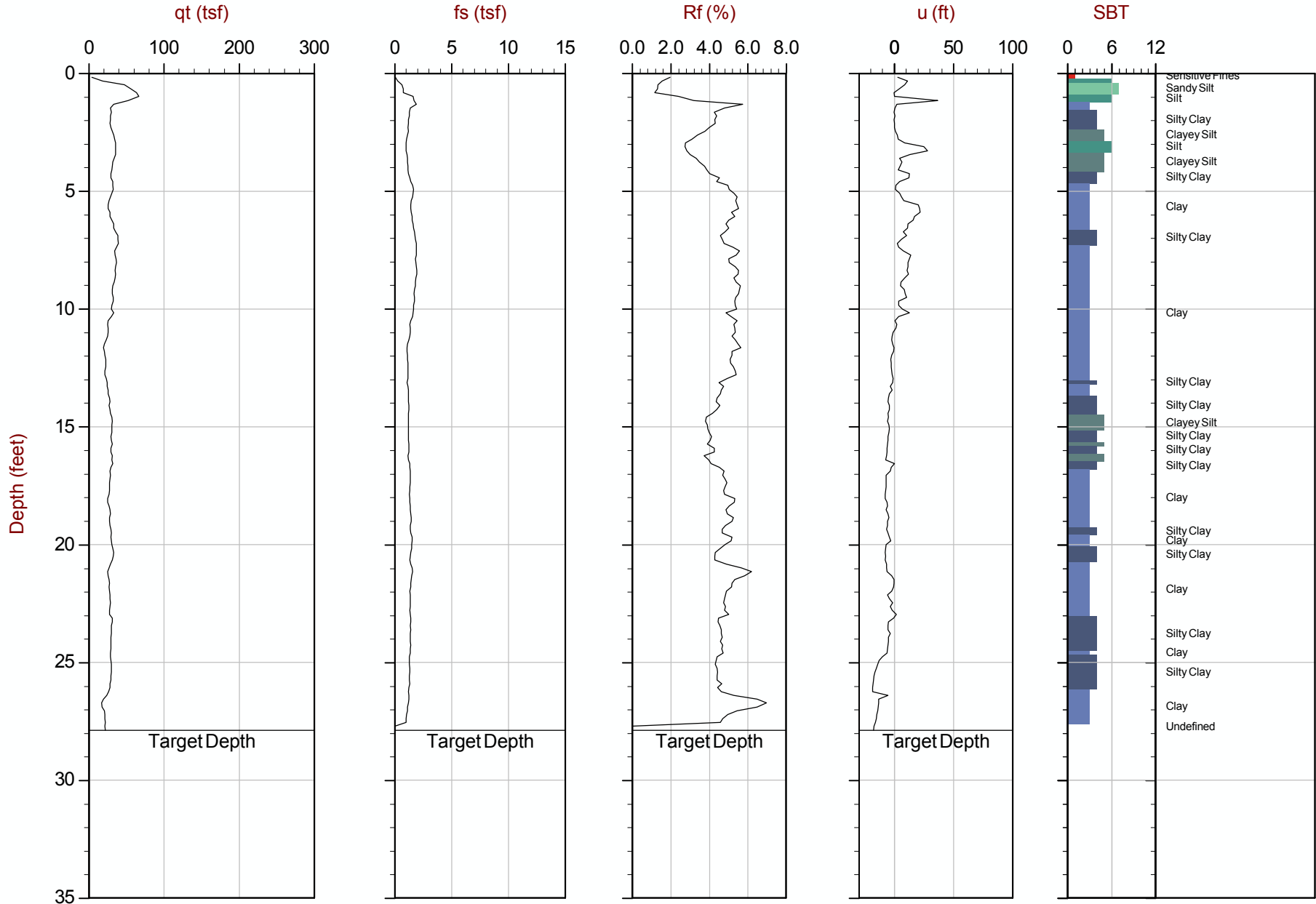


Max Depth: 8.400 m / 27.56 ft
 Depth Inc: 0.050 m / 0.164 ft
 Avg Int: Every Point

File: 16-54112_CPSTR6_EB2_B1.COR
 Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
 Coords: N: 874672 E: 1777462 Elev: 873.3

△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
 The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

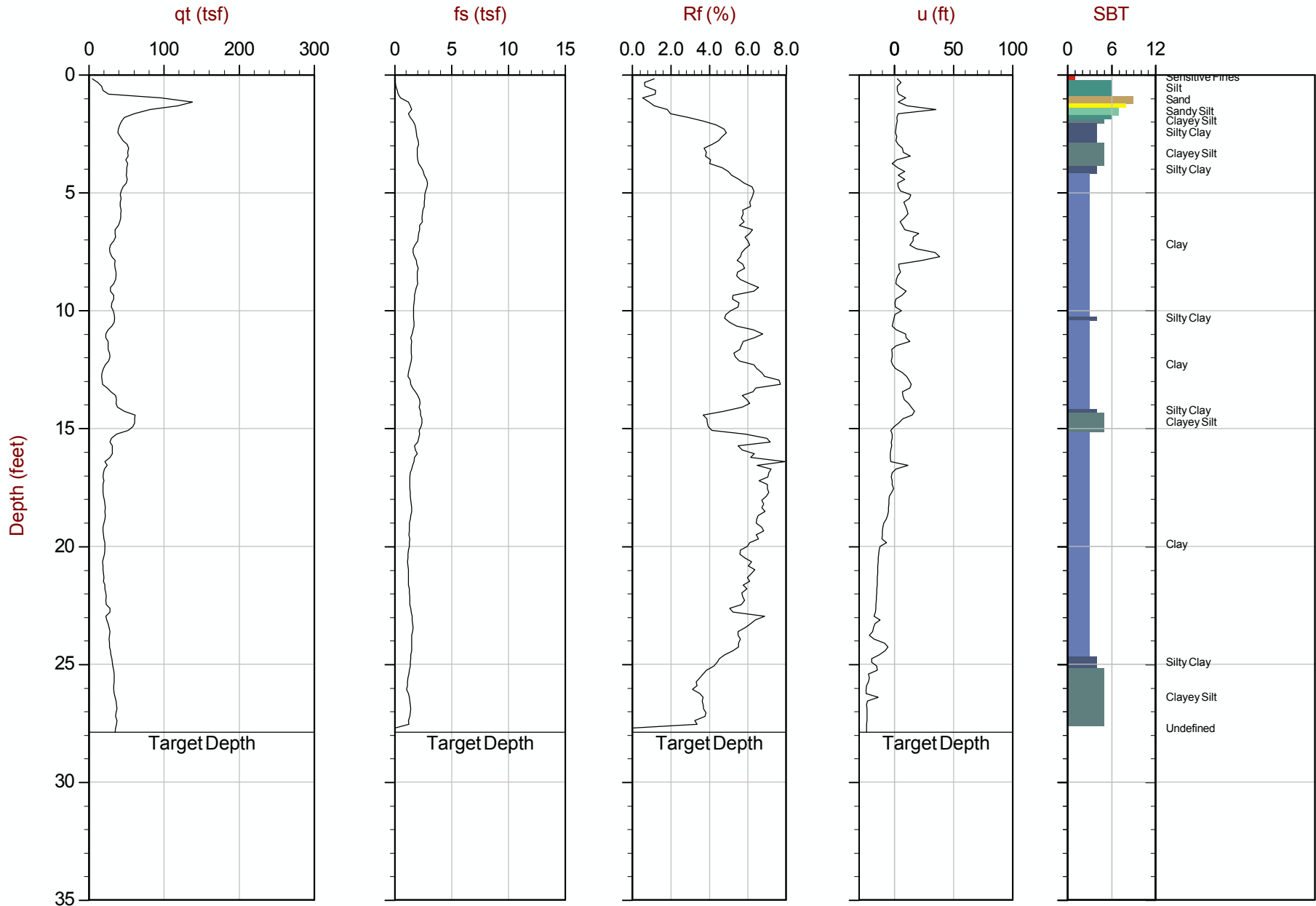


Max Depth: 8.500 m / 27.89 ft
 Depth Inc: 0.050 m / 0.164 ft
 Avg Int: Every Point

File: 16-54112_CPSTR6_EB2_B2.COR
 Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
 Coords: N: 874736 E: 1777468 Elev: 872.5

△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
 The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Max Depth: 8.500 m / 27.89 ft
 Depth Inc: 0.050 m / 0.164 ft
 Avg Int: Every Point

File: 16-54112_CPSTR6_EB2_B3.COR
 Unit Wt: SBT Zones

SBT: Robertson and Campanella, 1986
 Coords: N: 874716 E: 1777445 Elev: 872.2

△ Dissipation with estimated Ueq value △ Dissipation, equilibrium not achieved
 The reported coordinates were acquired from hand-held GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

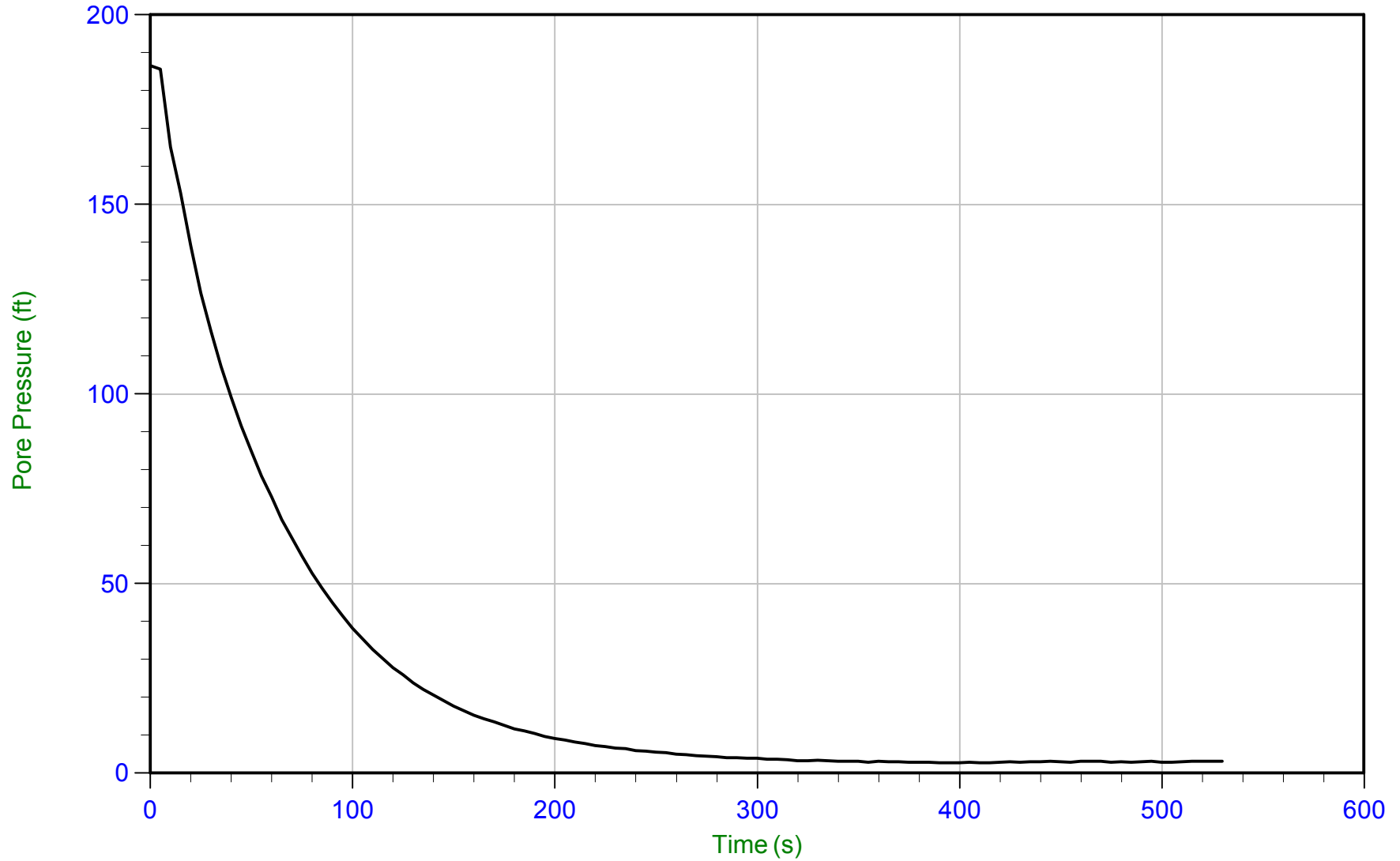
Pore Pressure Dissipation Summary and
Pore Pressure Dissipation Plots



Job No: 16-54112
Client: Kleinfelder
Project: U-2525 C Site #4
Start Date: 19-Dec-2016
End Date: 21-Dec-2016

CPT_u PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm ²)	Duration (s)	Test Depth (ft)	Estimated Equilibrium Pore Pressure U _{eq} (ft)	Calculated Phreatic Surface (ft)
STR5_EB2_B2	16-54112_CP STR5_EB2_B2.PPD	15.0	530	24.6	3.0	21.6
STR5_EB2_B3	16-54112_CP STR5_EB2_B3.PPD	15.0	865	29.9		
Totals			14.4 min			

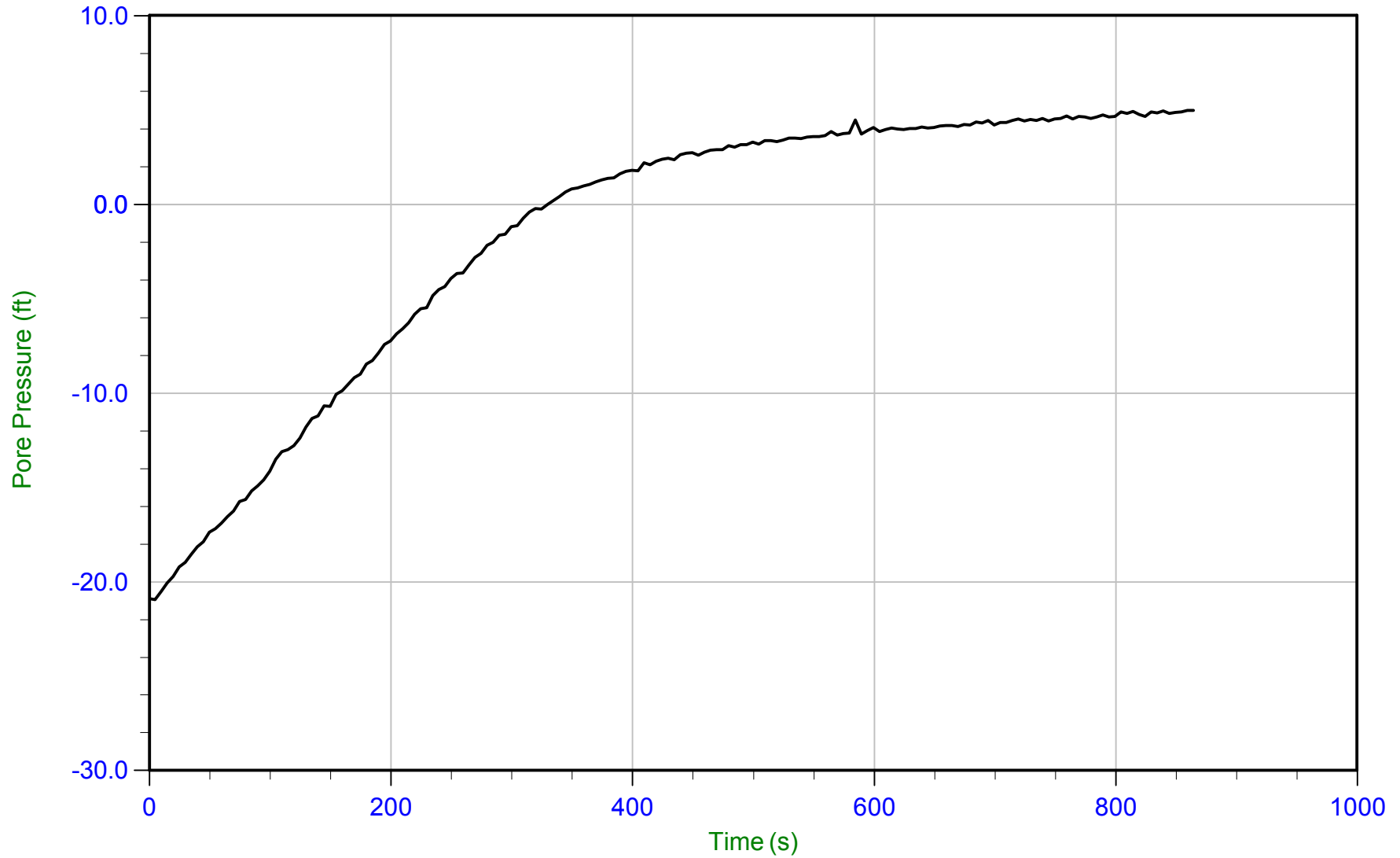


Trace Summary:

Filename: 16-54112_CPSTR5_EB2_B2.PPD
Depth: 7.500 m / 24.606 ft
Duration: 530.0 s

U Min: 2.7 ft
U Max: 186.5 ft

WT: 6.579 m / 21.584 ft
Ueq: 3.0 ft



Trace Summary: Filename: 16-54112_CPSTR5_EB2_B3.PPD UMin: -20.9 ft
 Depth: 9.100 m / 29.855 ft UMax: 5.0 ft
 Duration: 865.0 s

Flat Plate Dilatometer Test Summary, Plots and Tabular Results



Job No: 16-54112
Client: Kleinfelder
Project: U-2525 C Site #4
Start Date: 19-Dec-2016
End Date: 21-Dec-2016

FLAT PLATE DILATOMETER TEST SUMMARY

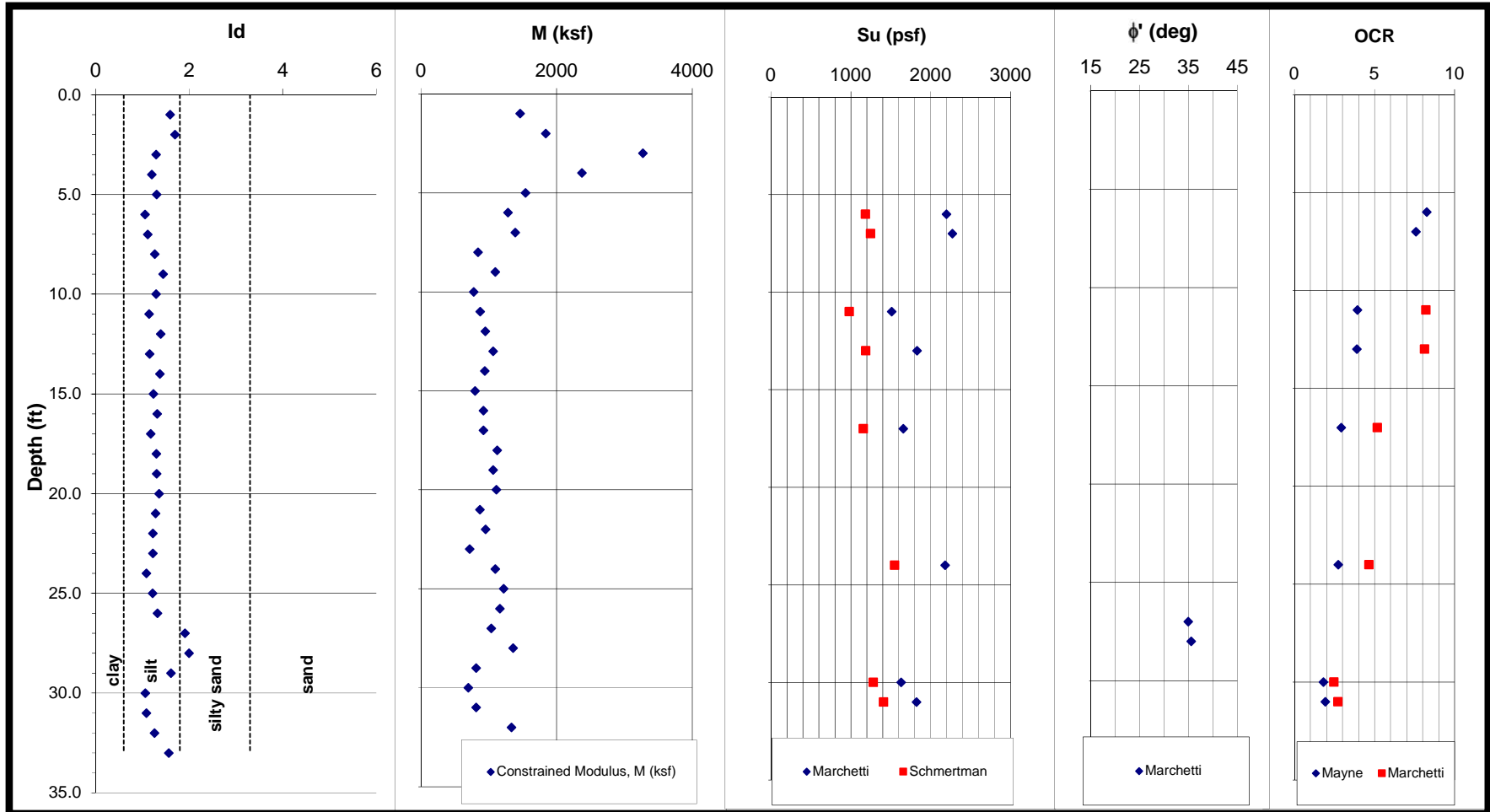
Sounding ID	File Name	Date	Final Depth (ft)	Assumed Phreatic Surface (ft)	Northing ² (feet)	Easting (feet)	Refer to Notation Number
STR5_EB1_B1	16-54112_DMT STR5_EB1_B1	20-Dec-2016	33		874653	1777563	1
STR5_EB1_B2	16-54112_DMT STR5_EB1_B2	20-Dec-2016	20		874584	1777560	1
STR5_EB1_B3	16-54112_DMT STR5_EB1_B3	20-Dec-2016	30		874621	1777567	1
STR5_EB2_B1	16-54112_DMT STR5_EB2_B1	21-Dec-2016	25		874655	1777453	1
STR5_EB2_B2	16-54112_DMT STR5_EB2_B2	21-Dec-2016	21		874591	1777450	1
STR5_EB2_B3	16-54112_DMT STR5_EB2_B3	21-Dec-2016	28		874627	1777441	1
STR6_EB1_B1	16-54112_DMT STR6_EB1_B1	20-Dec-2016	32		874663	1777566	1
STR6_EB1_B2	16-54112_DMT STR6_EB1_B2	20-Dec-2016	32		874724	1777577	1
STR6_EB1_B3	16-54112_DMT STR6_EB1_B3	20-Dec-2016	32		874701	1777579	1
STR6_EB2_B1	16-54112_DMT STR6_EB2_B1	21-Dec-2016	28		874672	1777462	1
STR6_EB2_B2	16-54112_DMT STR6_EB2_B2	20-Dec-2016	28		874736	1777468	1
STR6_EB2_B3	16-54112_DMT STR6_EB2_B3	21-Dec-2016	27		874716	1777445	1

1. Phreatic surface is assumed not to be encountered within exploration depth.
2. State Plane System 3200 - North Carolina. Coordinates were provided by client.



