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MOBILIZATION AND DEMOBILIZATION

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SECTION 02000

MOBILIZATION AND DEMOBILIZATION

PART 1 GENERAL

1.1 MOBILIZATION AND DEMOBILIZATION

Mobilization and Demobilization shall include transporting the dredge and all items of attendant plant to the site of the work, setting up the dredge and other equipment, and laying of pipelines and otherwise placing the entire plant in condition for effective dredging. Upon completion of the work, the dredge and all attendant plant shall be removed from the site.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

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DIVISION 02 - SITE WORK

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DREDGING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

CORPS OF ENGINEERS (COE)

EM 1110-1-1003	(1996) U.S. Army Corps of Engineers Navstar Global Positioning System Surveying
EM 1110-2-1003	(1994) U.S. Army Corps of Engineers Hydrographic Surveying

1.2 SUBMITTALS

Government approval is required for all submittals with a "G" designation. The following shall be submitted in accordance with SECTION 01330 SUBMITTAL PROCEDURES:

SD-04 Samples

Sediment Samples

SD-05 Design Data

Dredge Sample Data Form

SD-06 Test Reports

Daily Report of Operations

SD-07 Certificates

Construction Plan G

Hydrographic Survey Contractor G

1.3 REQUIRED WORK

In the area to be dredged, all materials shall be removed and disposed of as indicated. Should material which cannot be removed without unreasonable methods be encountered, the Contractor shall remove all overlying material which in the judgment of the Contracting Officer Representative, can be removed. Nothing in this paragraph shall be construed as prohibiting the removal of excepted material by special means at prices agreed upon and approved in accordance with the CONTRACT CLAUSE: DIFFERING SITE CONDITIONS.

1.4 EXISTING CONSTRUCTION

Reference is made to the CONTRACT CLAUSE: PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS, which obligates the Contractor to protect from damage all existing improvements known to exist at, near, or adjacent to the site of the work.

1.5 CHARACTER OF MATERIALS

The materials to be removed will consist of, but not be limited to: fine to coarse sand, silt, sandy silt, clay, gravels, and the following type of debris which were encountered in previous dredging jobs: tires, plastic sheeting, tree stumps and branches, lumber, and other debris. The geotechnical boring logs shown in the drawings and the cone penetrometer test holes shown in the report titled "Presentation of CPT Testing Results" are indicative of the types of materials expected to be dredged. Any questions regarding this report and/or the nature of the expected dredge materials shall be directed to the U.S. Army Corps of Engineers, Los Angeles District, Geotechnical Branch, 911 Wilshire Blvd., Los Angeles, CA 90017.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 CONSTRUCTION PLAN

The Contractor shall submit a Construction Plan to the Contracting Officer for approval at least 10 days prior to start of dredging operations. The Construction Plan shall indicate the methods and equipment proposed to obtain, transport, deposit, and reposition beach fill materials, and maintain the beach fill areas during construction operations. The Contractor shall submit three (3) copies of this plan to the Contracting Officer. The plan as a minimum shall contain the following information:

Order of dredging operations and all proposed time lines.

Operation/use of the work/storage area.

Layout of all buoys, anchors, pipelines, and ancillary equipment.

Methods and equipment for positioning at the dredge and disposal site(s).

Methods for beach fill operations.

Layout of the dredge and major auxiliary floating plant. This shall include locations of engines and fuel storage, engine type, horsepower ratings, electrical rooms, transformer rooms, emergency generating equipment, and vertical and horizontal access.

3.2 DAILY REPORT OF OPERATIONS

The Contractor will be required to prepare and maintain a Daily Report of Operations and furnish copies thereof to the Contracting Officer's Representative. The daily reports shall document construction related operations for all shifts in a 24-hour period. Further instruction on the preparation of the report shall be provided. Copies of sample submittals are provided at the end of the SECTION 01451: CONTRACTOR QUALITY CONTROL.

3.3 PLACEMENT OF DREDGED MATERIAL

3.3.1 Beach Fill

Dredged material shall be transported and uniformly deposited within the beach fill limits of the area indicated on the drawings. The fill elevations are ideal and the actual elevation of the fill may vary 0.1 meter above or below the indicated elevations. The dredged material shall be deposited in a uniform manner progressing from the shoreward side to the seaward side of the beach fill. The beach fill shall begin at the east jetty of the U.S. Naval Weapons Station and progress in a southeasterly direction along the fill area. Each section where deposition occurs shall be filled to the required elevation prior to moving to the next section. The Contractor shall ensure that dredged material is adequately broken up if required into an acceptable consistency to allow dispersion following its deposition.

Any dredged material that is deposited other than in the area indicated on the drawings, or approved by the Contracting Officer, will not be included in the measurement and the Contractor may be required to remove such misplaced material and deposit it where directed at his own expense. Debris and other unsuitable materials encountered shall become the property of the Contractor and shall be removed from the site.

3.3.2 Dike System

A dike system shall be employed at the beach fill site to control runback into the nearshore zone during the period March 1 - September 15. Dredged material shall be discharged into the impoundment area created by the dike, and the return water discharged into the nearshore zone. Material for the dike system shall be obtained from the beach adjacent to the site. The general extent and location of the dike system shall be fully described in the Construction Plan. In the event of dike failure, dredge material disposal shall be discontinued until the dike is repaired.

3.3.3 Loss En Route

During dredging, water will be permitted to overflow barges, hopper bins, or scows provided that every attempt is made to minimize the overflow of dredged material. During transport to the beach fill site, water and dredged material shall not be permitted to overflow or spill out.

3.3.4 Borrow Area

Dredge materials shall be taken from the Borrow Area as indicated on the drawings. The depth of cut in the borrow area shall be at all times be subject to approval of the Contracting Officer. The maximum depth of dredging for the Borrow Area is 3 meters. Suitable material for beach fill shall be fine to coarse sand and gravels, with such minor amounts of silts, clays, and gravel as allowed by the Contracting Officer. Unsuitable material such as excessive amounts of gravel, silts, or clays, as determined by the Contracting Officer shall be disposed of at the direction of the Contracting Officer. Whenever, in the opinion of the Contractor Officer, it is necessary to change the location of the dredging equipment working the Borrow Area in order to obtain suitable material, the Contractor shall move his equipment to the new designated location at no additional cost to the Government. Debris and other unsuitable materials encountered shall become the property of the Contractor and shall be removed from the site and disposed of at an approved disposal site at no additional cost to the Government.

3.4 SURVEY REQUIREMENTS OF OFFSHORE DREDGING

3.4.1 Electronic Positioning System

The Contractor shall obtain, operate, and maintain a short range Electronic Positioning System (EPS) or Differential Global Positioning System (DGPS) for dredging operations. This EPS or DGPS shall be established, operated, and maintained by the Contractor when dredging is actively underway. The EPS or DGPS shall be capable of displaying and recording the dredge vessel's location in the State Plane Coordinate System based on the California Lambert Conformal Projection System for Zone 5 and/or Zone 6 as appropriate (SPCS 83 Meters) at 30 second time intervals while operating and/or traveling to or from the work areas.