DILATOMETER TEST RESULTS

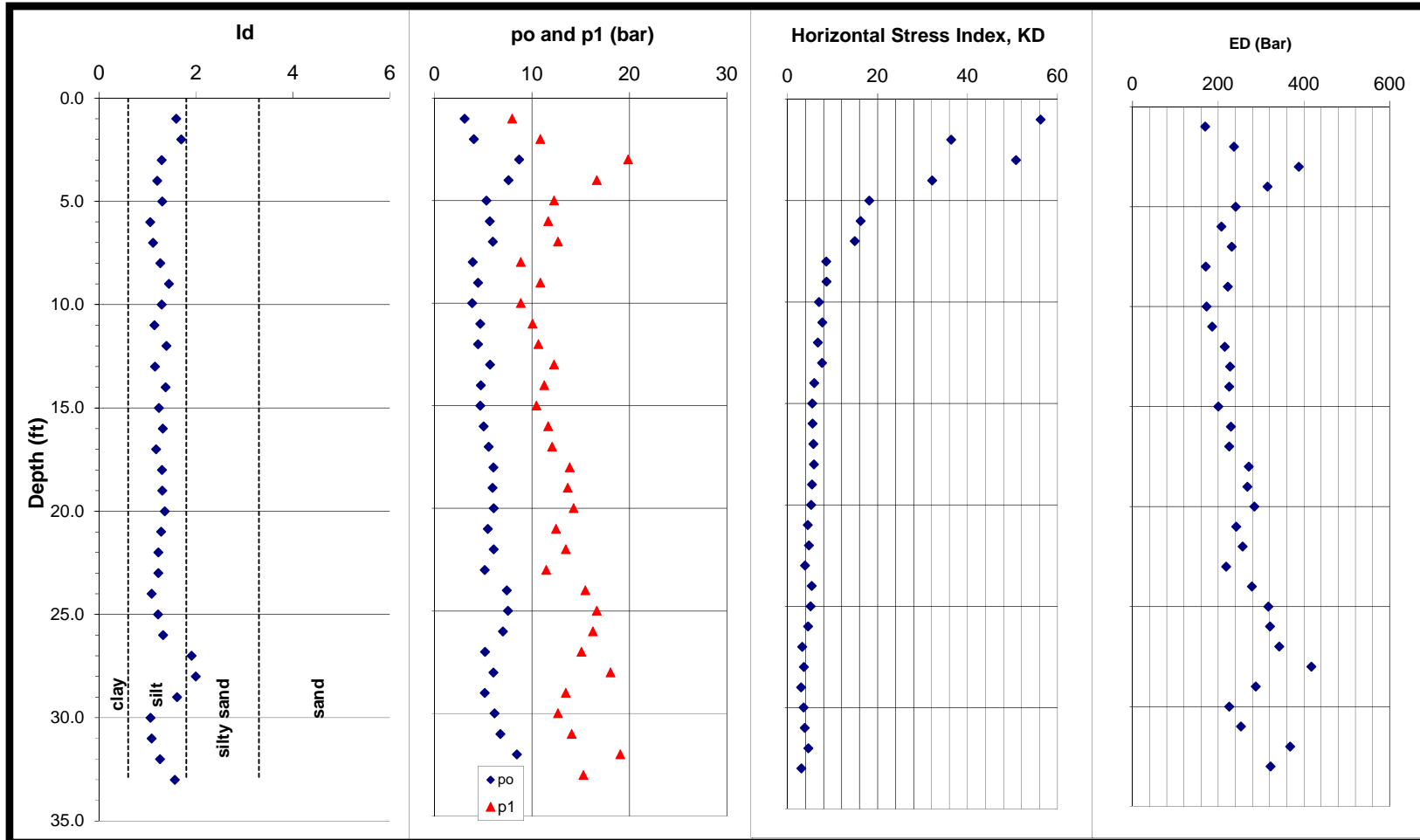
Test ID: STR5_EB1_B1
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR5_EB1_B1
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/20/16
 Sounding No: STR5_EB1_B1
 Ground Water Depth (ft): N/A

Membrane 1 Membrane 2 Membrane 3
 $\Delta A =$ 0.2 0 0
 $\Delta B =$ 0.35 0 0
 Zm= 0 bar

Northing 874653
 Easting 1777563
 Elevation 876.9

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



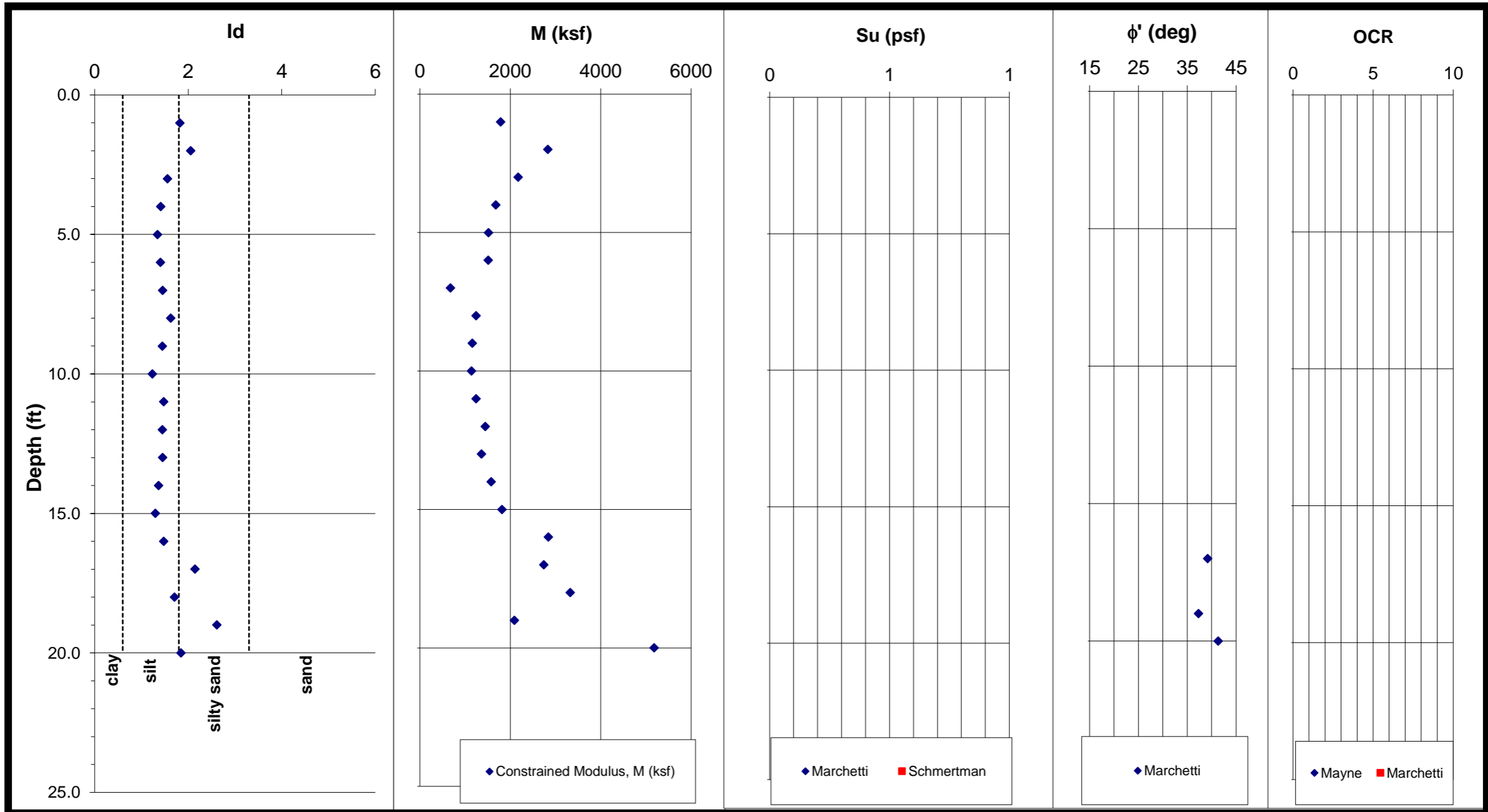
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	po (bar)	p1 (bar)	p2 (bar)	uo (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	ld	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	3.1	8.3		3.1	7.95		0	114	114	114	1.59	56.2	169					4.13	354			1463
2.0	4.15	11.2		4.0	10.85		0	117	231	231	1.70	36.3	237					3.72	495			1841
3.0	9	20.2	0	8.7	19.85		0	125	356	356	1.29	50.8	388					4.04	810			3273
4.0	7.8	17		7.6	16.65		0	123	492	492	1.20	32.1	315					3.61	658			2373
5.0	5.45	12.6		5.3	12.25		0	119	611	611	1.30	18.2	240					3.07	502			1540
6.0	5.75	12	0	5.7	11.65		0	119	730	730	1.06	16.2	208	2.5	8.3	26.2		2.96	434	2196	1183	1283
7.0	6.1	13		6.0	12.65		0	120	838	838	1.11	14.9	231	2.3	7.6	23.0		2.88	483	2271	1249	1391
8.0	3.95	9.2		3.9	8.85		0	115	953	953	1.26	8.6	171					2.35	358			840
9.0	4.55	11.2	0	4.4	10.85		0	118	1071	1071	1.44	8.7	222					2.36	464			1096
10.0	3.9	9.2		3.9	8.85		0	115	1154	1154	1.29	7.0	173					2.15	361			777
11.0	4.75	10.4		4.7	10.05		0	117	1271	1271	1.14	7.7	186	1.6	3.9	8.2		2.24	388	1512	981	871
12.0	4.55	11	0	4.5	10.65		0	117	1388	1388	1.39	6.7	215					2.11	449			948
13.0	5.8	12.6		5.7	12.25		0	119	1550	1550	1.15	7.7	228	1.6	3.9	8.1		2.24	476	1828	1188	1064
14.0	4.85	11.6		4.7	11.25		0	118	1668	1668	1.37	5.9	226					1.99	472			939
15.0	4.75	10.8	0	4.7	10.45		0	117	1786	1786	1.24	5.5	200					1.91	419			798
16.0	5.15	12		5.0	11.65		0	119	1897	1897	1.31	5.5	230					1.92	479			922
17.0	5.65	12.4		5.5	12.05		0	119	2016	2016	1.18	5.7	226	1.3	2.9	5.2		1.95	472	1656	1157	921
18.0	6.2	14.2	0	6.0	13.85		0	121	2137	2137	1.30	5.9	271					1.98	567			1123
19.0	6.1	14		5.9	13.65		0	120	2289	2289	1.30	5.4	268					1.90	559			1062
20.0	6.25	14.6		6.1	14.25		0	121	2410	2410	1.35	5.3	284					1.87	594			1111
21.0	5.6	12.8	0	5.5	12.45		0	119	2529	2529	1.28	4.5	242					1.72	506			870
22.0	6.2	13.8		6.0	13.45		0	120	2648	2648	1.22	4.8	257					1.77	536			950
23.0	5.25	11.8		5.2	11.45		0	118	2766	2766	1.22	3.9	219					1.57	457			717
24.0	7.6	15.8	0.1	7.4	15.45	0.30	0	122	2888	2888	1.08	5.4	279	1.2	2.7	4.7		1.88	582	2181	1549	1095
25.0	7.75	17		7.5	16.65		0	123	3074	3074	1.22	5.1	317					1.84	662			1217
26.0	7.25	16.6		7.0	16.25		0	123	3196	3196	1.32	4.6	321					1.74	670			1163
27.0	5.45	15.4	0.05	5.2	15.05	0.25	0	121	3317	3317	1.91	3.3	342									1035
28.0	6.4	18.4		6.0	18.05		0	123	3452	3452	1.99	3.6	417									1357
29.0	5.35	13.8		5.2	13.45		0	120	3572	3572	1.61	3.0	288					1.35	601			811
30.0	6.25	13	1.25	6.1	12.65	1.45	0	120	3590	3590	1.06	3.6	226	0.9	1.8	2.5		1.48	472	1631	1282	696
31.0	6.9	14.4		6.8	14.05		0	121	3711	3711	1.08	3.8	253	0.9	1.9	2.7		1.54	529	1821	1410	814
32.0	8.75	19.4		8.4	19.05		0	125	3835	3835	1.26	4.6	368					1.74	769			1335
33.0	6.2	15.6	0	6.0	15.25		0	122	4014	4014	1.56	3.1	322					1.37	673			925



DILATOMETER TEST RESULTS

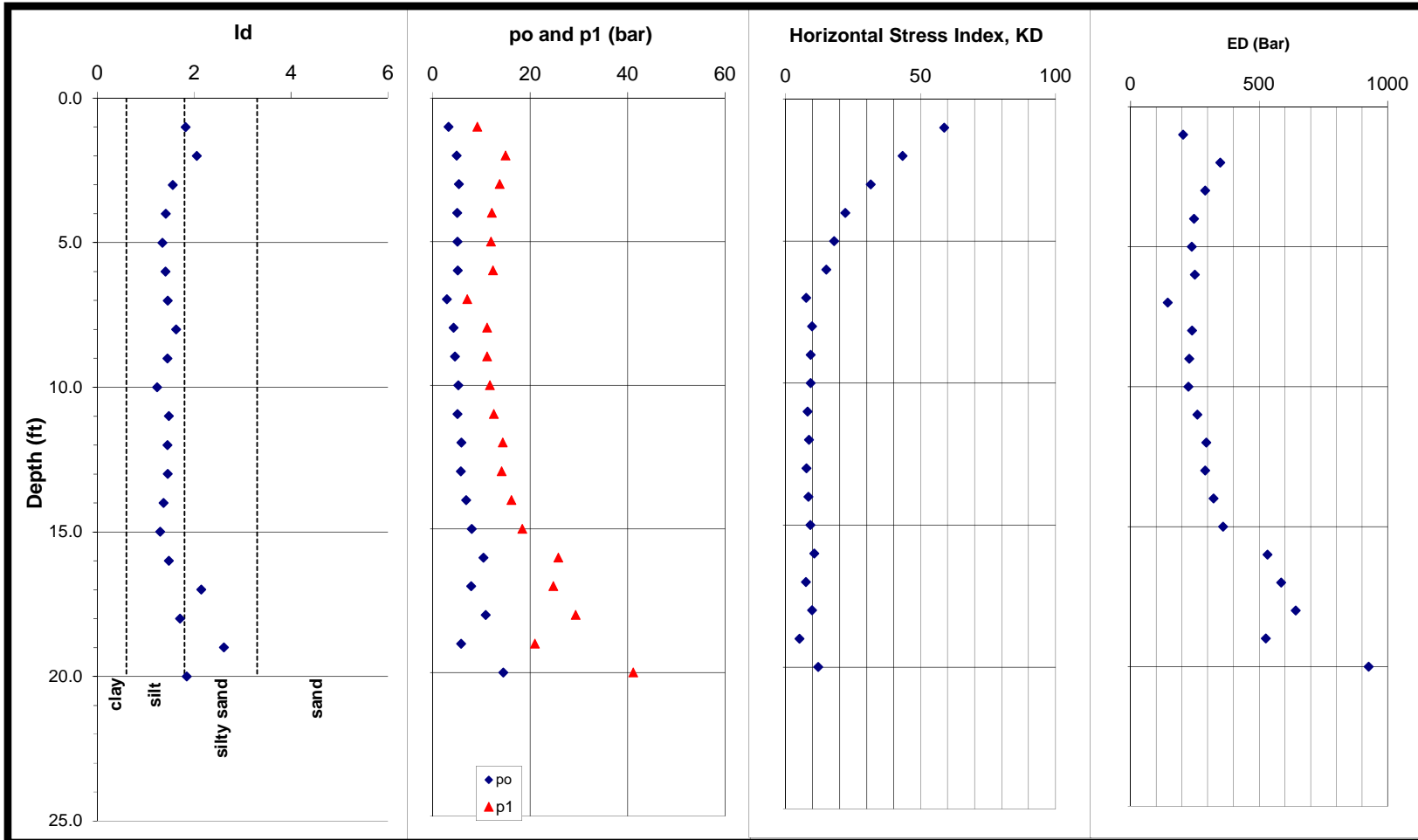
Test ID: STR5_EB1_B2
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR5_EB1_B2
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/20/16
 Sounding No: STR5_EB1_B2
 Ground Water Depth (ft): N/A

	Membrane 1	Membrane 2	Membrane 3
$\Delta A =$	0.125	0	0
$\Delta B =$	0.65	0	0
$Z_m =$	0	bar	

Northing 874584
 Easting 1777560
 Elevation 874.1

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



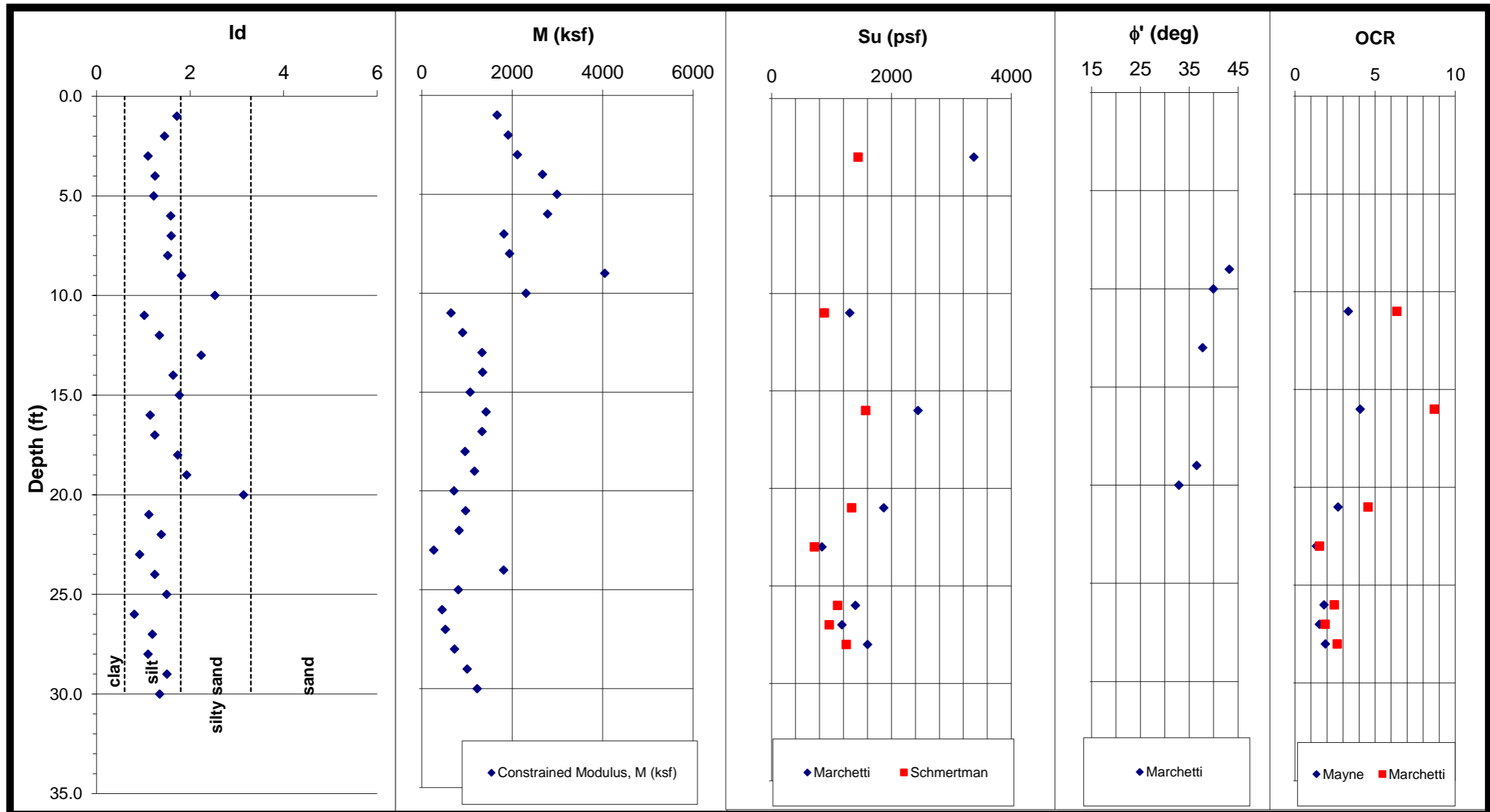
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	p ₀ (bar)	p ₁ (bar)	p ₂ (bar)	u ₀ (psf)	γ_r^5 (pcf)	σ_{v0} (psf)	σ_{v0}' (psf)	l _d	K _D	E _D (bar)	K ₀	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	3.4	9.8		3.2	9.15		0	115	115	115	1.82	58.7	205				47.3	4.18	428			1788
2.0	5.25	15.6		4.9	14.95		0	121	236	236	2.05	43.3	349				46.3	3.89	729			2832
3.0	5.65	14.4	0	5.4	13.75		0	120	357	357	1.56	31.5	291					3.59	607			2176
4.0	5.25	12.8		5.0	12.15		0	119	476	476	1.41	22.1	247					3.25	516			1676
5.0	5.3	12.6		5.1	11.95		0	119	595	595	1.34	17.9	238					3.05	497			1515
6.0	5.35	13	0	5.1	12.35		0	119	714	714	1.41	15.0	250					2.88	523			1509
7.0	2.95	7.7		2.9	7.05		0	113	789	789	1.45	7.6	145					2.24	302			676
8.0	4.45	11.8		4.2	11.15		0	118	907	907	1.63	9.8	240					2.48	500			1240
9.0	4.75	11.8	0	4.6	11.15		0	118	1025	1025	1.44	9.3	229					2.43	478			1160
10.0	5.45	12.4		5.3	11.75		0	119	1187	1187	1.23	9.3	225					2.42	470			1139
11.0	5.3	13.2		5.1	12.55		0	119	1307	1307	1.48	8.1	260					2.30	542			1245
12.0	6.15	15	0	5.9	14.35		0	121	1428	1428	1.44	8.6	294					2.35	614			1446
13.0	6.05	14.8		5.8	14.15		0	121	1571	1571	1.45	7.7	291					2.24	607			1362
14.0	7.15	16.8		6.8	16.15		0	122	1693	1693	1.36	8.4	323					2.33	675			1576
15.0	8.35	19	0	8.0	18.35		0	124	1817	1817	1.30	9.2	360					2.42	751			1815
16.0	11	26.4		10.4	25.75		0	128	2052	2052	1.48	10.6	533					2.55	1113			2842
17.0	8.55	25.4		7.9	24.75		0	127	2179	2179	2.14	7.5	586				39.2	2.24	1223			2740
18.0	11.6	30	0	10.8	29.35		0	130	2309	2309	1.71	9.8	642					2.48	1341			3328
19.0	6.4	21.6		5.8	20.95		0	124	2365	2365	2.61	5.1	526				37.3	1.90	1098			2088
20.0	15.6	41.8		14.5	41.15		0	134	2499	2499	1.85	12.1	926				41.3	2.68	1935			5183



DILATOMETER TEST RESULTS

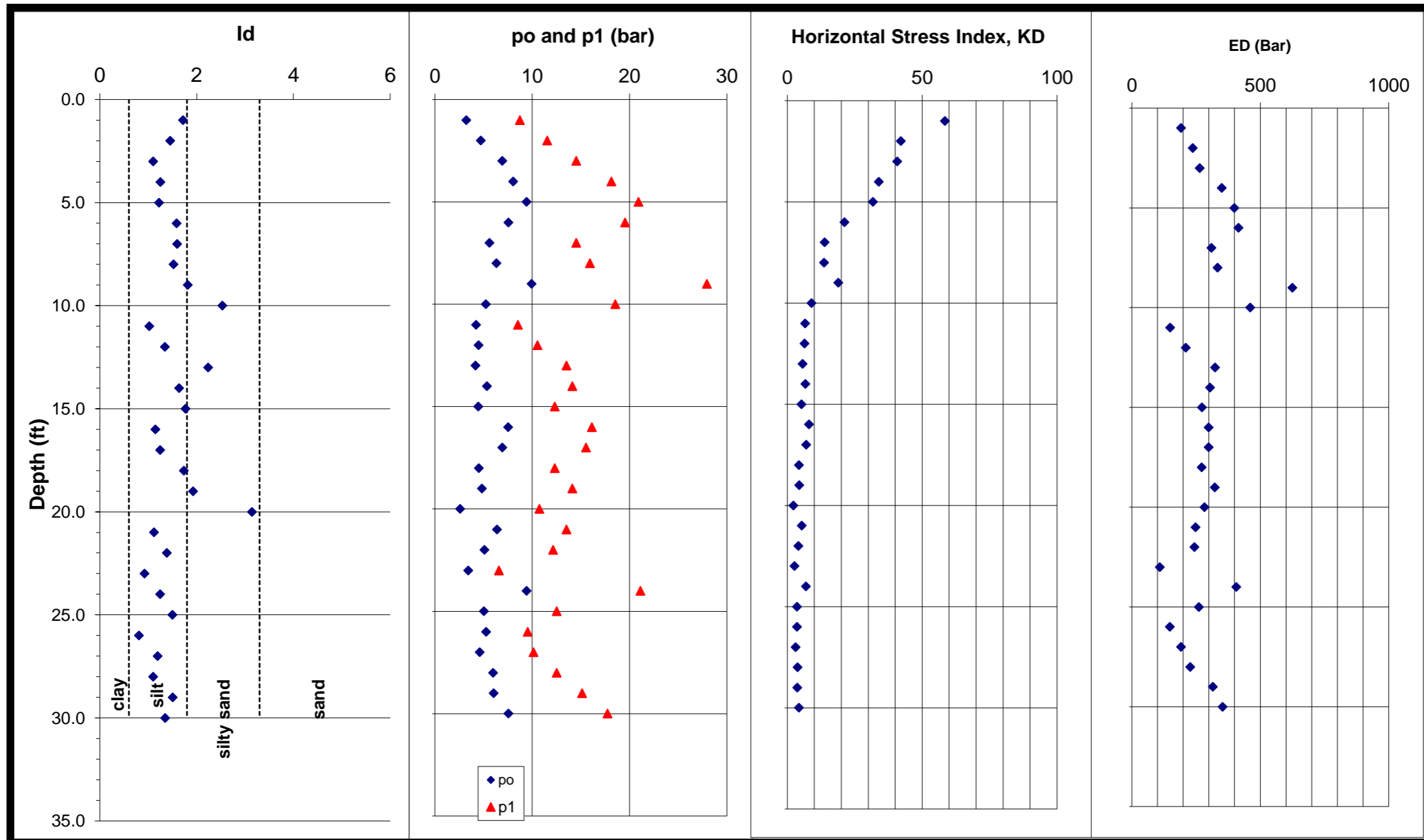
Test ID: STR5_EB1_B3
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR5_EB1_B3
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/20/16
 Sounding No: STR5_EB1_B3
 Ground Water Depth (ft): N/A

	Membrane 1	Membrane 2	Membrane 3
$\Delta A =$	0.175	0	0
$\Delta B =$	0.475	0	0
Zm=	0	bar	

Northing 874621
 Longitude: 1777567
 Elevation 875.8

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



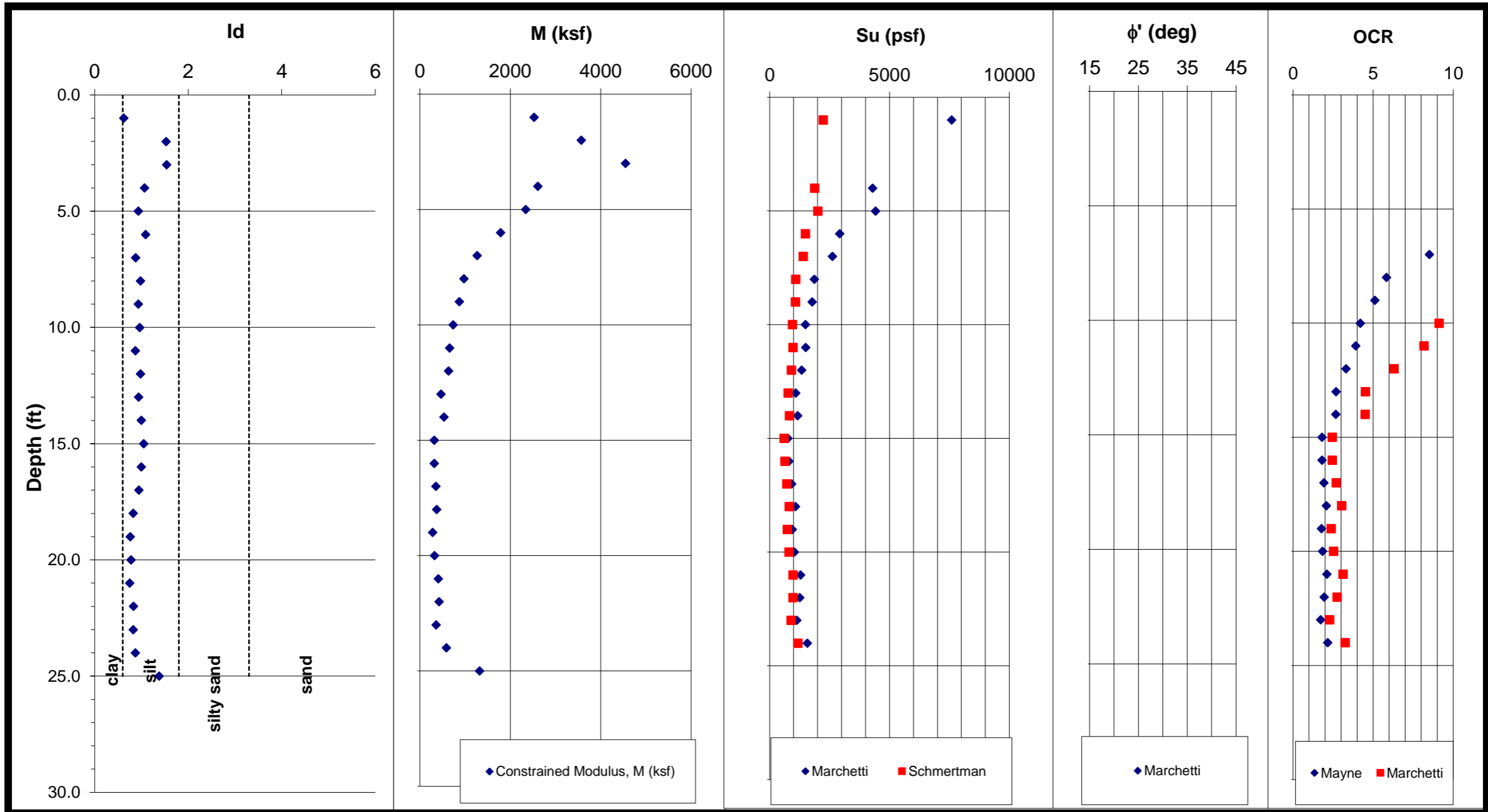
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	p _o (bar)	p ₁ (bar)	p ₂ (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	l _d	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	3.3	9.2		3.2	8.725		0	115	115	115	1.72	58.4	191					4.17	400			1666
2.0	4.85	12		4.7	11.525		0	118	233	233	1.45	42.1	237					3.86	495			1910
3.0	7.1	15	0	6.9	14.525		0	121	355	355	1.10	40.7	264	4.1	20.7	110.1		3.83	552	3373	1444	2113
4.0	8.35	18.6		8.0	18.125		0	124	496	496	1.25	33.9	350					3.66	731			2670
5.0	9.8	21.4		9.4	20.925		0	126	622	622	1.22	31.7	399					3.59	833			2993
6.0	7.95	20	0.6	7.6	19.525	0.78	0	125	746	746	1.58	21.1	415					3.21	867			2784
7.0	5.85	15		5.6	14.525		0	121	847	847	1.59	13.8	310					2.81	647			1815
8.0	6.6	16.4		6.3	15.925		0	122	969	969	1.52	13.6	333					2.79	696			1944
9.0	10.6	28.4	1.1	9.9	27.925	1.28	0	129	1098	1098	1.82	18.9	625				43.2	3.10	1305			4047
10.0	5.7	19		5.2	18.525		0	123	1230	1230	2.53	8.9	461				40.0	2.40	963			2306
11.0	4.25	9		4.2	8.525		0	115	1345	1345	1.02	6.6	149	1.4	3.3	6.4		2.08	312	1304	881	648
12.0	4.6	11	0	4.5	10.525		0	117	1463	1463	1.35	6.4	210					2.07	438			904
13.0	4.45	14		4.2	13.525		0	120	1554	1554	2.24	5.6	324				37.8	1.97	677			1335
14.0	5.6	14.6		5.4	14.125		0	121	1674	1674	1.64	6.7	304					2.11	635			1343
15.0	4.65	12.8	0	4.5	12.325		0	119	1793	1793	1.77	5.2	273					1.88	571			1071
16.0	7.75	16.6		7.5	16.125		0	123	1961	1961	1.15	8.0	299	1.6	4.1	8.7		2.28	624	2442	1570	1422
17.0	7.15	16		6.9	15.525		0	122	2083	2083	1.25	6.9	299					2.14	624			1335
18.0	4.7	12.8	0	4.5	12.325		0	119	2202	2202	1.74	4.3	271					1.69	567			959
19.0	5.1	14.6		4.8	14.125		0	120	2287	2287	1.92	4.4	322				36.5	1.73	673			1167
20.0	2.8	11.2		2.6	10.725		0	116	2403	2403	3.14	2.2	282				32.9	1.20	590			710
21.0	6.55	14	0	6.4	13.525		0	120	2523	2523	1.12	5.3	248	1.2	2.7	4.6		1.87	517	1870	1334	967
22.0	5.25	12.6		5.1	12.125		0	119	2618	2618	1.38	4.1	244					1.62	510			827
23.0	3.4	7.05		3.4	6.575		0	112	2730	2730	0.92	2.6	109	0.7	1.3	1.5		1.16	228	842	715	264
24.0	9.8	21.6	0	9.4	21.125		0	126	2856	2856	1.24	6.9	406					2.13	848			1810
25.0	5.2	13		5.0	12.525		0	119	2983	2983	1.50	3.5	261					1.49	544			810
26.0	5.3	10		5.3	9.525		0	116	3099	3099	0.81	3.6	148	0.9	1.8	2.5		1.45	308	1398	1101	448
27.0	4.7	10.6	0	4.6	10.125		0	117	3216	3216	1.20	3.0	191	0.8	1.5	1.9		1.31	400	1172	963	524
28.0	6.1	13		6.0	12.525		0	120	3347	3347	1.10	3.7	228	0.9	1.9	2.6		1.52	476	1600	1245	722
29.0	6.3	15.6		6.0	15.125		0	122	3469	3469	1.50	3.6	315					1.52	658			1003
30.0	7.85	18.2	0	7.5	17.725		0	124	3709	3709	1.35	4.2	353					1.66	738			1228



DILATOMETER TEST RESULTS

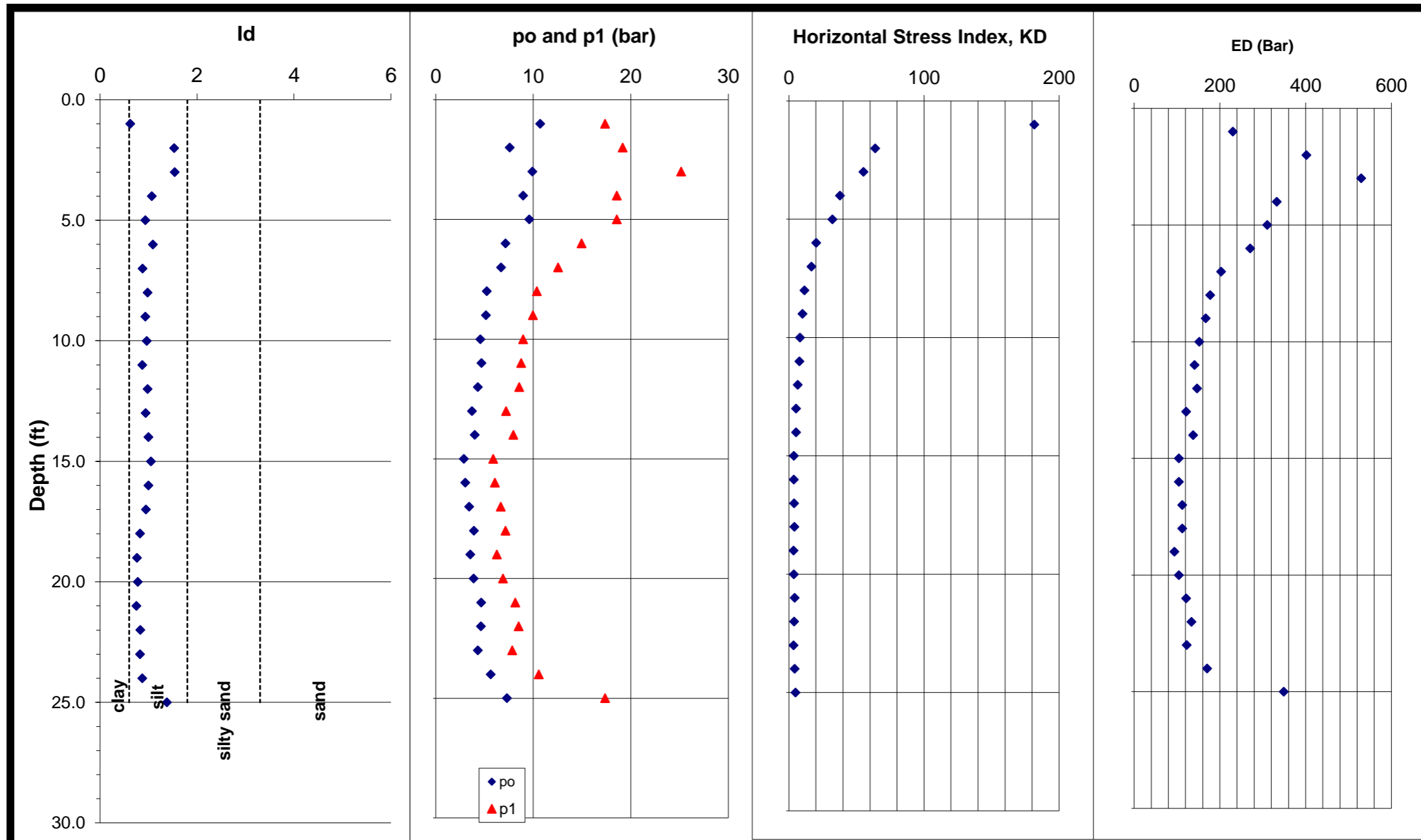
Test ID: STR5_EB2_B1
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR5_EB2_B1
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/21/16
 Sounding No: STR5_EB2_B1
 Ground Water Depth (ft): N/A

	Membrane 1	Membrane 2	Membrane 3
$\Delta A =$	0.225	0	0
$\Delta B =$	0.25	0	0
Zm=	0	bar	