3.4.2 EPS/DGPS Configuration

The EPS or DGPS shall be similar, or equal, in design, performance, accuracy, operation characteristics, and frequency to equipment specified in the following technical materials:

USACE EM 1110-1-1003 Navstar Global Positioning System Surveying

USACE EM 1110-2-1003 Hydrographic Surveying

Information on the above mentioned manuals may be obtained from: Headquarters, U.S. Army Corps of Engineers, Washington, D.C. or www.usace.army.mil. It is emphasized that differential GPS positioning techniques shall be used for GPS surveying and further emphasized that an EPS system with a low and medium frequency (long-range navigation system)

will not comply with the above specifications. The complete system shall be described in the Construction Plan. The Contractor shall provide access for the Contracting Officer to the EPS or DGPS equipment as part of the Government's quality assurance responsibility.

3.4.3 Shore-Based Control

The Contractor shall establish horizontal control necessary to locate active and/or passive short range EPS or DGPS transmitter/receiver devices. Survey control shall meet third order, class I, accuracy standards in accordance with USACE EM 1110-2-1003 "Hydrographic Surveying". The Contractor shall obtain all necessary permits, rights-of-entry, or leases required for operating and maintaining shore-based electronic equipment on public/private property. The actual number of shore-based control points shall be determined by the Contractor and shall be determined by the operating characteristics of the approved system (i.e., circular, hyperbolic, elliptical, etc., for EPS or Differential GPS). As a minimum, the EPS shall provide at least three redundant lines-of-position from the shore-based network, and for DGPS, ranges from 4(minimum) or more satellites will be needed for 3-dimensional positioning. The shore-based control points shall be located such that the generated lines-of-position shall intersect at the final vessel location at not less than 40 degrees.

3.4.4 Dredging Vessel Location

Except as specified hereinafter, electronic positioning data shall be received, displayed, and recorded on board the disposal vessel. Positional data may be received, displayed, and recorded on a towing or other adjacent vessel provided the eccentric distance between the vessels is less than 30 meters and that the eccentric distance and bearings remain essentially constant for each successive disposal operation. Eccentric distance measurements shall be computed by means of an electronic data transmitter/telemetry system. Gyro-radar distance/bearing measurements will not be permitted for eccentric distance measurements. Eccentric coordinates, if any, shall be clearly identified and computed on the hard copy positional record required under paragraph: Electronic Positioning System.

3.4.5 Calibration

EPS calibration techniques shall conform to standard hydrographic surveying practice in accordance with Chapter 6 of USACE EM 1110-2-1003, "Hydrographic Surveying". The Contractor shall be responsible for maintaining effective, accurate, and reliable EPS calibration, including periodic survey checks throughout the duration of the contract. Calibration records shall be submitted as part of the daily Quality Control records. Degradation in offshore positional accuracy during the course of this contract may cause a suspension of dredging operations.

3.4.6 Backup Equipment

The Contractor shall provide and maintain the following backup equipment:

For EPS System:

One shore control transmitter/receiving device.

One line printer and/or plotter.

One offshore guidance controller.

One power supply.

Spare parts kit for the receiver.

For DGPS System:

One complete Differential GPS equipment and accessories.

In the event of a failure of the EPS or DGPS, the Contractor shall immediately notify the Contracting Officer.

3.5 SIDE SLOPES AND EXCESSIVE DREDGING

3.5.1 Side Slopes

Side slopes formed by the removal of material outside of the Borrow Area will not be paid for. Material removed will be determined by calculation of the material removed from the dredge prism.

3.5.2 Excessive Dredging

Material taken from beyond the limits as extended in the provisions above may be deducted from the total amount dredged as excessive dredging, or excessive side slope dredging for which payment will not be made. Materials dredged from below allowable depth limits, which are not suitable for disposal or which result in extra costs, shall be the responsibility of the Contractor.

3.6 SAMPLING OF MATERIAL

The Contractor shall obtain representative Sediment Samples of the dredged material. The exact location and depth of each sample shall be as directed by the Contracting Officer. The samples shall be taken at evenly spaced yardage intervals of 50,000 cubic meters. Each sample shall not be less than two liters and shall be obtained in plastic bottles. The samples shall be delivered to the address specified herein below at such times as may be determined by the Contracting Officer. A Dredge Sample Data Form shall be completed for each sample. Further instruction on the preparation of the form shall be provided. Samples shall be delivered to:

U.S. Army Corps of Engineers, Soils Laboratory
645 North Durfee Avenue
South El Monte, CA 91733-4399
ATTN: Mr. Art Moncayo
Tel: (818) 401-4095

3.7 CONTRACTOR'S SURVEYS

3.7.1 Survey Data

Reference is made to SECTION 00800: SPECIAL CONTRACT REQUIREMENTS, QUANTITY SURVEYS, FAR 52.236-16 which requires payment based on Government surveys. Progress payments or evidence (condition surveys) supporting extreme weather (storm) related shoaling, will be based upon Contractor's hydrographic surveys. The Contractor's survey shall provide full coverage of the entire borrow area for which progress payment or evidence of storm-related shoaling is being submitted.

It is further emphasized that only condition surveys supporting extreme weather (storm) related shoaling will be considered for payment in addition to the government surveys, provided that the Contractor's surveys clearly show the condition before and after each shoaling event and the condition after removal of material from the shoaled area. Survey data which does not meet all applicable requirements and quality assurance verifications will not constitute a valid request for payment of shoaling.

Contractor's hydrographic surveys shall be performed electronically (automated) and the data shall be provided and submitted to the Government on an electronic media (IBM compatible, ASCII format) in delimited files of easting, northing, and depth (x,y,z), where the depth is indicated as negative if recorded below MLLW. The first lines of the data file will list the information as follows:

* Project Name (Beach Nourishment, San Gabriel River to Newport Bay, Stage 11)

* Surveyor's Name

* Area Surveyed

* Date of Survey

* Vertical Datum

* Horizontal Datum

These first 6 lines will be preceded by an asterisk (*), which indicates a comment line.

A plot of soundings will accompany the x,y,z data and all data shall be collected and plotted in metric units (meters).

3.7.2 Sounding Data Standards

The Contractor's hydrographic surveys for progress payment or evidence supporting extreme (storm) weather-related shoaling shall meet or exceed the survey standards listed in EM 1110-2-1003 (Hydrographic Surveying) for Class I surveys. Surveys shall be in the State Plane Coordinate System of 1983 - meters (SPCS 83), Zone 6, State of California.

3.7.3 Positioning System

It is required that hydrographic surveys shall be conducted using an Automated Range-Azimuth Positioning System or Differential Global Positioning System (DGPS) with positional accuracy of +/- 3 meters (1 DRMS) or exceed the survey standards listed in EM 1110-1-1003 and EM 1110-2-1003 that is linked to an automated (digital) depth recording device capable of continuous logging of x,y,z positional data with depth measurement resolution to the nearest five-hundredths (5/100) of a meter. Digital depths shall be supplemented by analog depth records if survey is performed by single beam echosounder. Sounding lines shall be verified by crosslines at least 10 percent of the principal lines and along the centerline of channel. Distance between successive soundings (sounding interval) shall be not greater than 2 meters. Soundings shall be reduced to sounding datum (Mean Lower Low Water) by using measured tides and other appropriate corrections resulting in an accuracy of +/- 0.2 meters from actual depth.