Northing 874655
 Easting 1777453
 Elevation 873.0

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



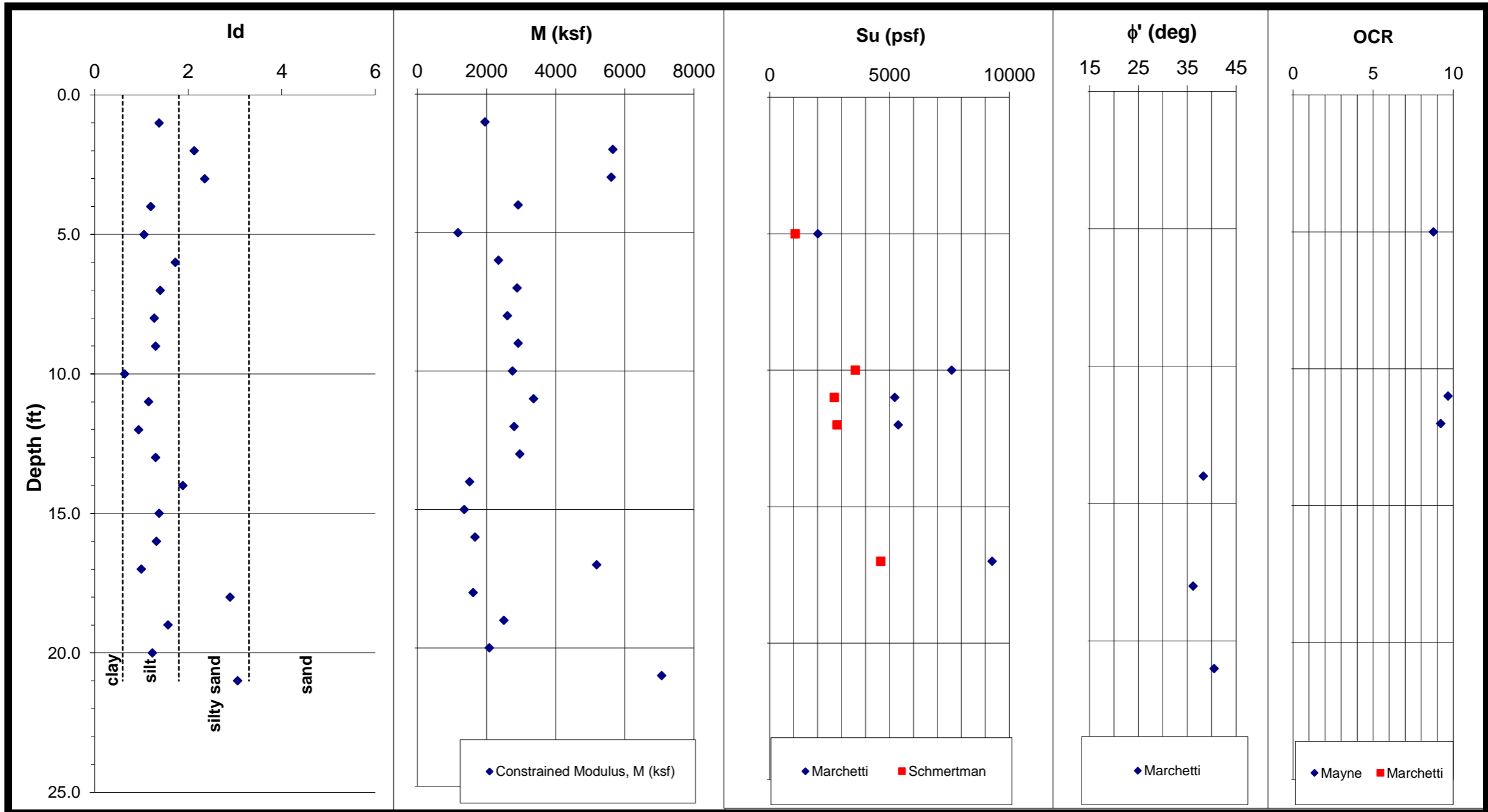
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	p _o (bar)	p ₁ (bar)	p ₂ (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	l _d	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	10.8	17.6		10.7	17.35		0	123	123	123	0.62	181.6	230	8.9	92.4	1134.0		5.24	481	7594	2237	2524
2.0	7.9	19.4		7.6	19.15		0	124	248	248	1.53	63.9	402					4.26	839			3570
3.0	10.4	25.4	0.15	9.9	25.15	0.38	0	128	376	376	1.54	55.1	529					4.11	1105			4548
4.0	9.2	18.8		9.0	18.55		0	124	497	497	1.07	37.7	332	3.9	19.2	97.5		3.76	694	4292	1873	2608
5.0	9.8	18.8		9.6	18.55		0	124	622	622	0.93	32.2	311	3.6	16.4	76.5		3.61	649	4419	2005	2341
6.0	7.3	15.2	0	7.2	14.95		0	122	743	743	1.09	20.1	271	2.8	10.2	36.6		3.16	565	2926	1494	1786
7.0	6.75	12.8		6.7	12.55		0	120	837	837	0.87	16.7	203	2.5	8.5	27.4		2.99	424	2616	1399	1267
8.0	5.25	10.6		5.2	10.35		0	117	954	954	0.98	11.5	178	2.0	5.8	15.2		2.63	371	1859	1093	975
9.0	5.15	10.2	0	5.1	9.95		0	117	1071	1071	0.93	10.0	167	1.8	5.1	12.4		2.50	348	1770	1075	872
10.0	4.55	9.2		4.6	8.95		0	116	1156	1156	0.96	8.3	152	1.6	4.2	9.1		2.31	318	1495	954	733
11.0	4.65	9		4.7	8.75		0	115	1271	1271	0.87	7.7	141	1.6	3.9	8.2		2.24	295	1506	978	659
12.0	4.3	8.8	0	4.3	8.55		0	115	1386	1386	0.98	6.5	147	1.4	3.3	6.3		2.07	306	1334	903	634
13.0	3.65	7.45		3.7	7.2		0	113	1470	1470	0.94	5.3	121	1.2	2.7	4.5		1.86	253	1085	775	470
14.0	3.95	8.2		4.0	7.95		0	114	1585	1585	0.99	5.3	138	1.2	2.7	4.5		1.86	287	1166	833	533
15.0	2.8	6.15	0	2.9	5.9		0	111	1695	1695	1.05	3.5	105	0.9	1.8	2.4		1.47	219	764	602	321
16.0	2.95	6.3		3.0	6.05		0	111	1779	1779	1.00	3.6	105	0.9	1.8	2.5		1.47	219	804	633	321
17.0	3.35	6.9		3.4	6.65		0	112	1891	1891	0.94	3.8	112	0.9	1.9	2.7		1.52	234	922	715	357
18.0	3.85	7.4	0	3.9	7.15		0	113	2004	2004	0.82	4.1	112	1.0	2.1	3.0		1.60	234	1077	819	373
19.0	3.45	6.5		3.5	6.25		0	111	2117	2117	0.76	3.5	94	0.9	1.8	2.4		1.43	196	937	741	281
20.0	3.8	7.15		3.9	6.9		0	113	2230	2230	0.78	3.6	105	0.9	1.9	2.5		1.47	219	1035	811	323
21.0	4.6	8.4	0	4.7	8.15		0	114	2344	2344	0.75	4.2	121	1.0	2.1	3.1		1.61	253	1285	973	407
22.0	4.6	8.75		4.6	8.5		0	115	2529	2529	0.83	3.8	134	1.0	2.0	2.8		1.53	280	1255	969	428
23.0	4.25	8.1		4.3	7.85		0	114	2643	2643	0.82	3.4	123	0.9	1.7	2.3		1.41	257	1130	899	362
24.0	5.65	10.8	0	5.6	10.55		0	117	2761	2761	0.87	4.3	170	1.0	2.2	3.3		1.64	356	1566	1178	584
25.0	7.55	17.6		7.3	17.35		0	123	3084	3084	1.38	4.9	349					1.81	729			1321



DILATOMETER TEST RESULTS

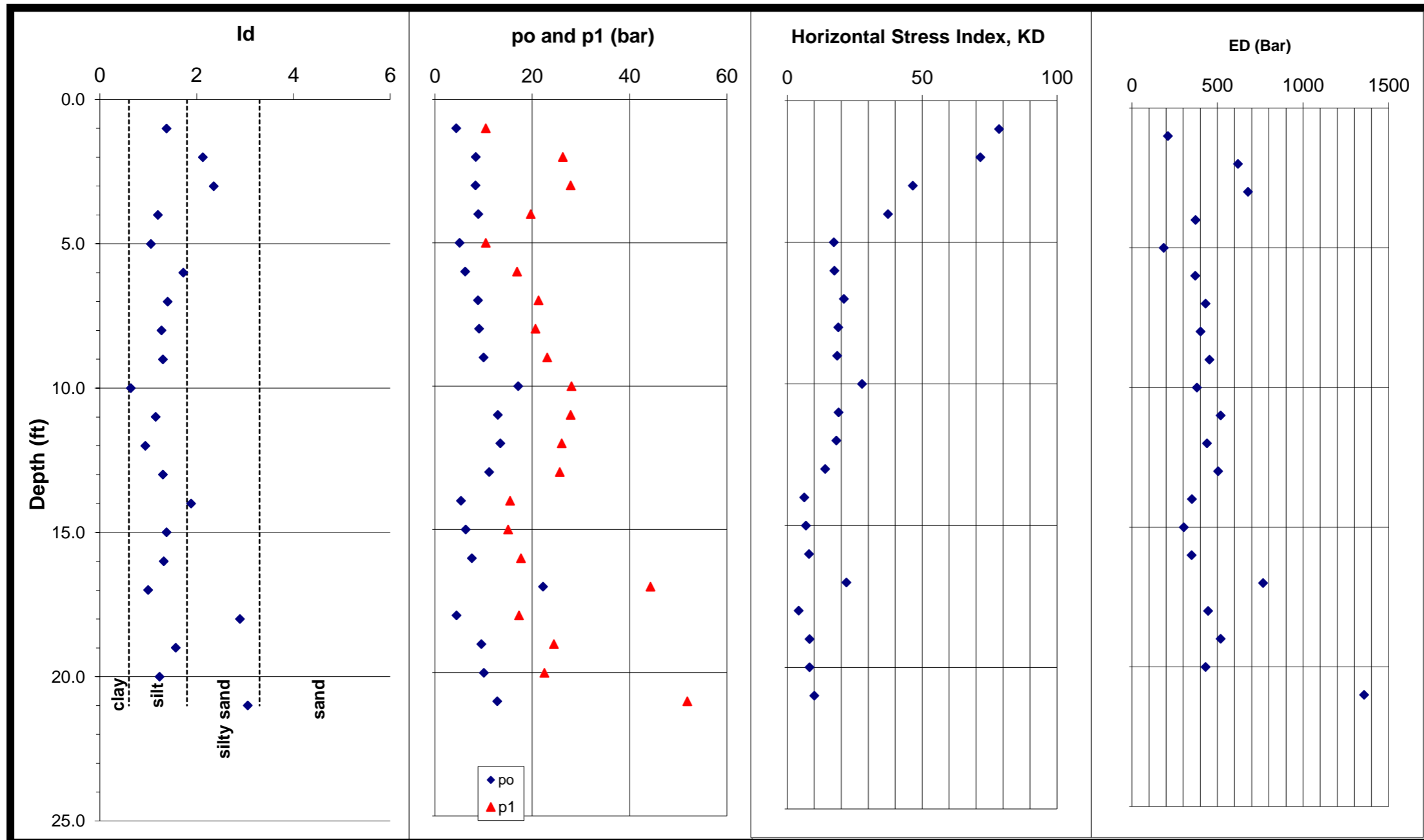
Test ID: STR5_EB2_B2
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR5_EB2_B2
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/21/16
 Sounding No: STR5_EB2_B2
 Ground Water Depth (ft): N/A

	Membrane 1	Membrane 2	Membrane 3
$\Delta A =$	0.25	0	0
$\Delta B =$	0.125	0	0
Zm=	0	bar	

Northing 874591
 Easting 1777450
 Elevation 874.0

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



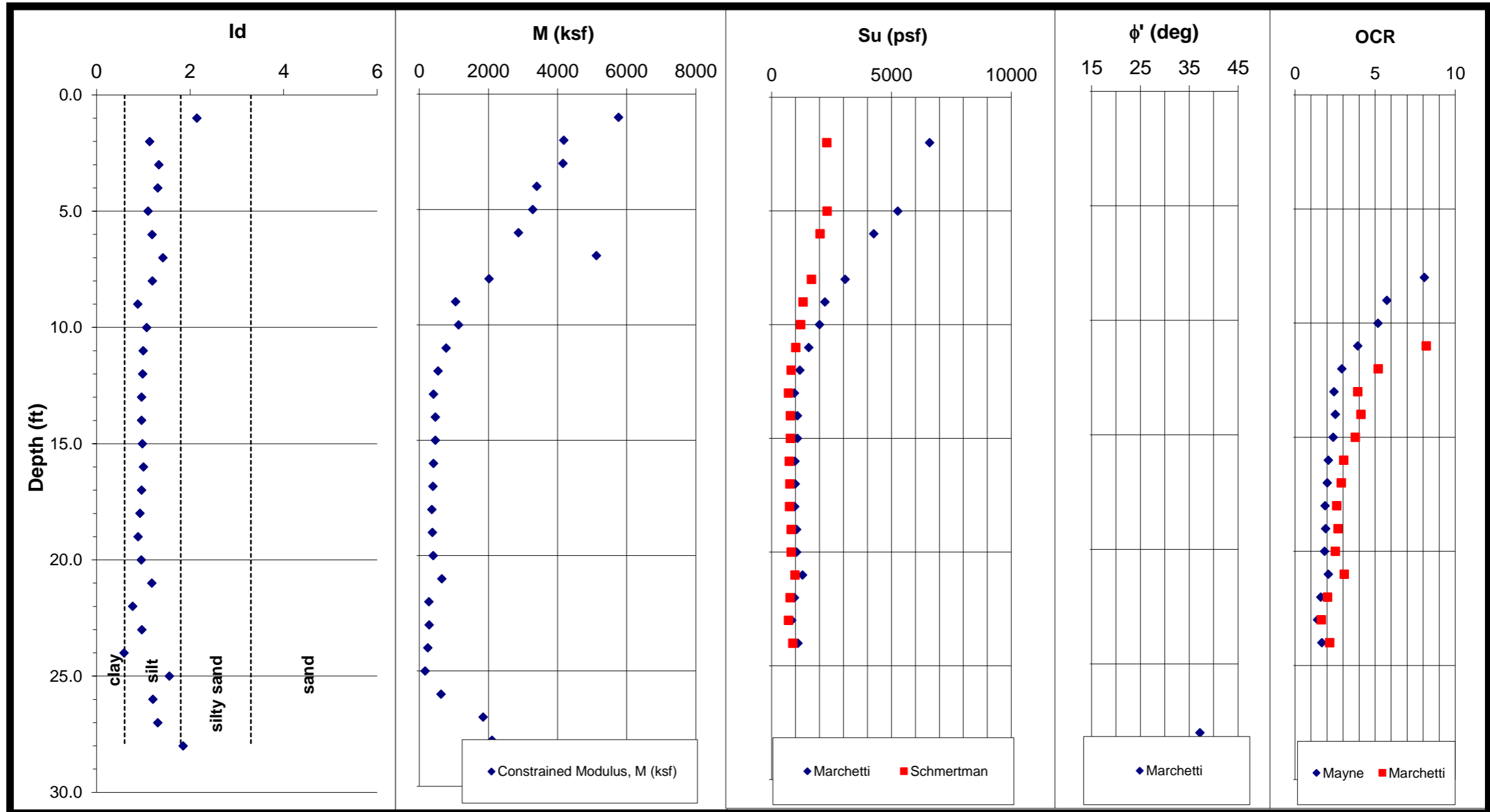
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	p _o (bar)	p ₁ (bar)	p ₂ (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	l _d	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	4.45	10.6		4.4	10.475		0	117	117	117	1.37	78.6	210					4.45	439			1956
2.0	9	26.4		8.4	26.275		0	128	245	245	2.13	71.6	620				47.9	4.36	1296			5653
3.0	9	28	0	8.3	27.875		0	128	373	373	2.35	46.5	679				46.5	3.96	1417			5606
4.0	9.2	19.8		8.9	19.675		0	125	500	500	1.20	37.3	373					3.75	778			2916
5.0	5.1	10.6		5.1	10.475		0	117	618	618	1.06	17.2	187	2.5	8.8	28.8		3.01	390	2005	1064	1176
6.0	6.45	17	0	6.2	16.875		0	123	740	740	1.73	17.5	371					3.03	774			2345
7.0	9.2	21.4		8.9	21.275		0	126	881	881	1.40	21.0	431					3.20	900			2882
8.0	9.4	20.8		9.1	20.675		0	126	1007	1007	1.27	18.9	402					3.10	839			2602
9.0	10.4	23.2	0.15	10.0	23.075	0.40	0	127	1134	1134	1.30	18.5	453					3.08	945			2913
10.0	17.4	28.2		17.1	28.075		0	129	1293	1293	0.64	27.7	380	3.3	14.1	60.3		3.46	793	7590	3577	2748
11.0	13.4	28		12.9	27.875		0	129	1422	1422	1.15	19.0	518	2.7	9.7	33.5		3.11	1082	5219	2702	3364
12.0	13.8	26.2	0.95	13.4	26.075	1.20	0	129	1551	1551	0.94	18.1	438	2.6	9.2	31.1		3.06	915	5360	2809	2802
13.0	11.6	25.8		11.2	25.675		0	128	1668	1668	1.30	14.0	504					2.82	1052			2963
14.0	5.6	15.6		5.4	15.475		0	122	1790	1790	1.88	6.3	351				38.3	2.06	732			1509
15.0	6.5	15.2	0.25	6.3	15.075	0.50	0	122	1912	1912	1.38	6.9	303					2.14	633			1357
16.0	7.85	17.8		7.6	17.675		0	124	1978	1978	1.32	8.0	349					2.29	729			1667
17.0	23	44.4		22.2	44.275		0	136	2114	2114	0.99	21.9	766	2.9	11.2	41.9		3.24	1600	9281	4636	5190
18.0	4.8	17.4	0	4.4	17.275		0	122	2235	2235	2.89	4.1	445				36.2	1.73	930			1609
19.0	10	24.6		9.5	24.475		0	128	2423	2423	1.57	8.2	518					2.31	1082			2502
20.0	10.4	22.6		10.1	22.475		0	127	2549	2549	1.23	8.2	431					2.31	900			2078
21.0	14.4	52	0	12.8	51.875		0	136	2685	2685	3.06	9.9	1356				40.5	2.50	2833			7069