3.7.4 Survey Firm Acceptance

The Contractor's hydrographic surveys for progress payment or evidence supporting extreme (storm) weather-related shoaling shall be performed by an independent Hydrographic Survey Contractor with at least three (3) years of experience in hydrographic surveying of navigable waterways and have either a current Land Surveyor's or a Professional Engineer's license, authorized to certify surveys in the State of California. The hydrographic survey firm selected by the Contractor must be approved by the Contracting Officer prior to performing surveys for this contract. For the Contracting Officer to approve the selected survey firm, the Contractor must provide documentation indicating that modern electronic horizontal positioning and sounding system equipment will be used for the surveys to be performed as well as documentation verifying the experience of the operators using the equipment. Typical information that will be required, as a minimum, includes the name, model, and year of manufacture of the electronic equipment, the electronic frequencies of the horizontal positioning equipment and sounding equipment, and the manufacturer's stated positioning and sounding accuracies, and capability of the equipment proposed for usage. In addition, the Contractor must provide information that a safe and suitable vessel meeting U.S. Coast Guard requirements is available and will be used for operation in the waters where the surveys are to be performed. The Contractor shall submit credentials/qualifications as evidence that qualified, experienced staff are available and will be used for the operation of the vessel as well as for the electronic positioning and sounding equipment.

3.7.5 Data Processing

The Contractor shall use a Data Processing System to map the sounding data and calculate quantities. Reduced sounding data shall then be imported into the Data Processing System where cross-sections are compared to dredge templates and volume quantities are calculated. The software shall be capable of digital terrain modeling and shall produce, as a minimum, sounding sheets, cross section profiles, 3-dimensional area profiles, and quantity volume calculations using the Triangulated Irregular Network (TIN) method.

3.7.6 Surveys During Progress of Work

Contract depth will be determined by soundings or sweeping taken behind the dredge as work progresses. The Contractor shall take progress soundings or sweepings.

3.7.7 Monthly Estimates

Monthly estimates of work completed will be based on the result of soundings taken during the progress of the work or, at the option of the Contracting Officer, on 85 percent of the scow or barge measurement. Deductions will be made for dredging and disposal not in accordance with the specifications.

3.8 GOVERNMENT SURVEYS

The Government will take soundings before and after dredging. The Government will perform one (1) pre-dredge survey after award of the contract and as close to commencement of dredging as possible, but not more than 14 calendar days prior to start of dredging. For the final survey, the Contractor shall notify the Contracting Officer not less than ten (10) working days prior to completion of the work. The Government will perform the final survey as soon as possible after completion of the work, but not more than five (5) calendar days after notice of completion of work, at no cost to the Contractor. All areas found to be in compliance with the contract requirements will be accepted finally and be measured for payment in accordance with SECTION 01250: MEASUREMENT AND PAYMENT.

3.8.1 Final Survey

If the Government is unable to perform the final survey(s) due to the failure of the Contractor to complete the work in accordance with his prior notification, the Contracting Officer will charge the cost of survey plant and standby labor, at $3,000.00 per day, to the Contractor. Preliminary data from the final Government survey will be available within ten (10) working days. If the preliminary survey data indicates that the dredged amount is not at the required quantity, the Contractor will be directed to resume dredging and to complete the work to project quantity. Adjustment in cost for additional Government post-dredge surveys shall be specified in paragraph: FINAL EXAMINATION AND ACCEPTANCE.

3.8.2 Method of Measurement

The material removed will be measured by cubic meters in place, by means of soundings taken before and after dredging. The drawings represent existing conditions based on current available information, but will be verified and corrected, if necessary, by soundings taken before dredging in each area. Soundings will be taken by lead line, 200 kHz single-beam acoustic methods, acoustic multi-beam swath methods, or in combination, as determined by the Government; results of soundings by some or all methods will be the basis for payment. Areas sounded more than 30 days prior to dredging will be re-sounded when requested by the Contractor. The Contractor has the option of being present when such soundings are made.

3.9 FINAL EXAMINATION AND ACCEPTANCE

3.9.1 Final Examination

As soon as practicable after the completion of the entire work and in the opinion of the Contracting Officer, the work will not be subject to damage by further cost and expense of the Government by sounding, a final examination of the work will be conducted as determined by the Contracting Officer. The Contractor or his authorized representative will be notified when soundings are to be made, and will be permitted to accompany the survey party. When the dredged amount is found to be a satisfactory quantity, it will be accepted finally. Should more than two soundings operations by the Government be necessary by reason of completing the work will be charged against the Contractor at the rate of $3,000.00 per day for each day in which the Government plant is engaged in sounding and/or is en route to or from the site or held at or near the said site for such operations.

3.9.2 Final Acceptance

Final acceptance of the whole or a part of the work and the deductions or corrections of deductions made thereon will not be reopened after having once been made, except on evidence of collusion, fraud, or obvious error, and the acceptance of a completed section shall not change the time of payment of the retained percentages of the whole or any part of the work.

-- End of Section --

PRESENTATION OF CPT TESTING RESULTS

SEA FLOOR CPT TESTING
SURFSIDE and SUNSET BEACHES
SEAL BEACH, CALIFORNIA

AUGUST, 2000

Prepared for:

U.S. ARMY CORPS OF ENGINEERS
Los Angeles District

Prepared by:

GREGG DRILLING & TESTING, INC.
Signal Hill, CA

August 22, 2000

TABLE OF CONTENTS

1.0 INTRODUCTION

This report presents the results of an offshore CPT testing program conducted approximately 2 miles offshore from the Surfside and Sunset Beaches near Seal Beach, CA. The purpose of the site investigation is to assess the offshore sediments as suitable borrow material for beach remediation. The program consisted of CPT tests to a depth of up to 24 feet below the mud-line at 26 locations. The depths of water ranged from 46.5 to 64 feet. Gregg's mini-cone sea floor CPT system was used for the CPT testing. The CPT apparatus was deployed from a tugboat/barge configuration.

The CPT testing program was conducted between August 15, 2000 and August 17, 2000. Testing was performed under the direction and supervision of personnel from the Los Angeles office of the U.S. Army Corps of Engineers under work order number DACW09-00-Q-0027.

2.0 FIELD EQUIPMENT AND PROCEDURES

2.1 Sea Floor CPT System

The cone penetration tests (CPT's) were carried out by ***Gregg Drilling & Testing, Inc.*** using an electronic mini-cone CPT system. The sea floor CPT system consists of a sea floor platform housing a hydraulically powered chain driven draw-works, a submersible hydraulic power plant and an under-water electronics housing. The draw-works is used to push the cone into the soil. The cone is attached to a continuous stainless steel coil that is straightened as it goes through a set of rollers in the draw-works and is re-coiled as the cone is retracted. The submersible hydraulic power plant is used to power the draw works and consists of a hydraulic pump, reservoir and a valve system to enable thrust or retract. The electronics canister is a stainless steel chamber housing the electronics for data acquisition and for powering the hydraulic pump motor. The drive system and the coil are shown in Figures 1 and 2.

Figure 1 Sea Floor CPT System

Figure 2 Mini Cone Draw Works

An umbilical bundle of a steel tensile jacket and sealed interior electrical lines allows for remote operation from the surface. The umbilical is spooled on a hydraulically operated power spool as shown in Figure 3. The steel jacket of the umbilical carries the load of the platform as it is lowered from the ship's deck to the sea floor. Gregg's portable A-Frame (Figure 4) was used to deploy and recover the platform from the deck of the barge.

Figure 3. Umbilical Power Spool

Figure 4 Portable A-Frame

Two cone coils were used for this program. Initially a 21 foot coil was used allowing for a maximum penetration of approximately 15 ft. After determining that deeper penetration would be possible a 30 foot coil was installed allowing for penetrations up to approximately 24 ft.

During moves between locations the sea floor platform was pulled up against the stern of the barge or against the landing platform of the A-frame as shown in figure 5.

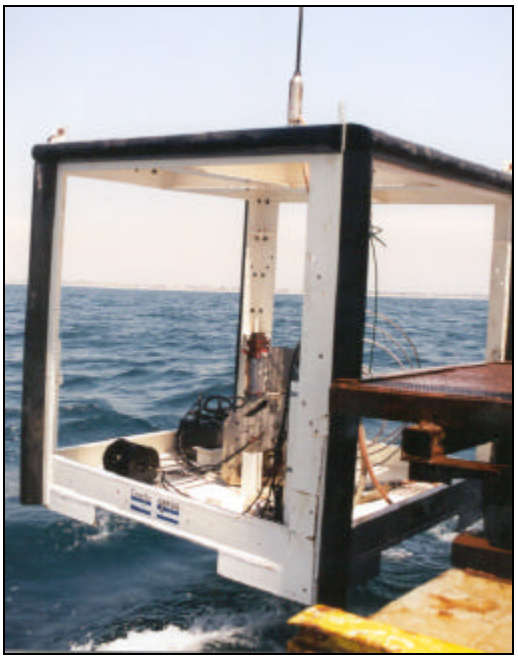


Figure 5 Sea Floor Platform Pulled Against Landing Platform During Moves

Figure 6 Mini Cone Penetrometer

A 45 MPa subtraction type mini cone as shown in Figure 6 was used for all of the soundings. This cone has a tip area of 2 cm^2 and friction sleeve area of 30 cm^2. The Net Area Ratio of the tip for the Mini-CPT probe is 0.82. The Net Area Ratio may be used to correct the tip resistance for the effects of unequal end area and the impact of pore pressure on the tip resistance measurement by means of the following equation:

$$Qt = Qc + (1-A)*U$$

Where the different parameters are defined as follows:

Qt - corrected tip resistance
Qc - measured tip resistance
A - Net Area Ratio (0.82 for Mini-CPT)
U - measured dynamic pore pressure

Pore pressure measurements are not recorded with the offshore Mini-CPT probe and therefore the tip resistance was not corrected for the Net Area Ratio of the probe. In sandy soils the influence of the Net Area Ratio correction on the tip resistance is negligible (i.e. < 3 tsf). The cone is designed with an equal end area friction sleeve, which means that sleeve friction values are not affected by the surrounding water pressure.

The CPT data acquisition system used during the testing program was capable of recording the Tip Resistance (Qc) and the Sleeve Friction (Fs) at 0.025 m depth intervals. Two tilt sensors mounted in the electronics canister allowed for the monitoring of the tilt of the sea floor platform during each sounding. The slope values were not recorded on diskette however, they were observed in real time during the soundings to make sure that the platform was not sliding or being lifted. At each test location the slope of the sea-bed was no more than 1.9 degrees. The typical values were about 0.8°. The slope values were recorded in the field notes and are presented in the testing summary in appendix A.

A plot of the tip resistance was displayed on the screen in real time during penetration. The depth, tip resistance and sleeve friction were stored on disk for future analysis and reference. In two instances the cone was bent during penetration (soundings CPTH-111 and CPTH-106). This was evident from the sudden drop in tip resistance and the high current required to retract the cone. The mini-CPT system has considerable hydraulic power enabling it to straighten the bent sounding rods without having to recover the platform. Data recorded after the cone was bent was removed from the sounding record.

The data acquisition system consists of a sea floor interface canister, a surface interface box and a laptop PC. The sea floor canister provides a connection between the cone, depth wheel and cone-up sensor to the analog to digital (A/D) converters and the digital I/O modules that convert analog signals, monitor the system and control the hydraulics. An underwater connection is made to the umbilical on the top of the canister. The surface interface box connects the data and I/O communication lines from the umbilical to the PC (Figure 7). The Tip and Sleeve data are recorded using 15 bit A/D modules with an operating range of ± 10 mV. The resolution of each module is 0.01% FS with an accuracy of ±0.02% FS (for the cones used this is approximately ±0.25 tsf on the tip). Digital I/O is used to control the hydraulic pump and the thrust/retract valves. A sensor is also used to indicate when the cone has retracted into its housing. Depth control is provided by signals generated from a depth wheel attached to the rollers of the drive system.

Figure 7 Data Acquisition System

2.2 **Procedures**

At each target location a Navy dive team placed a buoy to be used as a visual aid for the tugboat captain. They also recovered a soil sample in the top 8 feet below the mud-line. Having an independent team locate the soundings provided a check on our differential global positioning system (DGPS) to confirm our recorded sounding locations. After the buoy was set, the tugboat maneuvered the mini-cone platform over the target location. Soundings were conducted after the barge's location was stable over the target location.

Gregg Drilling provided navigational guidance for positioning the ship using DGPS hardware and a PC computer-based positioning software. A monitor displaying our current location was located both in the tugboat wheelhouse and in the Data Acquisition trailer. The GPS antenna was placed on the A-Frame to provide a reference location as close as possible to the desired sounding location. Differential corrections were made in real time using a differential beacon receiver and appropriate hardware and software.

The actual test location was recorded from our DGPS system when the platform touched the sea floor.

A complete set of baseline readings were taken prior to each sounding to determine temperature shifts and any zero load offsets. Establishing temperature shifts and load offsets enables corrections to be made to the cone data where necessary. The baselines were recorded when the platform first entered the water and again just before touching the sea floor. The deployment crew held the platform approximately 10 feet off the sea floor for baselines to be recorded. All data channels were zeroed at the surface baseline check. Depth was recorded relative to the platform on the sea floor and was collected at increments of 0.025m.

3.0 **CONE PENETRATION TEST DATA AND INTERPRETATION**

3.1 **CPT Data**

The CPT testing program is summarized in Appendix A. The reported sounding coordinates were recorded when the platform first touched down on the sea floor. Please note that the water depths recorded in the summary table were not corrected for tidal effects. The water depths were measured by the Army Corps field engineer by lowering a weighted tape to the sea bottom from the barge.

We ran into four minor problems during the test program. The first occurred when communications was lost to the electronics canister. After retrieving the platform to the surface it was found that the main canister cable had been pulled out due to wave action. A simple contact cleaning and reconnection of the cable was required to fix the problem. The second occurred at location CPTH-90 where we could not activate the thrust. An output line on the digital I/O module had burned out and was quickly modified by moving the output line on to another channel which is user-selectable in the software. This fix took about 20 minutes. The third problem arose when the hydraulic pump power cord shorted out due to excessive wear against an expanded metal grating. A waterproof field repair was made in approximately one hour. The fourth problem occurred with the tugboat. The work on August 16, 2000 (Wednesday) was stopped at approximately 2:15 when the tugboat lost control of one of its valves. However, because of overtime constraints we normally finished at 3:00 pm each day. By 2:30 that afternoon the seas got too rough to work and we would have been shut down anyway.