DILATOMETER TEST RESULTS

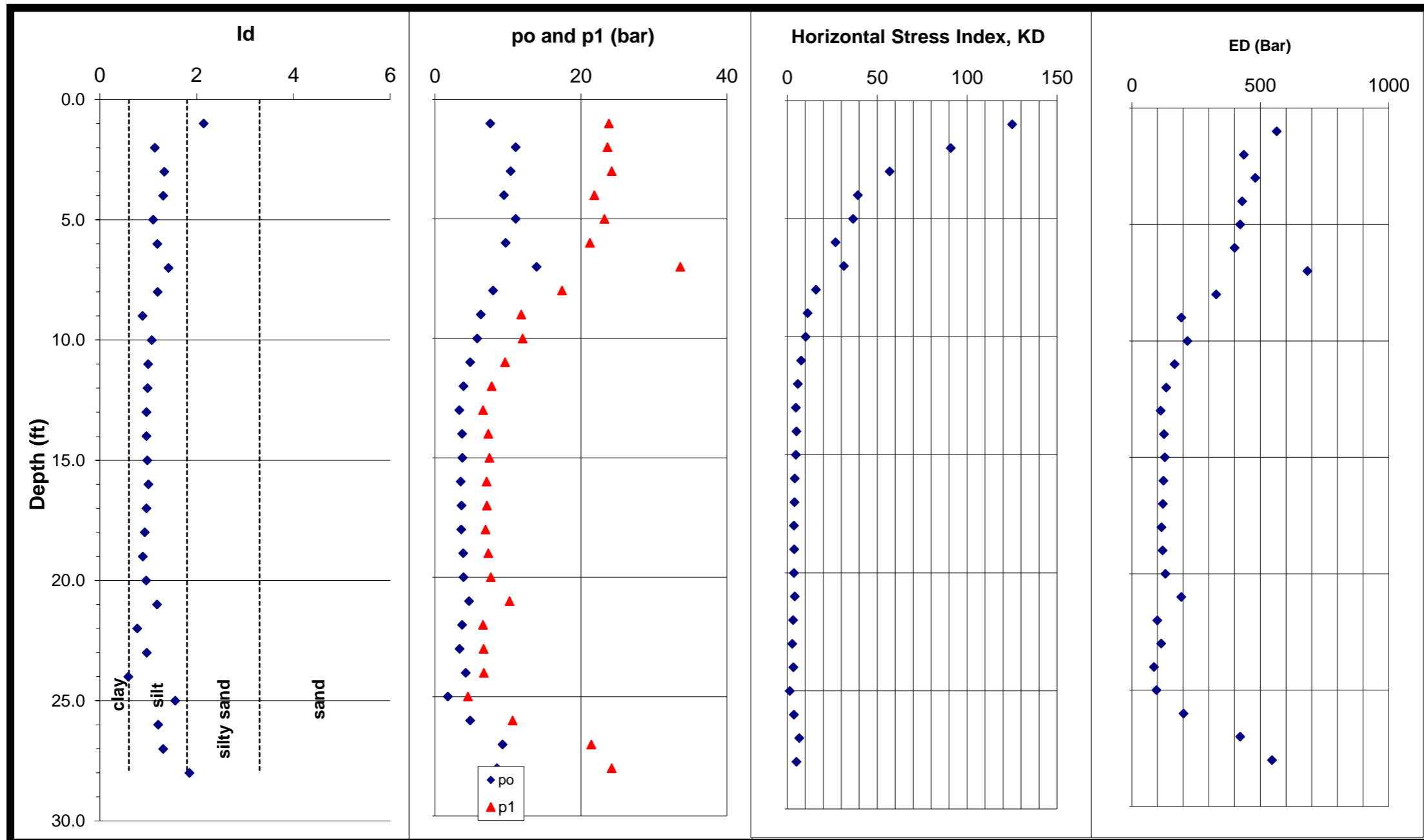
Test ID: STR5_EB2_B3
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR5_EB2_B3
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/21/16
 Sounding No: STR5_EB2_B3
 Ground Water Depth (ft): N/A

Membrane 1 Membrane 2 Membrane 3
 $\Delta A =$ 0.25 0 0
 $\Delta B =$ 0.175 0 0
 $Z_m =$ 0 bar

Northing 874627
 Easting 1777441
 Elevation 873.4

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



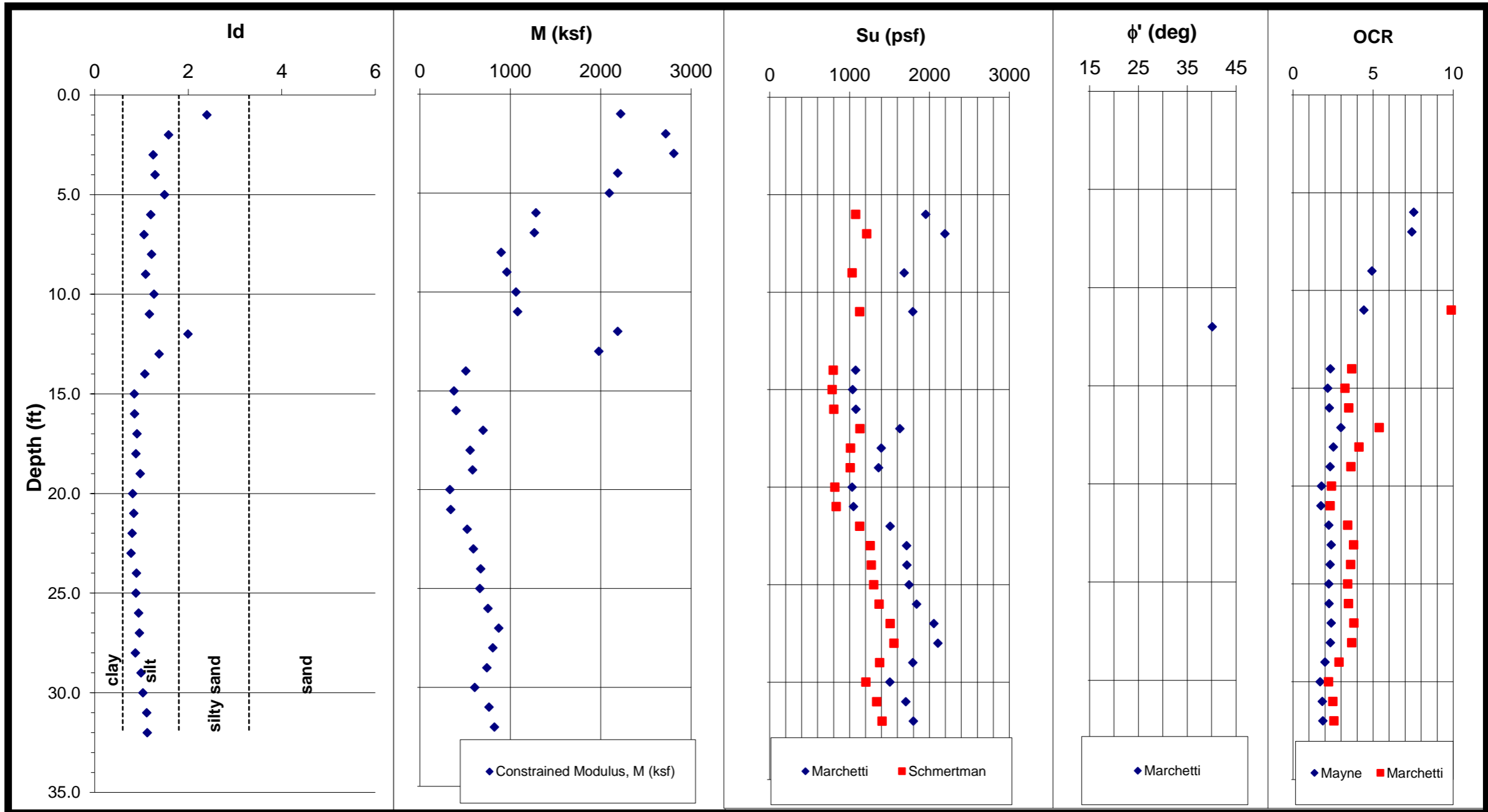
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	p _o (bar)	p ₁ (bar)	p ₂ (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	l _d	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	8.1	24		7.6	23.825		0	127	127	127	2.14	125.0	564				49.4	4.89	1178			5760
2.0	11.4	23.8		11.1	23.625		0	127	254	254	1.14	90.9	436	6.3	46.3	385.2		4.59	911	6592	2308	4182
3.0	10.8	24.4	0	10.4	24.225		0	128	382	382	1.33	56.9	480					4.15	1003			4157
4.0	9.8	22		9.5	21.825		0	126	505	505	1.31	39.1	429					3.79	896			3397
5.0	11.4	23.4		11.1	23.225		0	127	632	632	1.10	36.6	422	3.9	18.6	93.1		3.73	881	5260	2312	3283
6.0	10	21.4	0	9.7	21.225		0	126	758	758	1.19	26.7	400	3.3	13.6	57.1		3.43	835	4261	2026	2865
7.0	14.6	33.8		13.9	33.625		0	132	922	922	1.42	31.5	684					3.59	1429			5124
8.0	8.15	17.6		7.9	17.425		0	124	1046	1046	1.19	15.9	329	2.4	8.1	25.3		2.94	687	3065	1660	2017
9.0	6.3	12	0.5	6.3	11.825	0.75	0	119	1165	1165	0.88	11.3	192	2.0	5.7	14.8		2.61	401	2225	1313	1049
10.0	5.85	12.2		5.8	12.025		0	119	1191	1191	1.07	10.2	216	1.9	5.2	12.7		2.52	451	2003	1212	1135
11.0	4.8	9.8		4.8	9.625		0	116	1307	1307	1.00	7.7	167	1.6	3.9	8.2		2.24	348	1552	1007	780
12.0	3.85	7.95	0	3.9	7.775		0	114	1421	1421	0.99	5.8	134	1.3	2.9	5.2		1.95	280	1172	818	545
13.0	3.25	6.75		3.3	6.575		0	112	1457	1457	0.96	4.8	112	1.1	2.4	3.9		1.76	234	957	699	413
14.0	3.65	7.5		3.7	7.325		0	113	1570	1570	0.96	5.0	125	1.2	2.5	4.1		1.80	261	1075	779	469
15.0	3.7	7.65	0	3.8	7.475		0	114	1684	1684	0.98	4.7	128	1.1	2.4	3.8		1.74	268	1072	788	467
16.0	3.45	7.25		3.5	7.075		0	113	1807	1807	1.00	4.1	123	1.0	2.1	3.0		1.61	257	970	738	412
17.0	3.55	7.3		3.6	7.125		0	113	1920	1920	0.96	4.0	121	1.0	2.0	2.9		1.57	253	990	759	397
18.0	3.5	7.1	0	3.6	6.925		0	113	2032	2032	0.93	3.7	116	0.9	1.9	2.6		1.50	242	962	750	362
19.0	3.8	7.5		3.9	7.325		0	113	2152	2152	0.88	3.8	119	0.9	1.9	2.7		1.52	249	1046	812	378
20.0	3.85	7.85		3.9	7.675		0	114	2266	2266	0.96	3.6	130	0.9	1.8	2.5		1.48	272	1044	819	403
21.0	4.7	10.4	0	4.7	10.225		0	117	2383	2383	1.18	4.1	192	1.0	2.1	3.1		1.62	401	1289	979	651
22.0	3.6	6.75		3.7	6.575		0	112	2464	2464	0.77	3.1	99	0.8	1.6	2.0		1.33	207	956	776	275
23.0	3.3	6.85		3.4	6.675		0	112	2576	2576	0.97	2.8	114	0.7	1.4	1.6		1.21	238	844	709	287
24.0	4.1	6.9	0	4.2	6.725		0	112	2688	2688	0.59	3.3	87	0.8	1.7	2.2		1.36	181	1101	884	246
25.0	1.65	4.7		1.8	4.525		0	108	2693	2693	1.56	1.4	96					0.85	200			170
26.0	4.85	10.8		4.8	10.625		0	118	2810	2810	1.20	3.6	201					1.49	420			626
27.0	9.6	21.6	0	9.3	21.425		0	126	2936	2936	1.31	6.6	422					2.09	881			1843
28.0	9	24.4		8.5	24.225		0	127	3559	3559	1.85	5.0	546				37.2	1.84	1140			2101



DILATOMETER TEST RESULTS

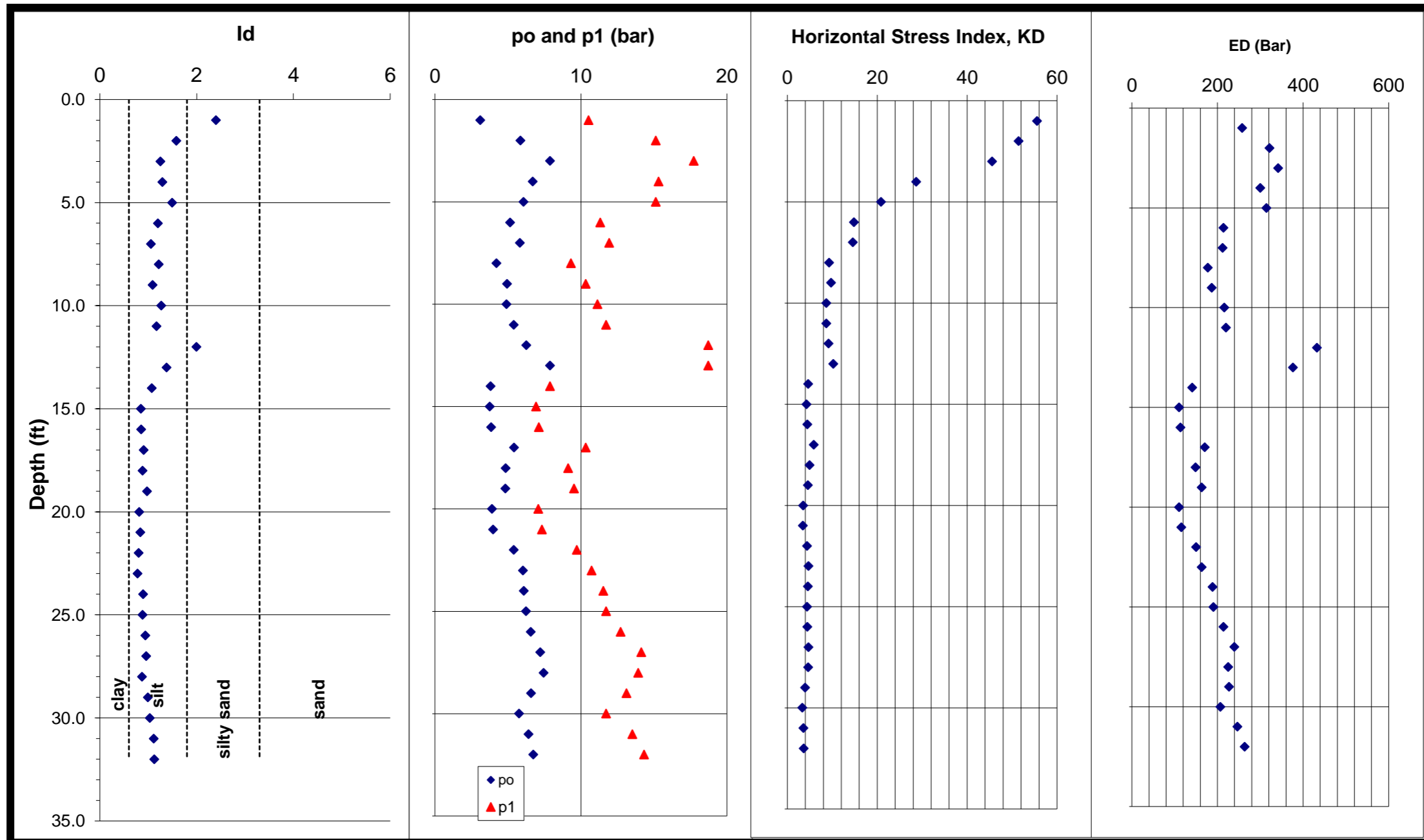
Test ID: STR6_EB1_B1
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR6_EB1_B1
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/20/16
 Sounding No: STR6_EB1_B1
 Ground Water Depth (ft): N/A

	Membrane 1	Membrane 2	Membrane 3
$\Delta A =$	0.2	0	0
$\Delta B =$	0.275	0	0
Zm=	0	bar	

Northing 874663
 Easting 1777566
 Elevation 877.3

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



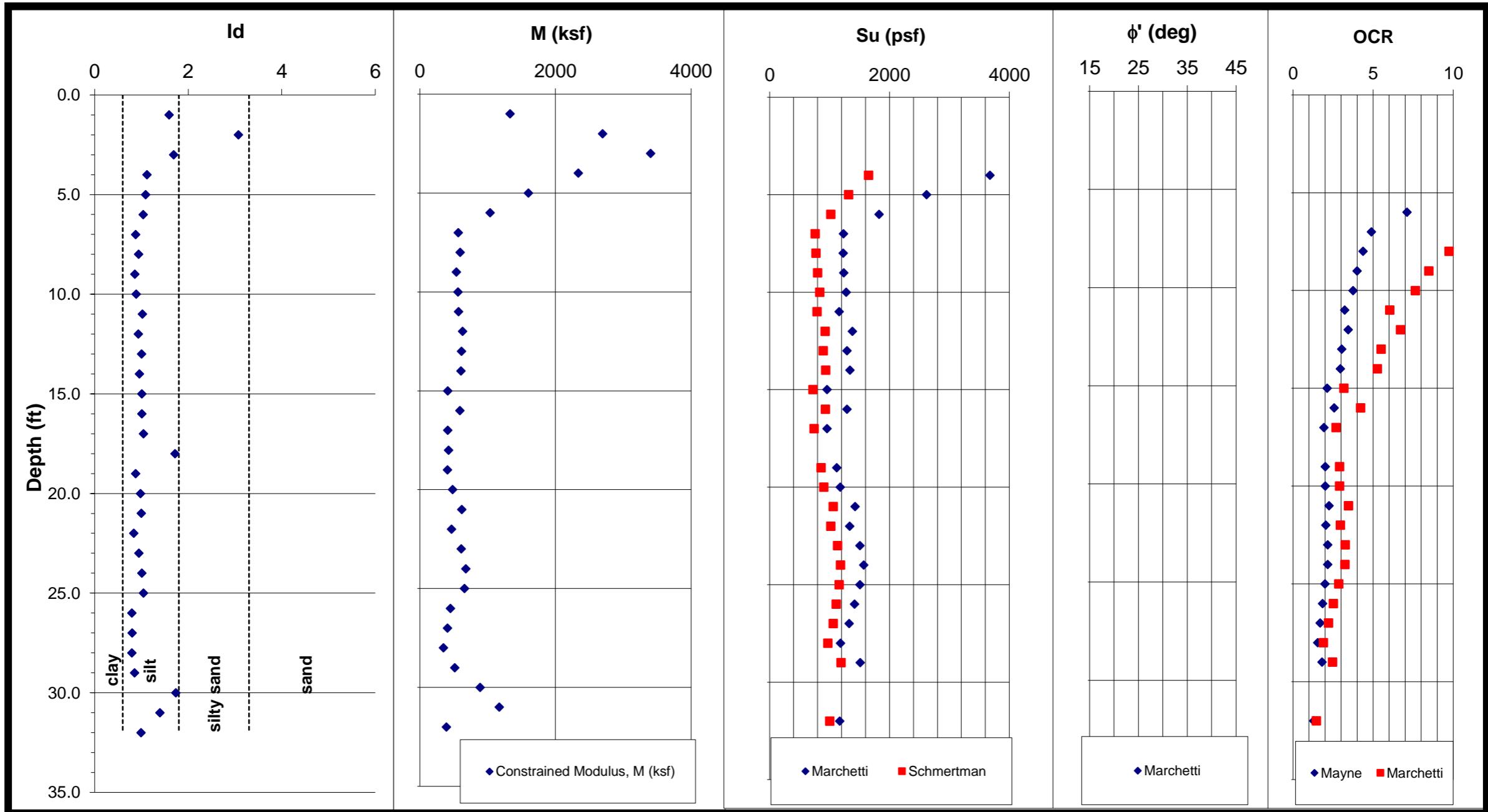
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	p _o (bar)	p ₁ (bar)	p ₂ (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	l _d	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	3.25	10.8		3.1	10.525		0	116	116	116	2.40	55.6	258				47.1	4.12	538			2220
2.0	6.1	15.4		5.9	15.125		0	122	238	238	1.58	51.4	322					4.05	672			2720
3.0	8.15	18	0	7.9	17.725		0	124	362	362	1.25	45.5	342					3.93	713			2807
4.0	6.9	15.6		6.7	15.325		0	122	488	488	1.29	28.7	300					3.50	626			2189
5.0	6.3	15.4		6.1	15.125		0	122	609	609	1.49	20.8	314					3.19	656			2096
6.0	5.25	11.6	0	5.2	11.325		0	118	727	727	1.20	14.8	214	2.3	7.5	22.7		2.87	447	1954	1077	1284
7.0	5.9	12.2		5.8	11.925		0	119	833	833	1.05	14.6	212	2.3	7.4	22.1		2.86	443	2192	1213	1266
8.0	4.25	9.6		4.2	9.325		0	116	949	949	1.22	9.3	178					2.42	371			899
9.0	5	10.6	0	4.9	10.325		0	117	1066	1066	1.09	9.7	187	1.8	4.9	11.7		2.47	390	1685	1033	963
10.0	5	11.4		4.9	11.125		0	118	1181	1181	1.27	8.7	216					2.36	451			1064
11.0	5.5	12		5.4	11.725		0	119	1299	1299	1.17	8.7	220	1.7	4.4	9.9		2.36	458	1790	1128	1082
12.0	6.65	19	0	6.3	18.725		0	124	1423	1423	1.99	9.2	433				40.1	2.42	904			2187
13.0	8.2	19		7.9	18.725		0	124	1616	1616	1.38	10.2	376					2.52	786			1978
14.0	3.8	8.15		3.8	7.875		0	114	1730	1730	1.07	4.6	141	1.1	2.3	3.7		1.73	295	1077	795	509
15.0	3.7	7.2	0	3.7	6.925		0	113	1843	1843	0.85	4.2	110	1.0	2.2	3.2		1.64	230	1040	783	377
16.0	3.8	7.4		3.8	7.125		0	113	1807	1807	0.85	4.4	114	1.1	2.3	3.5		1.68	238	1078	803	400
17.0	5.45	10.6		5.4	10.325		0	117	1925	1925	0.91	5.9	170	1.3	3.0	5.4		1.97	356	1629	1131	699
18.0	4.85	9.4	0	4.8	9.125		0	116	2040	2040	0.88	5.0	148	1.2	2.5	4.1		1.79	310	1397	1012	556
19.0	4.85	9.8		4.8	9.525		0	116	2210	2210	0.97	4.6	163	1.1	2.3	3.6		1.71	341	1363	1008	584
20.0	3.85	7.35		3.9	7.075		0	113	2323	2323	0.81	3.5	110	0.9	1.8	2.4		1.44	230	1031	814	332
21.0	3.95	7.6	0	4.0	7.325		0	113	2436	2436	0.84	3.4	116	0.9	1.7	2.3		1.42	242	1049	834	342
22.0	5.4	10		5.4	9.725		0	116	2563	2563	0.80	4.4	150	1.1	2.2	3.4		1.67	314	1509	1127	524
23.0	6.05	11		6.0	10.725		0	118	2680	2680	0.78	4.7	163	1.1	2.4	3.8		1.73	341	1714	1259	590
24.0	6.15	11.8	0	6.1	11.525		0	119	2799	2799	0.89	4.5	189	1.1	2.3	3.6		1.71	394	1718	1272	672
25.0	6.3	12		6.2	11.725		0	119	2968	2968	0.88	4.4	190	1.1	2.2	3.4		1.67	398	1745	1303	664
26.0	6.65	13		6.6	12.725		0	120	3088	3088	0.94	4.4	214	1.1	2.3	3.5		1.68	447	1838	1369	753
27.0	7.35	14.4	0	7.2	14.125		0	121	3209	3209	0.96	4.7	240	1.1	2.4	3.8		1.74	500	2054	1508	872
28.0	7.55	14.2		7.4	13.925		0	121	3382	3382	0.87	4.6	225	1.1	2.3	3.7		1.72	470	2105	1554	807
29.0	6.7	13.4		6.6	13.125		0	120	3502	3502	0.99	3.9	227	1.0	2.0	2.9		1.57	474	1792	1376	742
30.0	5.85	12	0	5.8	11.725		0	119	3621	3621	1.03	3.3	207	0.9	1.7	2.2		1.40	432	1504	1204	606
31.0	6.55	13.8		6.4	13.525		0	120	3734	3734	1.11	3.6	247	0.9	1.8	2.5		1.48	516	1704	1339	765
32.0	6.9	14.6		6.7	14.325		0	121	3855	3855	1.13	3.7	263	0.9	1.9	2.6		1.50	550	1799	1407	826