The cone penetration test data for the individual soundings are presented in graphical form in Appendices B through E. The plots in Appendix B are standard CPT plots of non-normalized CPT data with an interpreted profile of equivalent SPT $N_{(60)}$ (SPT blow counts for a 60% average energy) values plotted against depth in feet. Appendix C presents plots of normalized CPT data with an interpreted profile of equivalent SPT $N1_{(60)}$ ($N_{(60)}$ corrected for overburden stresses) values plotted against depth in feet. Appendix D presents the same data from Appendix B plotted against depth in meters. Appendix E presents the same data from Appendix C plotted against depth in meters.

All plots were made using the same scales for Tip and Friction plotted in tsf (ton/ft^2 - where 1 ton = 2000 lb). Normalized CPT data (Qtn) is unitless.

3.2 **CPT Interpretations**

The stratigraphic interpretation shown in the plots is based on relationships between cone bearing Qc, sleeve friction Fs and friction ratio Rf. The friction ratio (sleeve friction divided by cone bearing) is a calculated parameter, which is used to infer soil behavior type. Generally, cohesive soils have high friction ratios, low cone bearing and generate large excess pore water pressures. Cohesionless soils have lower friction ratios, high cone bearing and generate little in the way of excess pore water pressures.

The interpretation of soils encountered on this project was carried out using correlations developed by Robertson et al., 1990 (Figure 8). These correlations appear in several of Dr. Robertson's papers and a selected technical paper is presented in Appendix G. It should be noted that it is not always possible to clearly identify a soil type based on Qc, Fs and Rf. Occasionally soils will fall within different soil categories on the classification

charts. In these situations, experience and judgment and an assessment of pore pressure data should be used to infer the soil behavior type. It has been recommended (Lunne, Roberston and Powell, 1997) that normalized parameters be used for CPT interpretations, particularly for deep CPT profiles and for shallow soundings. The normalized parameters take into account the affects of overburden stress. The soundings conducted in this survey would be considered shallow and should be analyzed using the normalized parameters. Both non-normalized and normalized results have been presented in this report for completeness.

Computer tabulations of the interpreted soil types along with several other geotechnical parameters such as relative density, friction angle, soil permeability, Standard Penetration Test (SPT) N_{60} and N_{160} and several liquefaction parameters for each cone sounding is presented in Appendix F. Undrained shear strength has been reported for fine grained and cohesive materials. The estimate of undrained shear strength (Su) was calculated according to the following equation:

$$Su = (Qt-\sigma_{vo})/Nkt$$

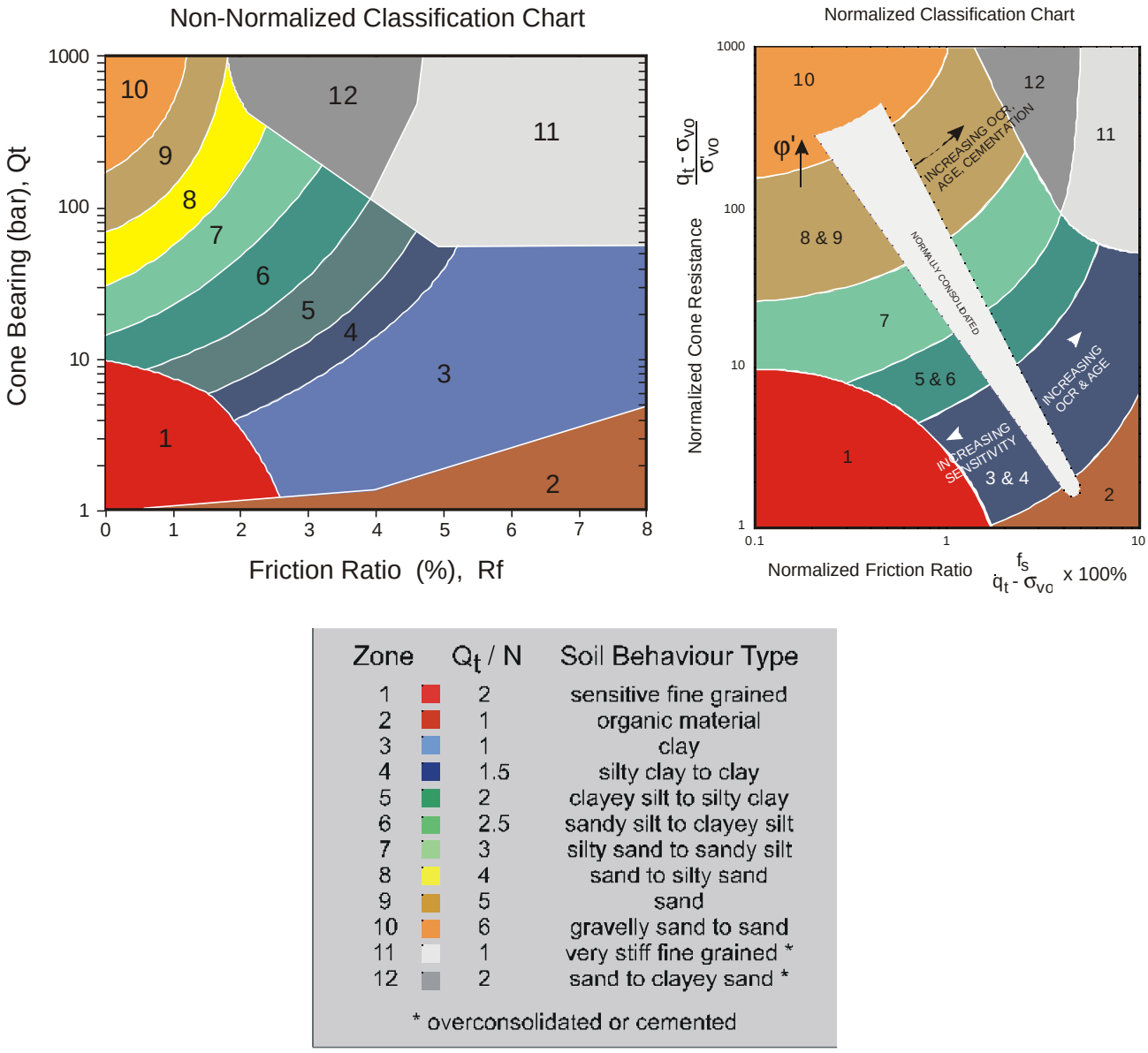
Where the different parameters are defined as follows:

Su - undrained shear strength
Qt - corrected tip resistance
σ_{vo} - Total vertical overburden stress
Nkt - Cone Factor Value

A value of 12.5 was used for the Cone Factor Value (Nkt). This number can vary between 10-20. The estimate of 12.5 was a preliminary estimate, chosen based upon some local experience. The level of conservatism in the estimate of Su increases with increasing Nkt. Note that Su is not an appropriate parameter for all soil zones and is plotted as 0 (zero) for sand and coarse grained zones. Likewise, tabular data is represented by a zero value in zones where the parameter is not appropriate.

The CPT interpretations are based on values averaged over 10 cm layers. The depths reported in the tabular output are the mid layer depths.

The methods used for interpreting each parameter and appropriate references are summarized in a table included in Appendix F.



Zone	Q_t / N	Soil Behaviour Type
1	2	sensitive fine grained
2	1	organic material
3	1	clay
4	1.5	silty clay to clay
5	2	clayey silt to silty clay
6	2.5	sandy silt to clayey silt
7	3	silty sand to sandy silt
8	4	sand to silty sand
9	5	sand
10	6	gravelly sand to sand
11	1	very stiff fine grained *
12	2	sand to clayey sand *

* overconsolidated or cemented

Figure 8 Non-normalized and Normalized Soil Behavior Type Classification Charts (after Roberston, 1990)

It should be noted that the unit weights shown in the tabulated output are generated by the program based on the inferred soil type.

4.0 **Closing**

We trust that the information presented in this report is sufficient for your purposes. Along with the CPT and soil behavior type profiles the interpreted parameters should provide the Geotechnical Project Engineer with sufficient information to make a geotechnical assessment of the proposed borrow area.

If you have any questions regarding the contents of this report, please do not hesitate to contact our office.

Sincerely,

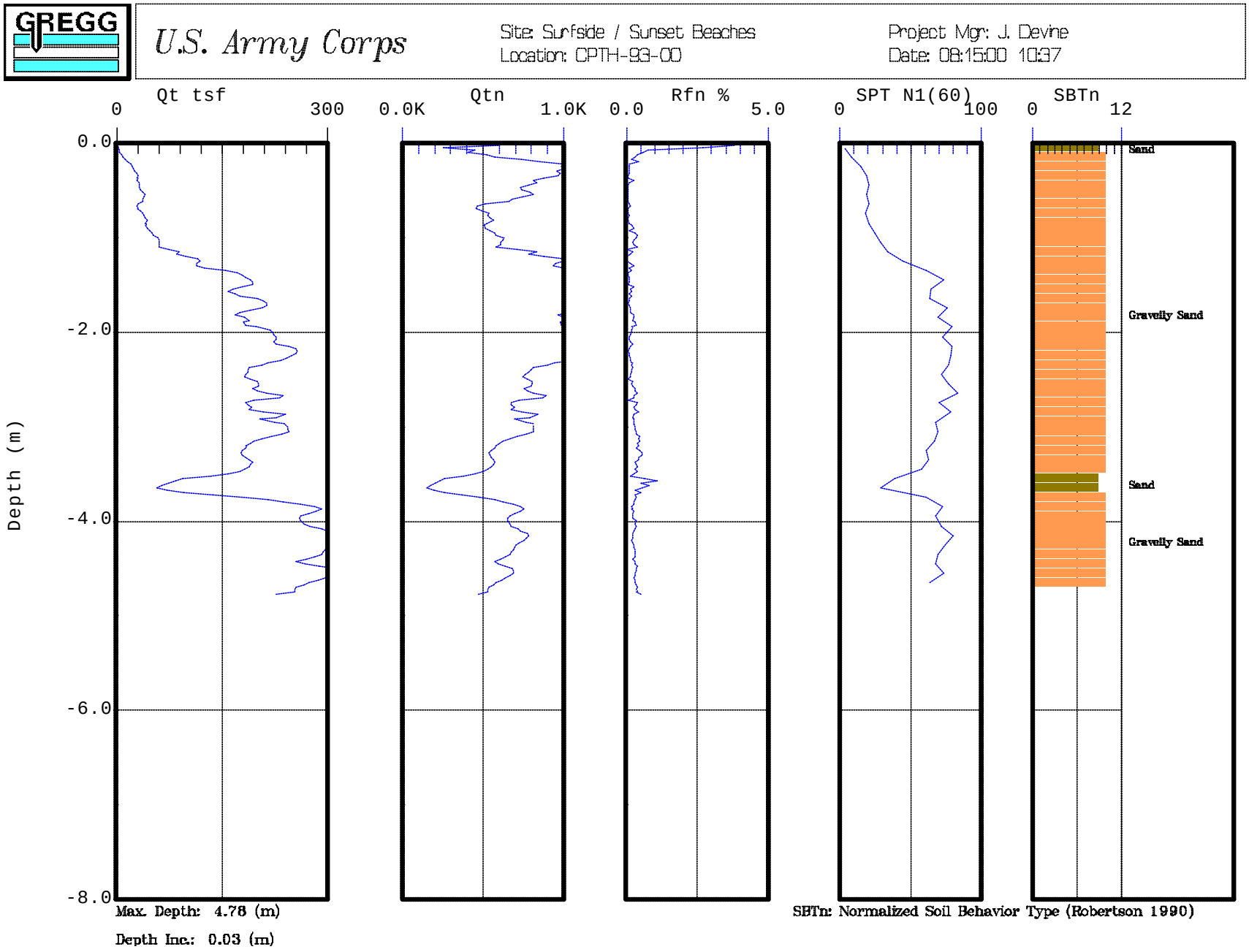
Jim Greig
Gregg Drilling & Testing, Inc.