DILATOMETER TEST RESULTS

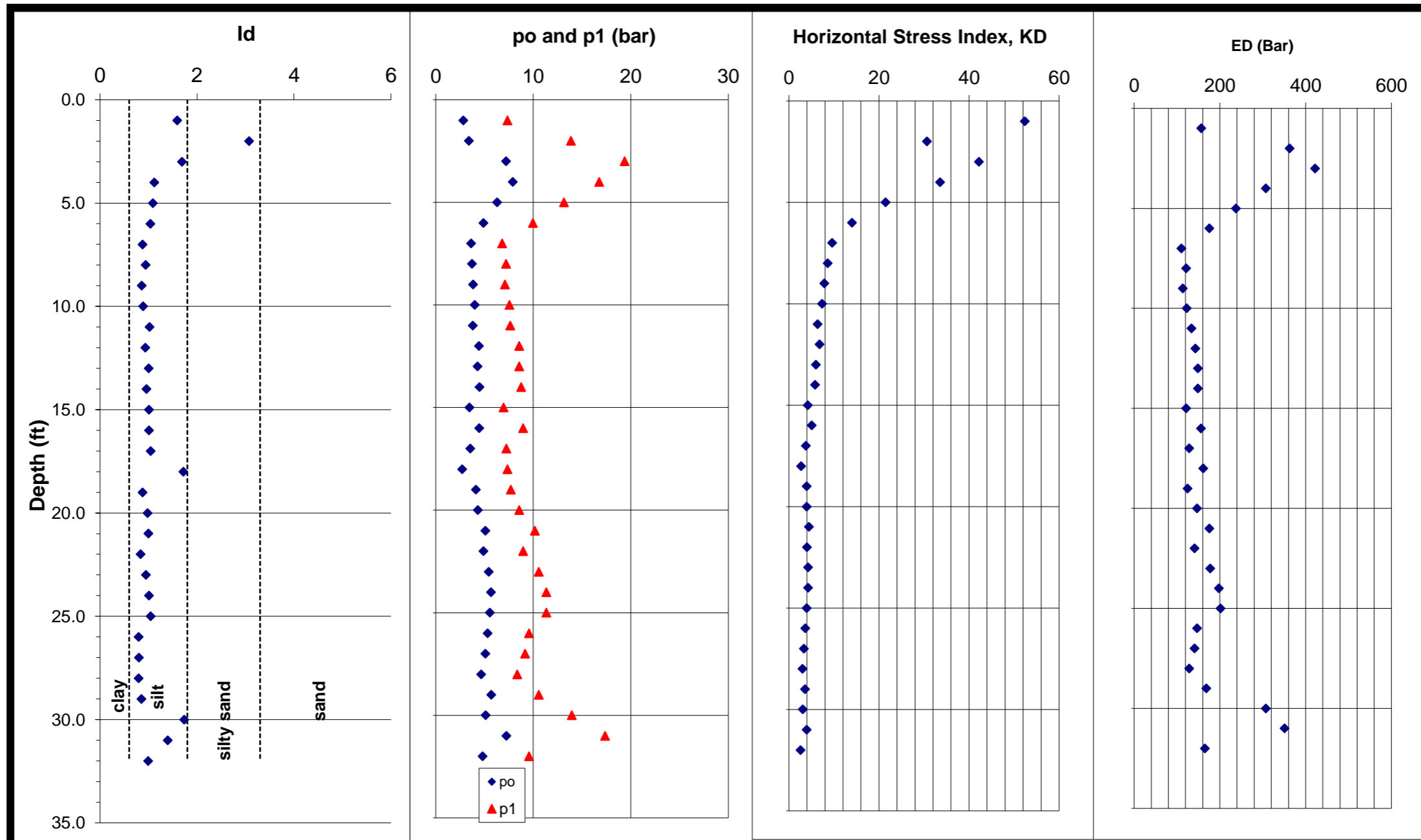
Test ID: STR6_EB1_B2
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR6_EB1_B2
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/20/16
 Sounding No: STR6_EB1_B2
 Ground Water Depth (ft): N/A

	Membrane 1	Membrane 2	Membrane 3
$\Delta A =$	0.25	0.175	0
$\Delta B =$	0.15	0.45	0
$Z_m =$	0	bar	

Northing 874724
 Easting 1777577
 Elevation 877.4

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



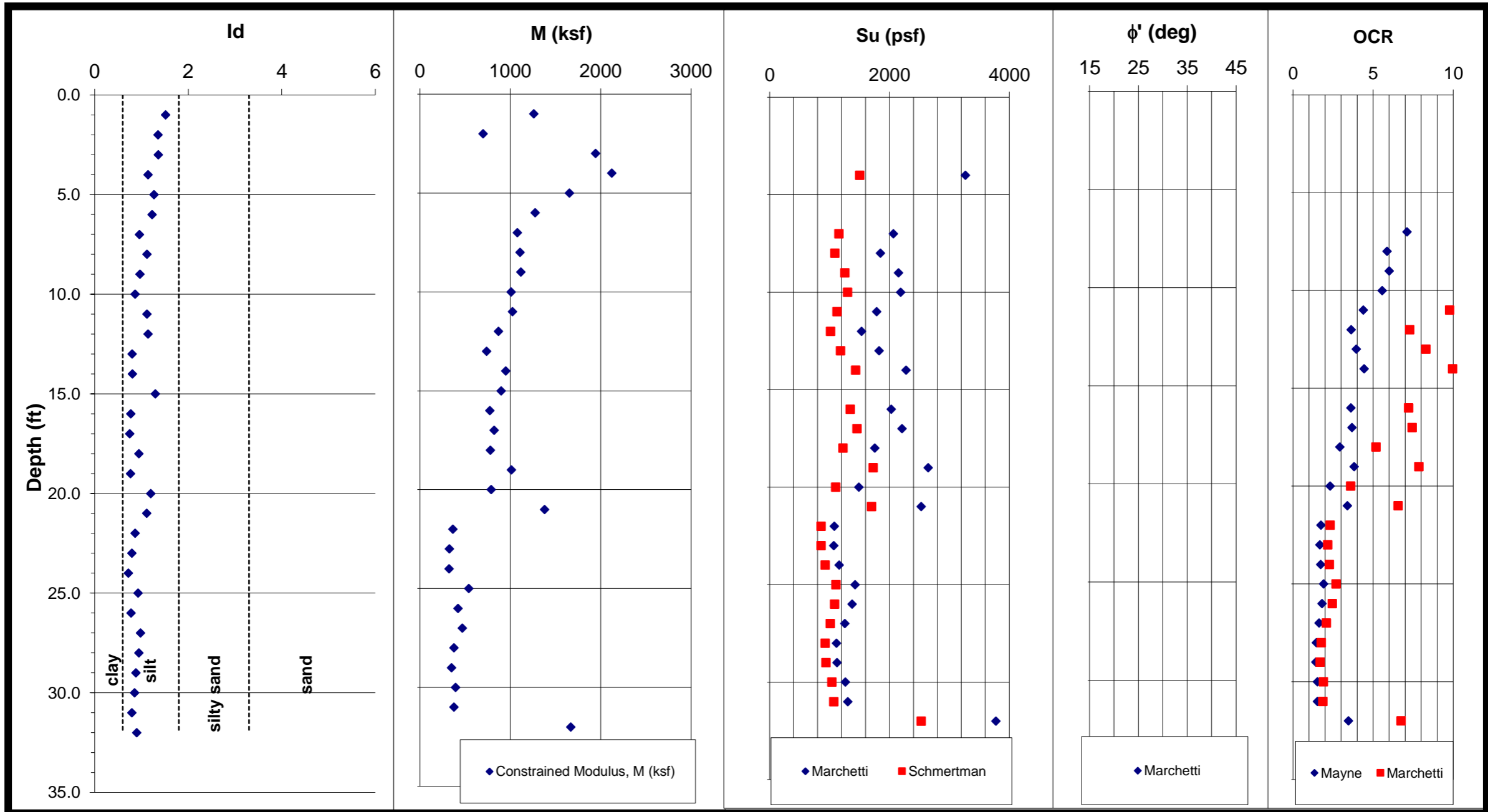
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	p _o (bar)	p ₁ (bar)	p ₂ (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	l _d	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	2.8	7.5		2.8	7.35		0	113	113	113	1.59	52.4	157					4.07	327			1331
2.0	3.65	14		3.4	13.85		0	119	232	232	3.07	30.6	363				45.1	3.56	757			2695
3.0	7.6	19.8	0	7.2	19.35		0	124	356	356	1.69	42.2	422					3.86	881			3402
4.0	8.15	17.2		7.9	16.75		0	123	492	492	1.12	33.5	307	3.7	17.1	81.3		3.65	641	3674	1651	2337
5.0	6.45	13.6		6.3	13.15		0	120	612	612	1.09	21.5	238	2.9	10.9	40.6		3.22	497	2620	1316	1601
6.0	4.95	10.4	0	4.9	9.95		0	117	729	729	1.04	14.0	176	2.3	7.1	20.8		2.82	367	1825	1020	1035
7.0	3.6	7.25		3.6	6.8		0	112	787	787	0.88	9.6	110	1.8	4.9	11.6		2.46	230	1233	757	566
8.0	3.7	7.65		3.7	7.2		0	113	900	900	0.94	8.6	121	1.7	4.4	9.7		2.35	253	1227	775	594
9.0	3.8	7.55		3.8	7.1		0	113	1013	1013	0.86	7.9	114	1.6	4.0	8.5		2.26	238	1236	798	537
10.0	4	8		4.0	7.55		0	114	1136	1136	0.88	7.4	123	1.5	3.7	7.6		2.19	257	1275	837	563
11.0	3.8	8.1		3.8	7.65		0	114	1250	1250	1.02	6.3	134	1.4	3.2	6.0		2.04	280	1162	792	572
12.0	4.45	9	0	4.4	8.55		0	115	1365	1365	0.93	6.8	143	1.4	3.4	6.7		2.11	299	1380	925	630
13.0	4.3	9		4.3	8.55		0	115	1496	1496	1.00	6.0	148	1.3	3.0	5.5		1.98	310	1289	892	615
14.0	4.5	9.2		4.5	8.75		0	115	1611	1611	0.96	5.8	148	1.3	3.0	5.3		1.95	310	1340	934	606
15.0	3.45	7.4	0	3.5	6.95		0	113	1724	1724	1.01	4.2	121	1.0	2.1	3.2		1.63	253	956	722	413
16.0	4.5	9.4		4.5	8.95		0	116	1850	1850	1.01	5.0	156	1.2	2.6	4.2		1.82	325	1291	932	591
17.0	3.55	7.7		3.5	7.25		0	113	1963	1963	1.04	3.8	128	0.9	1.9	2.7		1.53	268	956	741	410
18.0	2.75	7.8	0	2.7	7.35		0	113	2076	2076	1.72	2.7	161					1.26	337			424
19.0	4.1	8.15		4.1	7.7		0	114	2163	2163	0.88	4.0	125	1.0	2.0	2.9		1.57	261	1119	857	409
20.0	4.35	9		4.3	8.55		0	115	2278	2278	0.98	4.0	147	1.0	2.0	2.9		1.57	306	1179	903	482
21.0	5.15	10.6	0.1	5.1	10.15	0.35	0	117	2395	2395	1.00	4.4	176	1.1	2.3	3.5		1.69	367	1425	1062	619
22.0	4.9	9.4		4.9	8.95		0	116	2542	2542	0.83	4.0	141	1.0	2.0	3.0		1.58	295	1334	1019	465
23.0	5.5	11		5.4	10.55		0	118	2660	2660	0.94	4.3	178	1.0	2.2	3.3		1.65	371	1508	1134	610
24.0	5.75	11.8	0	5.7	11.35		0	118	2778	2778	1.01	4.3	198	1.0	2.2	3.2		1.65	413	1568	1181	679
25.0	5.65	11.8		5.5	11.35		0	118	2959	2959	1.05	3.9	201	1.0	2.0	2.9		1.57	420	1508	1159	659
26.0	5.35	10		5.3	9.55		0	116	3076	3076	0.79	3.6	147	0.9	1.8	2.5		1.47	306	1418	1112	450
27.0	5.1	9.6	0.15	5.1	9.15	0.40	0	116	3191	3191	0.80	3.3	141	0.9	1.7	2.2		1.39	295	1326	1061	409
28.0	4.65	8.8		4.6	8.35		0	115	3212	3212	0.80	3.0	128	0.8	1.5	1.9		1.29	268	1184	971	346
29.0	5.75	11		5.7	10.55		0	117	3330	3330	0.85	3.6	169	0.9	1.8	2.5		1.46	352	1512	1189	514
30.0	5.35	14.4	1.35	5.1	13.95	1.60	0	120	3450	3450	1.73	3.1	307					1.38	641			887
31.0	7.55	17.8		7.2	17.35		0	123	3824	3824	1.40	4.0	351					1.60	732			1170
32.0	4.85	10		4.8	9.55		0	116	3940	3940	0.99	2.5	165	0.7	1.3	1.5		1.13	344	1171	1002	390



DILATOMETER TEST RESULTS

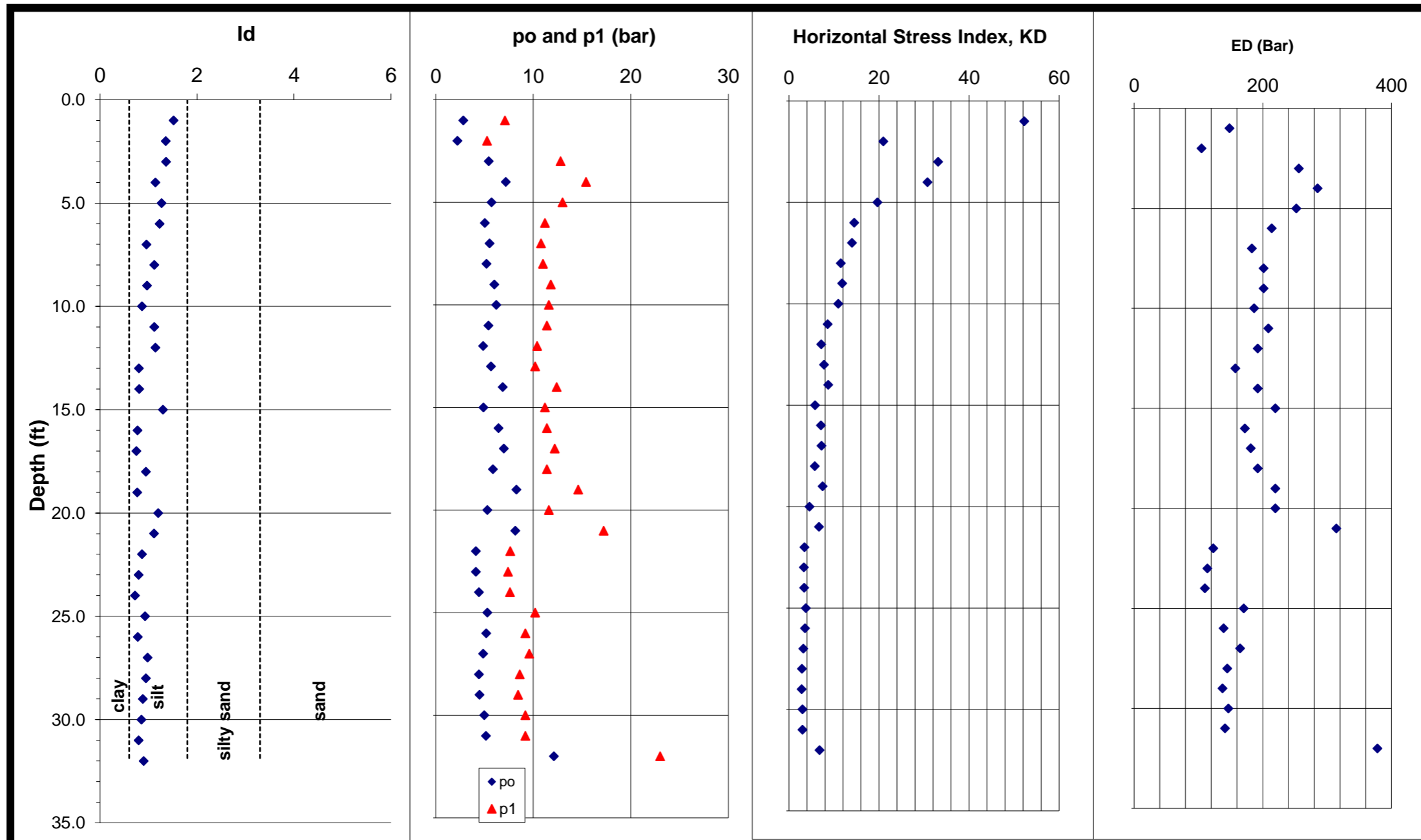
Test ID: STR6_EB1_B3
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR6_EB1_B3
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/20/16
 Sounding No: STR6_EB1_B3
 Ground Water Depth (ft): N/A

	Membrane 1	Membrane 2	Membrane 3
$\Delta A =$	0.225	0	0
$\Delta B =$	0.2	0	0
Zm=	0	bar	