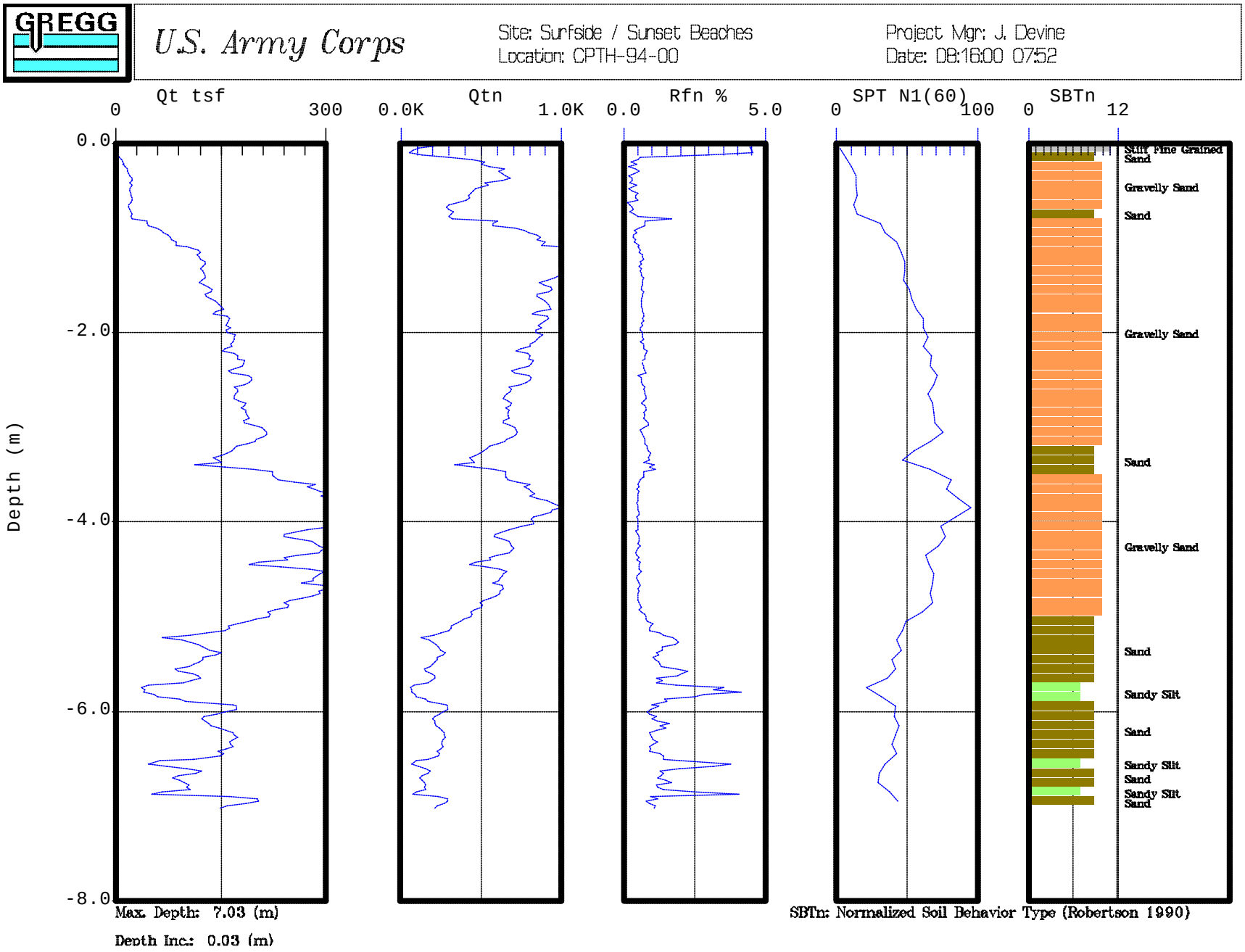
APPENDIX E

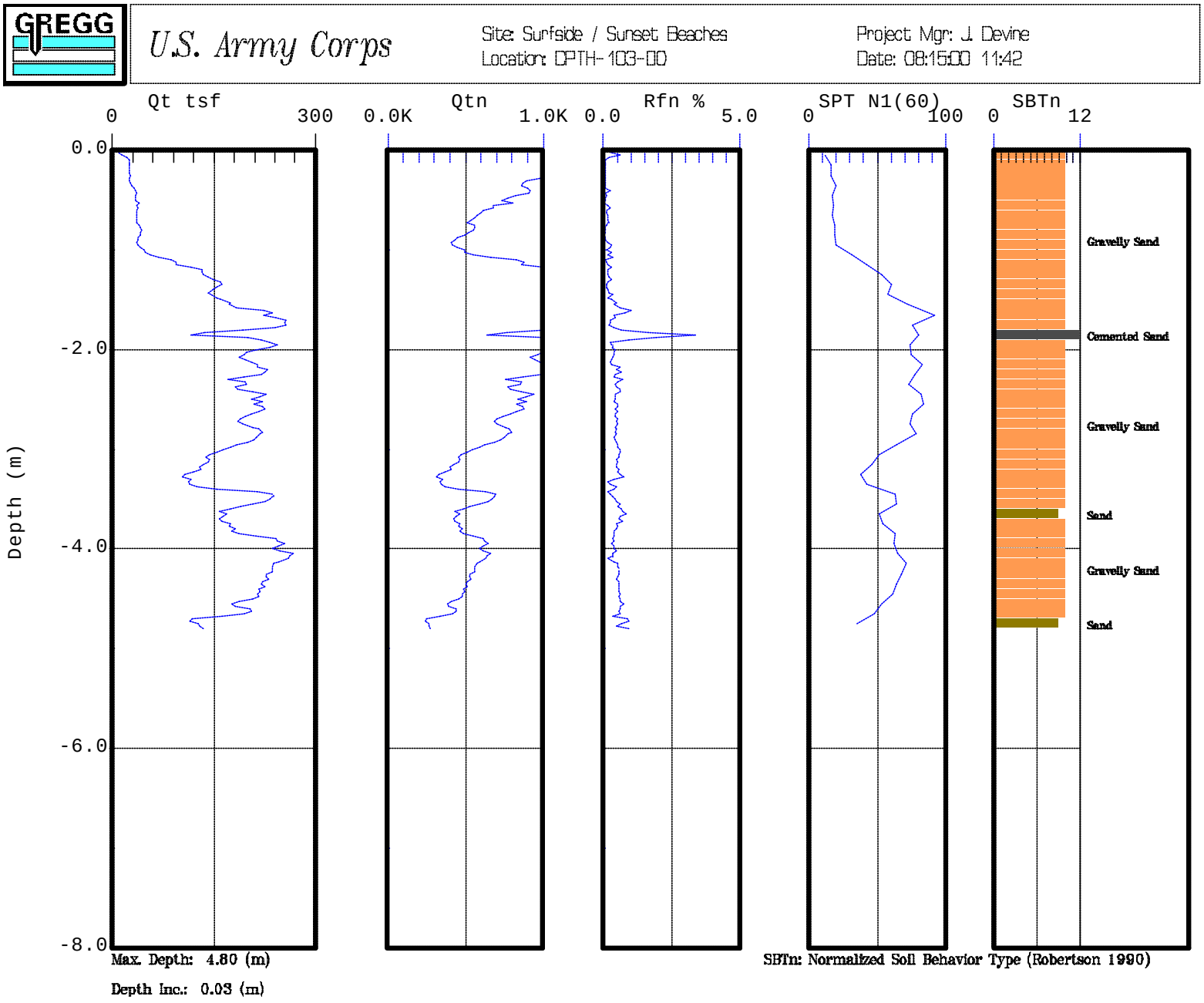
Normalized CPT PLOTS with SPT N_{60} against Depth in Meters

The columns presented in the CPT plots in Appendix E are defined as follows:

Qt -	tip resistance (tsf)
Qtn-	normalized tip resistance defined as $(Qt-\sigma_{vo})/\sigma_{vo}'$
Rfn -	normalized friction ratio (defined as $Fs/(Qt-\sigma_{vo})$ in %)
SPT $N1_{60}$	interpreted Standard Penetration Test blowcount for average energy of 60% corrected for overburden stress (blows/foot)
SBT -	interpreted soil behavior type (after Robertson 1990)


GREGG
U.S. Army Corps
Site: Surfside / Sunset Beaches
Location: CPTH-93-00
Project Mgr: J. Devine
Date: 08:15:00 10:37
Qt tsf
0
300
Qtn
0.0K
1.0K
Rfn %
0.0
5.0
SPT N1(60)
0
100
SBTn
0
12
Depth (m)
0.0
-2.0
-4.0
-6.0
-8.0
Sand
Gravelly Sand
Sand
Gravelly Sand
Max. Depth: 4.78 (m)
Depth Inc.: 0.03 (m)
SBTn: Normalized Soil Behavior Type (Robertson 1990)


GREGG
U.S. Army Corps
Site: Surfside / Sunset Beaches
Location: CPTH-94-00
Project Mgr: J. Devine
Date: 08:16:00 07:52
Qt tsf
0
300
Qtn
0.0K
1.0K
Rfn %
0.0
5.0
SPT N1(60)
0
100
SBTn
0
12
Depth (m)
0.0
-2.0
-4.0
-6.0
-8.0
Stiff Fine Grained
Sand
Gravelly Sand
Sand
Gravelly Sand
Sand
Gravelly Sand
Sand
Sandy Silt
Sand
Sandy Silt
Sand
Sandy Silt
Sand
Max. Depth: 7.03 (m)
Depth Inc.: 0.03 (m)
SBTn: Normalized Soil Behavior Type (Robertson 1990)


GREGG
U.S. Army Corps
Site: Surfside / Sunset Beaches
Location: CPTH-103-00
Project Mgr: J. Devine
Date: 08:15:00 11:42
Qt tsf
0
300
Qtn
0.0K
1.0K
Rfn %
0.0
5.0
SPT N1(60)
0
100
SBTn
0
12
Depth (m)
0.0
-2.0
-4.0
-6.0
-8.0
Gravelly Sand
Cemented Sand
Gravelly Sand
Sand
Gravelly Sand
Sand
Max. Depth: 4.80 (m)
Depth Inc.: 0.03 (m)
SBTn: Normalized Soil Behavior Type (Robertson 1990)

APPENDIX F

CPT Interpretations

The following pages contain the tabular output for a full set of CPT interpretations based on the latest published correlations. The output is prefaced by a description of the interpretations used and their appropriate references.