Northing 874701
 Easting 1777579
 Elevation 877.4

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



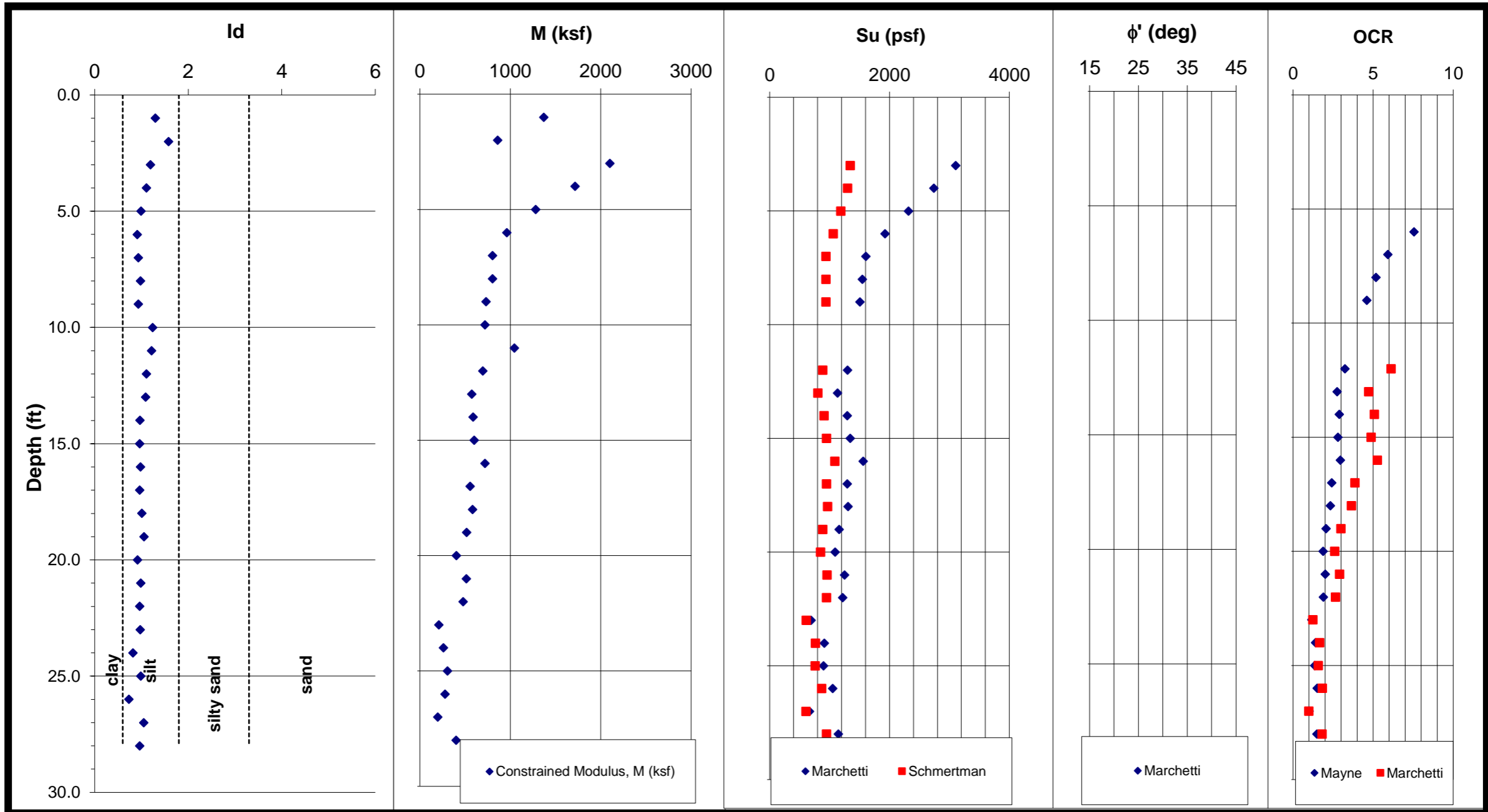
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	po (bar)	p1 (bar)	p2 (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	ld	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	2.8	7.3		2.8	7.1		0	113	113	113	1.52	52.3	148					4.07	310			1261
2.0	2.15	5.45		2.2	5.25		0	109	222	222	1.35	21.0	105					3.20	219			700
3.0	5.55	13	0	5.4	12.8		0	120	342	342	1.36	33.1	256					3.63	535			1943
4.0	7.35	15.6		7.2	15.4		0	122	488	488	1.14	30.7	285	3.5	15.6	71.0		3.56	595	3268	1500	2122
5.0	5.85	13.2		5.7	13		0	120	608	608	1.27	19.7	252					3.14	527			1655
6.0	5.1	11.4	0	5.0	11.2		0	118	726	726	1.23	14.5	214					2.85	447			1274
7.0	5.55	11		5.5	10.8		0	118	825	825	0.96	14.0	183	2.3	7.1	20.8		2.82	382	2064	1154	1078
8.0	5.25	11.2		5.2	11		0	118	943	943	1.12	11.5	201	2.0	5.9	15.4		2.63	420	1850	1086	1107
9.0	6.05	12	0	6.0	11.8		0	119	1061	1061	0.97	11.8	201	2.0	6.0	16.0		2.66	420	2148	1253	1117
10.0	6.25	11.8		6.2	11.6		0	119	1186	1186	0.87	11.0	187	1.9	5.6	14.2		2.59	390	2185	1299	1009
11.0	5.45	11.6		5.4	11.4		0	118	1304	1304	1.12	8.6	209	1.7	4.4	9.8		2.35	436	1784	1125	1025
12.0	4.9	10.6	0	4.9	10.4		0	117	1422	1422	1.14	7.1	192	1.5	3.6	7.3		2.17	401	1535	1015	870
13.0	5.65	10.4		5.7	10.2		0	117	1522	1522	0.80	7.8	158	1.6	4.0	8.3		2.24	329	1825	1182	739
14.0	6.9	12.6		6.9	12.4		0	119	1641	1641	0.81	8.7	192	1.7	4.4	10.0		2.36	401	2279	1433	948
15.0	4.95	11.4	0	4.9	11.2		0	118	1759	1759	1.30	5.8	220					1.96	458			901
16.0	6.45	11.6		6.4	11.4		0	118	1893	1893	0.77	7.1	172	1.5	3.6	7.2		2.15	360	2031	1345	774
17.0	7	12.4		7.0	12.2		0	119	2012	2012	0.75	7.2	181	1.5	3.7	7.4		2.17	379	2211	1457	822
18.0	5.9	11.6	0.15	5.9	11.4	0.38	0	118	2131	2131	0.94	5.7	192	1.3	2.9	5.2		1.94	401	1753	1224	780
19.0	8.35	14.8		8.3	14.6		0	121	2304	2304	0.76	7.5	220	1.5	3.8	7.9		2.21	458	2645	1728	1012
20.0	5.35	11.8		5.3	11.6		0	119	2423	2423	1.20	4.5	220	1.1	2.3	3.6		1.72	458	1488	1101	790
21.0	8.35	17.4	0.2	8.1	17.2	0.43	0	123	2546	2546	1.11	6.7	314	1.4	3.4	6.6		2.10	656	2529	1701	1378
22.0	4.05	7.85		4.1	7.65		0	114	2503	2503	0.86	3.4	123	0.9	1.7	2.3		1.42	257	1079	858	365
23.0	4.05	7.6		4.1	7.4		0	113	2616	2616	0.80	3.3	114	0.8	1.7	2.2		1.37	238	1071	860	327
24.0	4.35	7.8	0.05	4.4	7.6	0.28	0	114	2730	2730	0.72	3.4	110	0.9	1.7	2.3		1.40	230	1159	924	322
25.0	5.3	10.4		5.3	10.2		0	117	2928	2928	0.93	3.8	170	0.9	1.9	2.7		1.52	356	1425	1105	542
26.0	5.15	9.4		5.2	9.2		0	116	3044	3044	0.77	3.6	139	0.9	1.8	2.5		1.45	291	1375	1083	423
27.0	4.85	9.8	0	4.8	9.6		0	116	3160	3160	0.98	3.2	165	0.8	1.6	2.1		1.36	344	1253	1013	469
28.0	4.4	8.8		4.4	8.6		0	115	3224	3224	0.94	2.9	145	0.8	1.5	1.8		1.25	302	1113	924	377
29.0	4.45	8.65		4.5	8.45		0	115	3339	3339	0.88	2.8	138	0.7	1.4	1.7		1.22	287	1122	937	351
30.0	4.95	9.4	0.55	5.0	9.2	0.78	0	116	3455	3455	0.85	3.0	147	0.8	1.5	1.9		1.29	306	1265	1039	394
31.0	5.1	9.4		5.1	9.2		0	116	3591	3591	0.79	3.0	141	0.8	1.5	1.9		1.28	295	1303	1072	376
32.0	12.4	23.2		12.1	23		0	127	3718	3718	0.90	6.8	378	1.4	3.5	6.7		2.11	789	3777	2528	1668



DILATOMETER TEST RESULTS

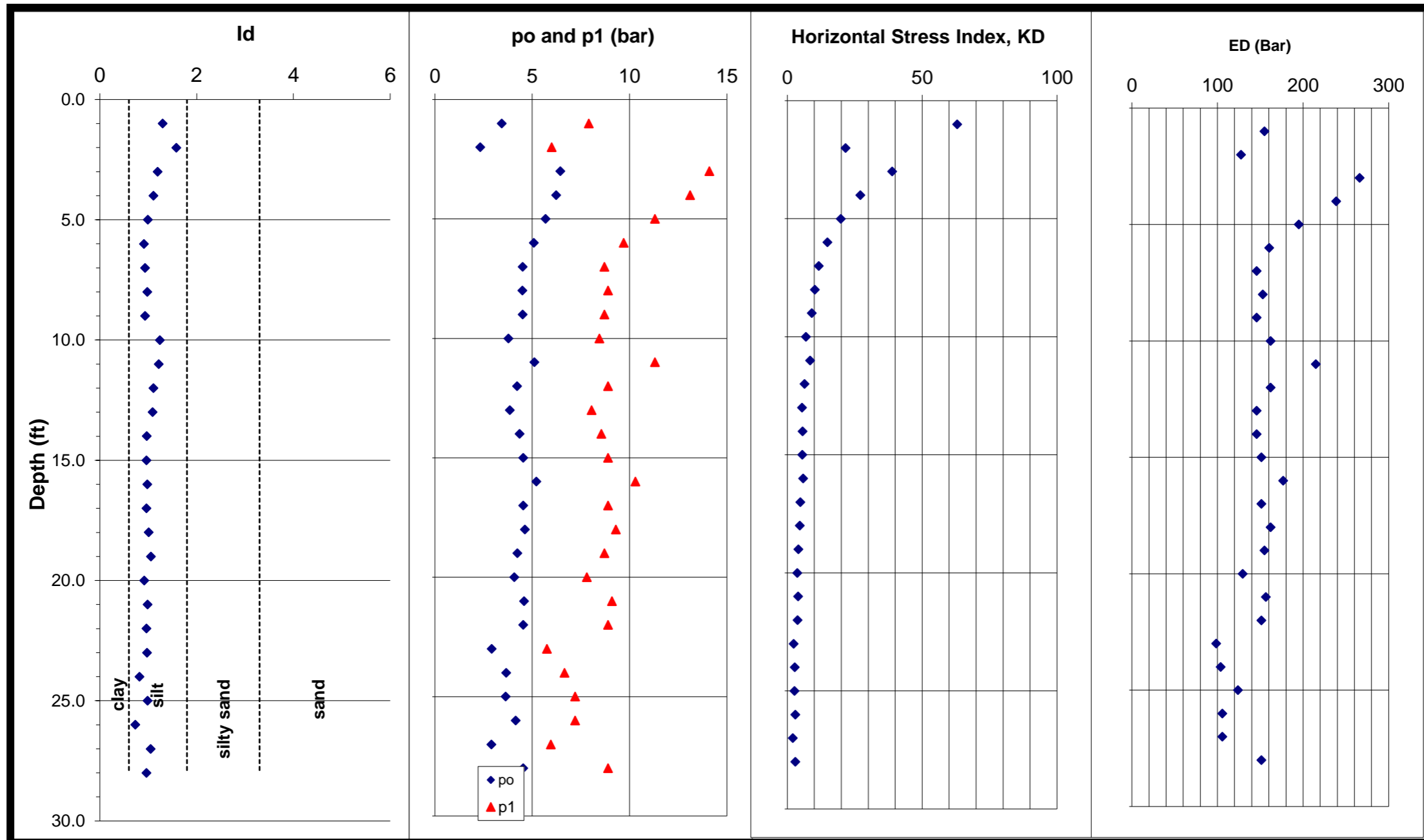
Test ID: STR6_EB2_B1
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR6_EB2_B1
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/21/16
 Sounding No: STR6_EB2_B1
 Ground Water Depth (ft): N/A

Membrane 1 Membrane 2 Membrane 3
 $\Delta A =$ 0.2 0 0
 $\Delta B =$ 0.3 0 0
 Zm= 0 bar

Northing 874672
 Easting 1777462
 Elevation 873.3

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



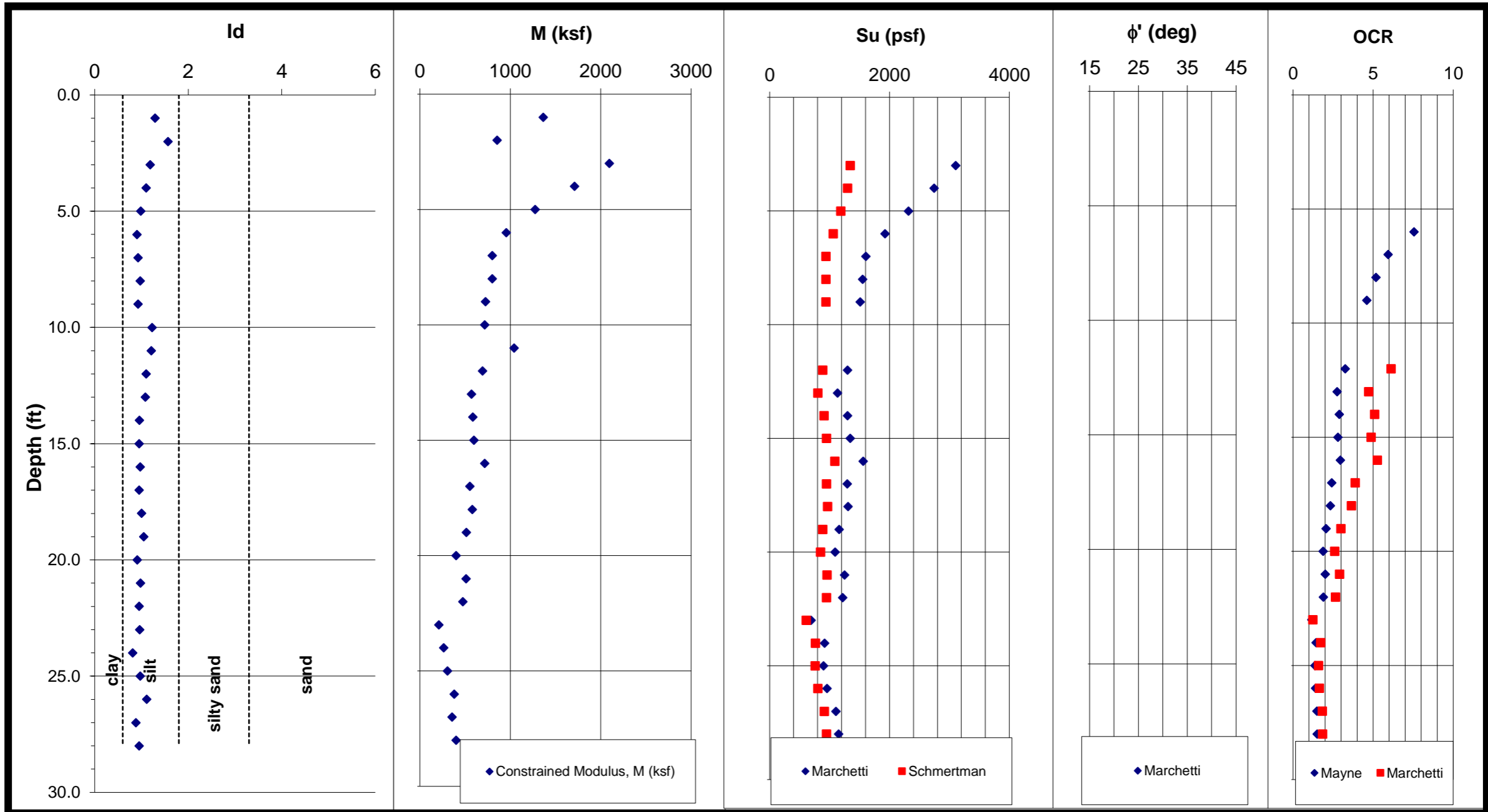
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	p _o (bar)	p ₁ (bar)	p ₂ (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	l _d	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	3.45	8.2		3.4	7.9		0	114	114	114	1.30	62.9	155					4.24	323			1372
2.0	2.3	6.3		2.3	6		0	111	225	225	1.58	21.6	128					3.23	266			860
3.0	6.6	14.4		6.4	14.1		0	121	346	346	1.19	38.9	266	4.0	19.8	102.4		3.79	556	3104	1344	2103
4.0	6.35	13.4		6.2	13.1		0	120	480	480	1.11	27.1	239	3.3	13.8	58.2		3.44	498	2742	1300	1716
5.0	5.75	11.6		5.7	11.3		0	118	599	599	0.99	19.8	195	2.8	10.1	35.8		3.15	407	2316	1187	1282
6.0	5.1	10	0	5.1	9.7		0	117	715	715	0.91	14.8	160	2.3	7.6	22.8		2.87	335	1926	1061	962
7.0	4.5	9		4.5	8.7		0	115	807	807	0.93	11.6	146	2.0	5.9	15.6		2.64	304	1606	940	805
8.0	4.5	9.2		4.5	8.9		0	116	922	922	0.98	10.2	153	1.9	5.2	12.6		2.52	320	1549	938	804
9.0	4.5	9	0	4.5	8.7		0	115	1038	1038	0.93	9.1	146	1.7	4.6	10.6		2.40	304	1508	940	731
10.0	3.8	8.75		3.8	8.45		0	115	1149	1149	1.24	6.9	162					2.13	339			721
11.0	5.2	11.6		5.1	11.3		0	118	1267	1267	1.21	8.4	215					2.33	449			1046
12.0	4.25	9.2	0	4.2	8.9		0	116	1383	1383	1.11	6.4	162	1.4	3.3	6.1		2.06	339	1298	883	696
13.0	3.85	8.35		3.9	8.05		0	114	1487	1487	1.09	5.4	146	1.2	2.8	4.7		1.89	304	1134	804	575
14.0	4.35	8.85		4.4	8.55		0	115	1602	1602	0.97	5.7	146	1.3	2.9	5.1		1.93	304	1297	909	588
15.0	4.55	9.2	0	4.5	8.9		0	116	1717	1717	0.96	5.5	151	1.2	2.8	4.9		1.91	316	1345	949	602
16.0	5.25	10.6		5.2	10.3		0	117	1876	1876	0.98	5.8	177	1.3	3.0	5.3		1.95	369	1561	1088	721
17.0	4.55	9.2		4.5	8.9		0	116	1991	1991	0.96	4.8	151	1.1	2.4	3.9		1.76	316	1297	949	555
18.0	4.65	9.6	0	4.6	9.3		0	116	2107	2107	1.01	4.6	162	1.1	2.3	3.6		1.72	339	1308	966	583
19.0	4.25	9		4.2	8.7		0	115	2190	2190	1.05	4.0	155	1.0	2.1	3.0		1.60	323	1161	885	517
20.0	4.05	8.1		4.1	7.8		0	114	2304	2304	0.92	3.7	129	0.9	1.9	2.6		1.50	270	1091	851	405
21.0	4.6	9.4	0	4.6	9.1		0	116	2420	2420	0.98	4.0	157	1.0	2.0	2.9		1.57	327	1249	958	515
22.0	4.55	9.2		4.5	8.9		0	116	2542	2542	0.96	3.7	151	0.9	1.9	2.6		1.51	316	1220	949	478
23.0	2.85	6.05		2.9	5.75		0	111	2652	2652	0.97	2.3	98	0.6	1.2	1.2		1.03	205	693	609	211
24.0	3.6	6.95	0	3.7	6.65		0	112	2764	2764	0.82	2.8	104	0.7	1.4	1.7		1.20	217	911	764	260
25.0	3.6	7.5		3.6	7.2		0	113	2828	2828	0.98	2.7	124	0.7	1.4	1.6		1.18	259	897	758	306
26.0	4.1	7.5		4.2	7.2		0	113	2941	2941	0.73	3.0	106	0.8	1.5	1.8		1.26	221	1052	868	278
27.0	2.85	6.25	0	2.9	5.95		0	111	3052	3052	1.05	2.0	106	0.5	1.0	1.0		0.89	221	666	607	197
28.0	4.55	9.2		4.5	8.9		0	116	3235	3235	0.96	2.9	151	0.8	1.5	1.8		1.27	316	1148	949	402



DILATOMETER TEST RESULTS

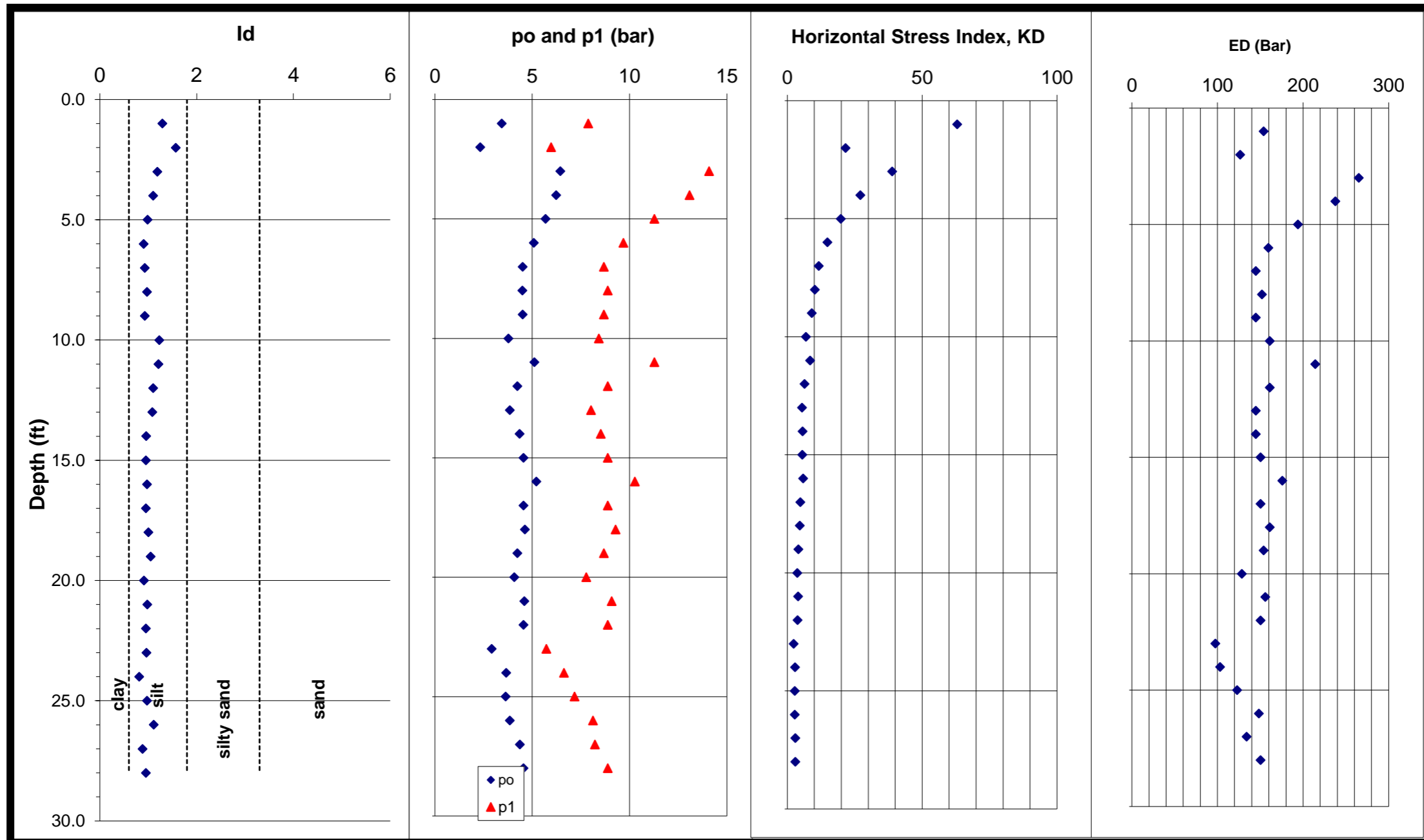
Test ID: STR6_EB2_B2
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR6_EB2_B2
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/20/16
 Sounding No: STR6_EB2_B2
 Ground Water Depth (ft): N/A

	Membrane 1	Membrane 2	Membrane 3
$\Delta A =$	0.2	0	0
$\Delta B =$	0.325	0	0
Zm=	0	bar	

Northing 874736
 Easting 1777468
 Elevation 872.5

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



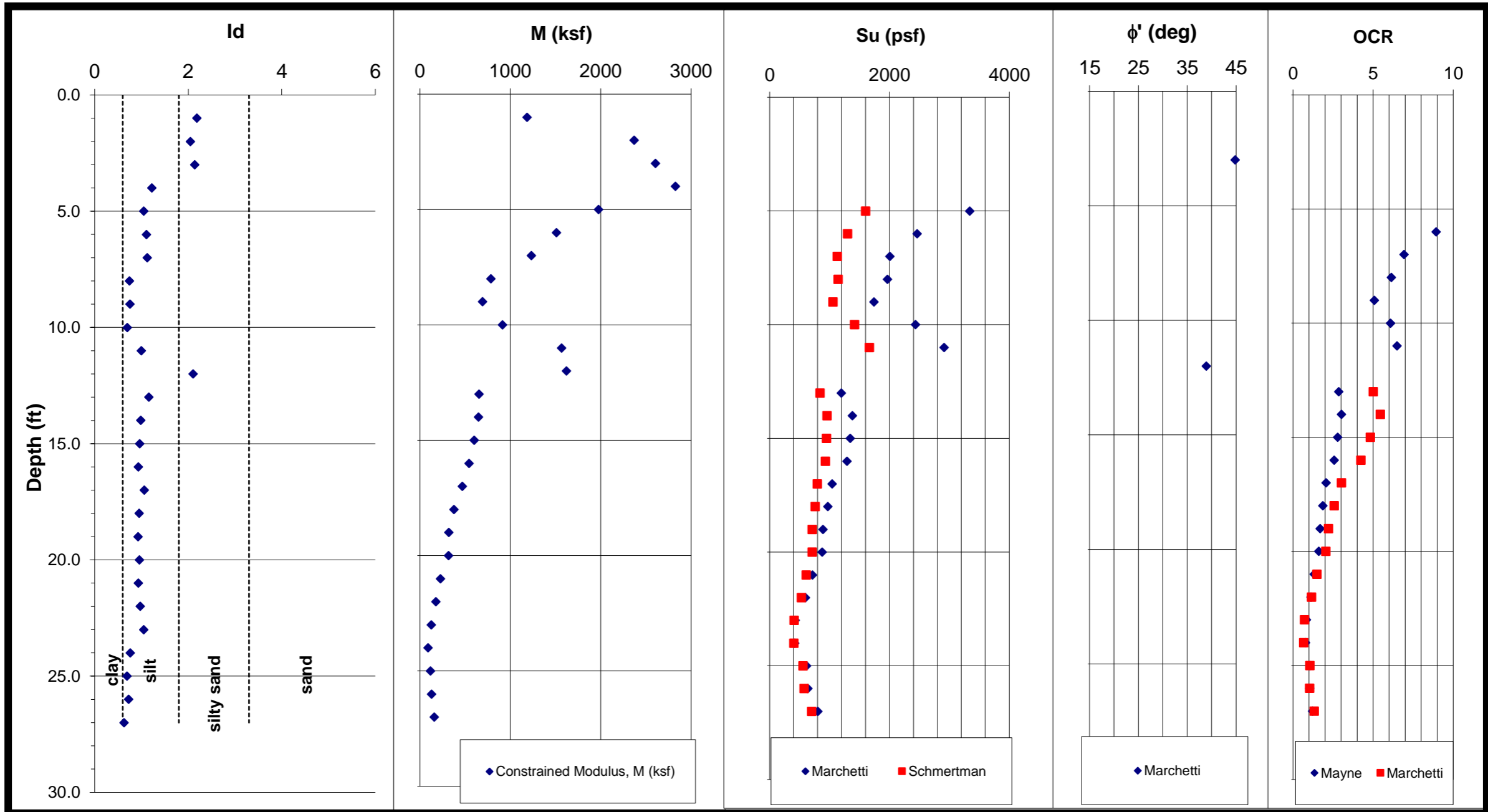
DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	po (bar)	p1 (bar)	p2 (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	ld	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	3.45	8.2		3.4	7.875		0	114	114	114	1.29	63.0	154					4.24	322			1364
2.0	2.3	6.3		2.3	5.975		0	111	225	225	1.57	21.6	127					3.23	264			854
3.0	6.6	14.4		6.4	14.075		0	121	346	346	1.19	38.9	265	4.0	19.8	102.4		3.79	554	3105	1344	2096
4.0	6.35	13.4		6.2	13.075		0	120	480	480	1.10	27.1	238	3.3	13.8	58.2		3.44	497	2743	1300	1709
5.0	5.75	11.6		5.7	11.275		0	118	599	599	0.98	19.8	194	2.8	10.1	35.8		3.15	405	2317	1187	1276
6.0	5.1	10	0	5.1	9.675		0	116	715	715	0.90	14.8	159	2.3	7.6	22.8		2.87	333	1927	1061	957
7.0	4.5	9		4.5	8.675		0	115	807	807	0.93	11.7	145	2.0	5.9	15.6		2.64	302	1607	940	800
8.0	4.5	9.2		4.5	8.875		0	116	922	922	0.98	10.2	152	1.9	5.2	12.6		2.52	318	1550	938	799
9.0	4.5	9	0	4.5	8.675		0	115	1037	1037	0.93	9.1	145	1.7	4.6	10.6		2.40	302	1509	940	726
10.0	3.8	8.75		3.8	8.425		0	115	1148	1148	1.23	6.9	161					2.13	337			718
11.0	5.2	11.6		5.1	11.275		0	118	1267	1267	1.21	8.4	214					2.33	447			1042
12.0	4.25	9.2	0	4.2	8.875		0	115	1382	1382	1.10	6.4	161	1.4	3.3	6.1		2.06	337	1299	883	692
13.0	3.85	8.35		3.9	8.025		0	114	1486	1486	1.08	5.4	145	1.2	2.8	4.7		1.89	302	1135	804	572
14.0	4.35	8.85		4.4	8.525		0	115	1601	1601	0.96	5.7	145	1.3	2.9	5.1		1.93	302	1297	909	585
15.0	4.55	9.2	0	4.5	8.875		0	115	1717	1717	0.95	5.5	150	1.2	2.8	4.9		1.91	314	1346	949	598
16.0	5.25	10.6		5.2	10.275		0	117	1875	1875	0.97	5.8	176	1.3	3.0	5.3		1.96	367	1562	1088	718
17.0	4.55	9.2		4.5	8.875		0	115	1991	1991	0.95	4.8	150	1.1	2.4	3.9		1.76	314	1297	949	552
18.0	4.65	9.6	0	4.6	9.275		0	116	2107	2107	1.00	4.6	161	1.1	2.3	3.7		1.72	337	1309	967	580
19.0	4.25	9		4.2	8.675		0	115	2189	2189	1.05	4.0	154	1.0	2.1	3.0		1.60	322	1161	885	514
20.0	4.05	8.1		4.1	7.775		0	114	2303	2303	0.91	3.7	128	0.9	1.9	2.6		1.50	268	1091	851	402
21.0	4.6	9.4	0	4.6	9.075		0	116	2419	2419	0.98	4.0	156	1.0	2.0	2.9		1.57	325	1250	958	512
22.0	4.55	9.2		4.5	8.875		0	115	2541	2541	0.95	3.7	150	0.9	1.9	2.6		1.51	314	1220	949	475
23.0	2.85	6.05		2.9	5.725		0	111	2652	2652	0.96	2.3	97	0.6	1.2	1.2		1.03	204	694	609	209
24.0	3.6	6.95	0	3.7	6.625		0	112	2691	2691	0.81	2.8	103	0.7	1.4	1.7		1.23	215	918	764	264
25.0	3.6	7.5		3.6	7.175		0	113	2804	2804	0.98	2.7	123	0.7	1.4	1.6		1.19	257	900	758	306
26.0	3.85	8.45		3.8	8.125		0	114	2918	2918	1.11	2.8	148	0.7	1.4	1.6		1.22	310	957	803	379
27.0	4.35	8.55	0.05	4.4	8.225	0.25	0	115	3094	3094	0.88	2.9	134	0.8	1.5	1.8		1.27	280	1105	912	355
28.0	4.55	9.2		4.5	8.875		0	115	3210	3210	0.95	3.0	150	0.8	1.5	1.8		1.28	314	1151	949	401



DILATOMETER TEST RESULTS

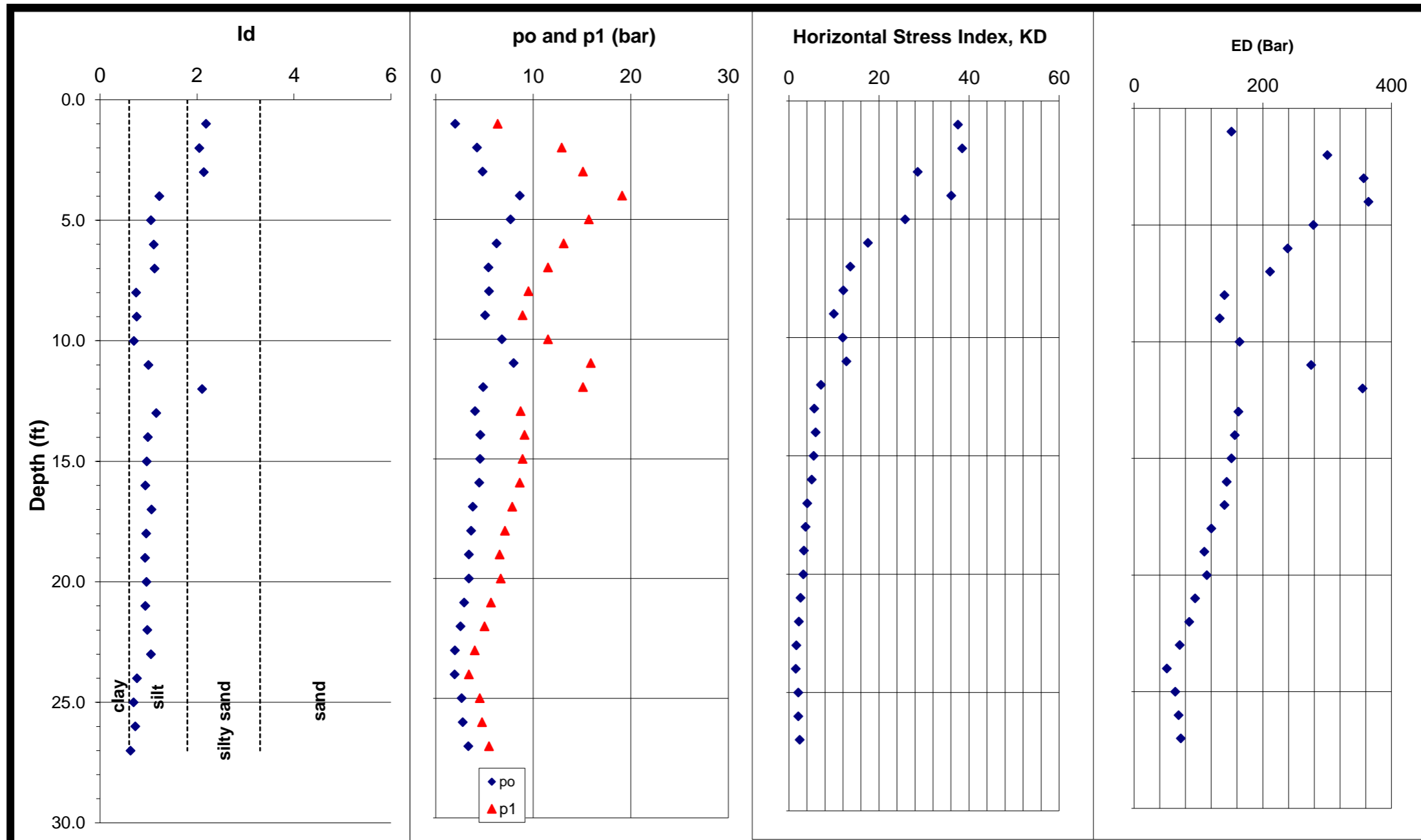
Test ID: STR6_EB2_B3
 Site: U-2525 C Site #4
 Location: Greensboro, NC
 Project No.: 16-54112





DILATOMETER TEST RESULTS

Test ID: STR6_EB2_B3
Site: U-2525 C Site #4
Location: Greensboro, NC
Project No.: 16-54112



Job No: 16-54112
 Job Name: U-2525 C Site #4
 Job Location: Greensboro, NC
 Date: 12/21/16
 Sounding No: STR6_EB2_B3
 Ground Water Depth (ft): N/A

	Membrane 1	Membrane 2	Membrane 3
$\Delta A =$	0.2	0	0
$\Delta B =$	0.3	0	0
Zm=	0	bar	

Northing 874716
 Easting 1777445
 Elevation 872.2

¹ Depth Below Existing Ground Surface
² Mayne, 1995
³ Marchetti, 2001
⁴ Schmertman, 1991
⁵ Mayne, 2002



DILATOMETER TEST RESULTS

Depth ¹ (ft)	A (bar)	B (bar)	C (bar)	p _o (bar)	p ₁ (bar)	p ₂ (bar)	u _o (psf)	γ_T^5 (pcf)	σ_{vo} (psf)	σ_{vo}' (psf)	l _d	K _D	E _D (bar)	K _o	OCR ²	OCR ³	ϕ^3 (deg)	R _M	E _D (ksf)	s _u ³ (psf)	s _u ⁴ (psf)	M (ksf)
1.0	2	6.65		2.0	6.35		0	111	111	111	2.19	37.5	151				45.8	3.75	316			1185
2.0	4.45	13.2		4.2	12.9		0	119	230	230	2.04	38.5	301				45.9	3.78	628			2370
3.0	5.1	15.4	0	4.8	15.1		0	121	351	351	2.14	28.6	357				44.8	3.50	746			2607
4.0	8.9	19.4		8.6	19.1		0	125	499	499	1.22	36.0	364					3.71	761			2826
5.0	7.85	16		7.7	15.7		0	122	621	621	1.05	25.8	279	3.2	13.1	54.0		3.40	582	3338	1601	1978
6.0	6.35	13.4	0	6.2	13.1		0	120	741	741	1.11	17.5	239	2.6	8.9	29.6		3.03	498	2460	1300	1511
7.0	5.5	11.8		5.4	11.5		0	119	830	830	1.13	13.6	211	2.2	6.9	19.9		2.79	441	2008	1130	1232
8.0	5.45	9.8		5.5	9.5		0	116	946	946	0.74	12.1	140	2.1	6.1	16.5		2.68	293	1964	1140	784
9.0	5.05	9.2	0	5.1	8.9		0	115	1061	1061	0.76	10.0	133	1.8	5.1	12.3		2.50	278	1740	1058	694
10.0	6.8	11.8		6.8	11.5		0	118	1183	1183	0.70	12.0	164	2.1	6.1	16.3		2.67	342	2434	1415	914
11.0	8.15	16.2		8.0	15.9		0	122	1306	1306	0.99	12.8	275	2.1	6.5	18.0		2.73	575	2910	1665	1568
12.0	5.15	15.4	0	4.9	15.1		0	121	1427	1427	2.11	7.1	355				38.9	2.18	742			1621
13.0	4.05	9		4.0	8.7		0	115	1498	1498	1.16	5.6	162	1.3	2.9	5.0		1.93	339	1198	841	653
14.0	4.6	9.4		4.6	9.1		0	116	1614	1614	0.98	5.9	157	1.3	3.0	5.5		1.98	327	1382	958	647
15.0	4.55	9.2	0	4.5	8.9		0	116	1729	1729	0.96	5.5	151	1.2	2.8	4.8		1.90	316	1343	949	600
16.0	4.45	8.9		4.5	8.6		0	115	1842	1842	0.93	5.0	144	1.2	2.6	4.2		1.81	301	1289	930	545
17.0	3.8	8.15		3.8	7.85		0	114	1956	1956	1.06	4.1	140	1.0	2.1	3.0		1.60	293	1044	795	470
18.0	3.6	7.4	0	3.6	7.1		0	113	2069	2069	0.95	3.7	120	0.9	1.9	2.6		1.50	251	972	759	376
19.0	3.35	6.85		3.4	6.55		0	112	2129	2129	0.93	3.3	109	0.9	1.7	2.2		1.40	228	888	710	319
20.0	3.35	6.95		3.4	6.65		0	112	2241	2241	0.96	3.2	113	0.8	1.6	2.0		1.35	236	875	709	318
21.0	2.85	5.95	0	2.9	5.65		0	110	2351	2351	0.93	2.6	95	0.7	1.3	1.5		1.15	198	716	610	227
22.0	2.45	5.3		2.5	5		0	109	2399	2399	0.97	2.2	86	0.6	1.1	1.2		0.99	179	596	529	177
23.0	1.85	4.3		2.0	4		0	107	2506	2506	1.05	1.6	71	0.4	0.8	0.7		0.85	148	426	408	126
24.0	1.8	3.7	0	1.9	3.4		0	105	2611	2611	0.76	1.5	51	0.4	0.8	0.7		0.85	107	416	403	91
25.0	2.55	4.8		2.7	4.5		0	108	2693	2693	0.69	2.1	64	0.6	1.1	1.1		0.89	133	617	556	119
26.0	2.65	5.05		2.8	4.75		0	108	2802	2802	0.72	2.1	69	0.6	1.0	1.0		0.89	145	637	575	129
27.0	3.25	5.75	0	3.4	5.45		0	110	2911	2911	0.63	2.4	73	0.6	1.2	1.3		1.04	152	806	700	158