Gregg In Situ CPT Interpretations as of January 7, 1999 (Release 1.00.19)

Gregg In Situ's interpretation routine should be considered a calculator of current published CPT correlations and is subject to change to reflect the current state of practice. The interpreted values are not considered valid for all soil types. The interpretations are presented only as a guide for geotechnical use and should be carefully scrutinized for consideration in any geotechnical design. Reference to current literature is strongly recommended.

The CPT interpretations are based on values of tip, sleeve friction and pore pressure averaged over a user specified interval (typically 0.25m). Note that Qt is the recorded tip value, Qc, corrected for pore pressure effects. Since all Gregg In Situ cones have equal end area friction sleeves, pore pressure corrections to sleeve friction, Fs, are not required.

The tip correction is: $Qt = Qc + (1-a) \cdot Ud$

where: *Qt* is the corrected tip load
Qc is the recorded tip load
Ud is the recorded dynamic pore pressure
a is the Net Area Ratio for the cone (typically 0.85 for Gregg In Situ cones)

Effective vertical overburden stresses are calculated based on a hydrostatic distribution of equilibrium pore pressures below the water table or from a user defined equilibrium pore pressure profile (this can be obtained from CPT dissipation tests). The stress calculations use unit weights assigned to the Soil Behavior Type zones or from a user defined unit weight profile.

Details regarding the interpretation methods for all of the interpreted parameters is given in table 1. The appropriate references referred to in table 1 are listed in table 2.

The estimated Soil Behavior Type is based on the charts developed by Robertson and Campanella shown in figure 1.

Table 1 CPT Interpretation Methods

Interpreted Parameter	Description	Equation	Ref
Depth	mid layer depth		
AvgQt	Averaged corrected tip (Qt)	$AvgQt = \frac{1}{n}\sum_{i=1}^{n} Qt_i$	
AvgFs	Averaged sleeve friction (Fs)	$AvgFs = \frac{1}{n}\sum_{i=1}^{n} Fs_i$	

AvgRf	Averaged friction ratio (Rf)	$AvgRf = 100\% \bullet \frac{AvgFs}{AvgQt}$	
AvgUd	Averaged dynamic pore pressure (Ud)	$AvgUd = \frac{1}{n}\sum_{i=1}^{n} Ud_i$	
SBT	Soil Behavior Type as defined by Robertson and Campanella		1
U.Wt.	Unit Weight of soil determined from: 1) uniform value or 2) value assigned to each SBT zone 3) user supplied unit weight profile		
TStress	Total vertical overburden stress at mid layer depth	$TStress = \sum_{i=1}^{n} g_i h_i$ where g_i is layer unit weight h_i is layer thickness	
EStress	Effective vertical overburden stress at mid layer depth	$EStress = TStress - Ueq$	
Ueq	Equilibrium pore pressure determined from: 1) hydrostatic from water table depth 2) user supplied profile		
Cn	SPT N_{60} overburden correction factor	$Cn=(s_v')^{-0.5}$ where s_v' *is in tsf* $0.5 < C_n < 2.0$	
N_{60}	SPT N value at 60% energy calculated from Qt/N ratios assigned to each SBT zone		3
$(N1)_{60}$	SPT N_{60} value corrected for overburden pressure	$N1_{60} = Cn \cdot N_{60}$	3
$\Delta(N1)_{60}$	Equivalent Clean Sand Correction to $(N1)_{60}$	$\Delta(N1)_{60} = \frac{K_{SPT}}{1 - K_{SPT}} \bullet (N1)_{60}$ Where: K_{SPT} is defined as: 0.0 for FC < 5% 0.0167 • (FC - 5) for 5% < FC < 35% 0.5 for FC > 35% FC - Fines Content in %	7
$(N1)_{60cs}$	Equivalent Clean Sand $(N1)_{60}$	$(N1)_{60cs} = (N1)_{60} + \Delta(N1)_{60}$	7
Su	Undrained shear strength - Nkt is use selectable	$Su = \frac{Qt - s_v}{N_{kt}}$	2
k	Coefficient of permeability (assigned to each SBT zone)		6
Bq	Pore pressure parameter	$Bq = \frac{\Delta u}{Qt - s_v}$	2
Qtn	Normalized Qt for Soil Behavior Type classification as defined by Robertson, 1990	$Qtn = \frac{Qt - s_v}{s_v'}$	4
Rfn	Normalized Rf for Soil Behavior Type classification as defined by Robertson, 1990	$Rfn = 100\% \bullet \frac{f_s}{Qt - s_v}$	4
SBTn	Normalized Soil Behavior Type (slightly modified from that published by Robertson, 1990. This version includes all the soil zones of the original non-normalized SBT chart - see figure 1)		4
Qc1	Normalized Qt for seismic analysis	$qc1 = qc \bullet (Pa/\sigma_v')^{0.5}$	5

		where: Pa = atm. pressure	
Qc1N	Dimensionless Normalized Qt1	qc1N = qc1 / Pa where: Pa = atm. pressure	
ΔQc1N1	Equivalent clean sand correction	$\Delta qc1N = \frac{K_{CPT}}{1 - K_{CPT}} \bullet qc1N$ Where: K_{CPT} is defined as: 0.0 for FC < 5% 0.0267 • (FC - 5) for 5% < FC < 35% 0.5 for FC > 35% FC - Fines Content in %	5
Qc1Ncs	Clean Sand equivalent Qc1N	*qc1Ncs = qc1N + Dqc1N*	5
Ic	Soil index for estimating grain characteristics	$Ic = [(3.47 - logQ)^2 + (log\ F + 1.22)^2\ ]^{0.5}$	5
FC	Fines content (%)	$FC=1.75(Ic^{3.25}) - 3.7$ *FC=100 for Ic > 3.5* *FC=0 for Ic < 1.26* *FC = 5% if 1.64 < Ic < 2.6 AND Rfn<0.5*	8
PHI	Friction Angle	Campanella and Robertson Durunoglu and Mitchel Janbu	1
Dr	Relative Density	Ticino Sand Hokksund Sand Schmertmann 1976 Jamiolkowski - All Sands	1
OCR	Over Consolidation Ratio		1
State Parameter			9
CRR	Cyclic Resistance Ratio		7

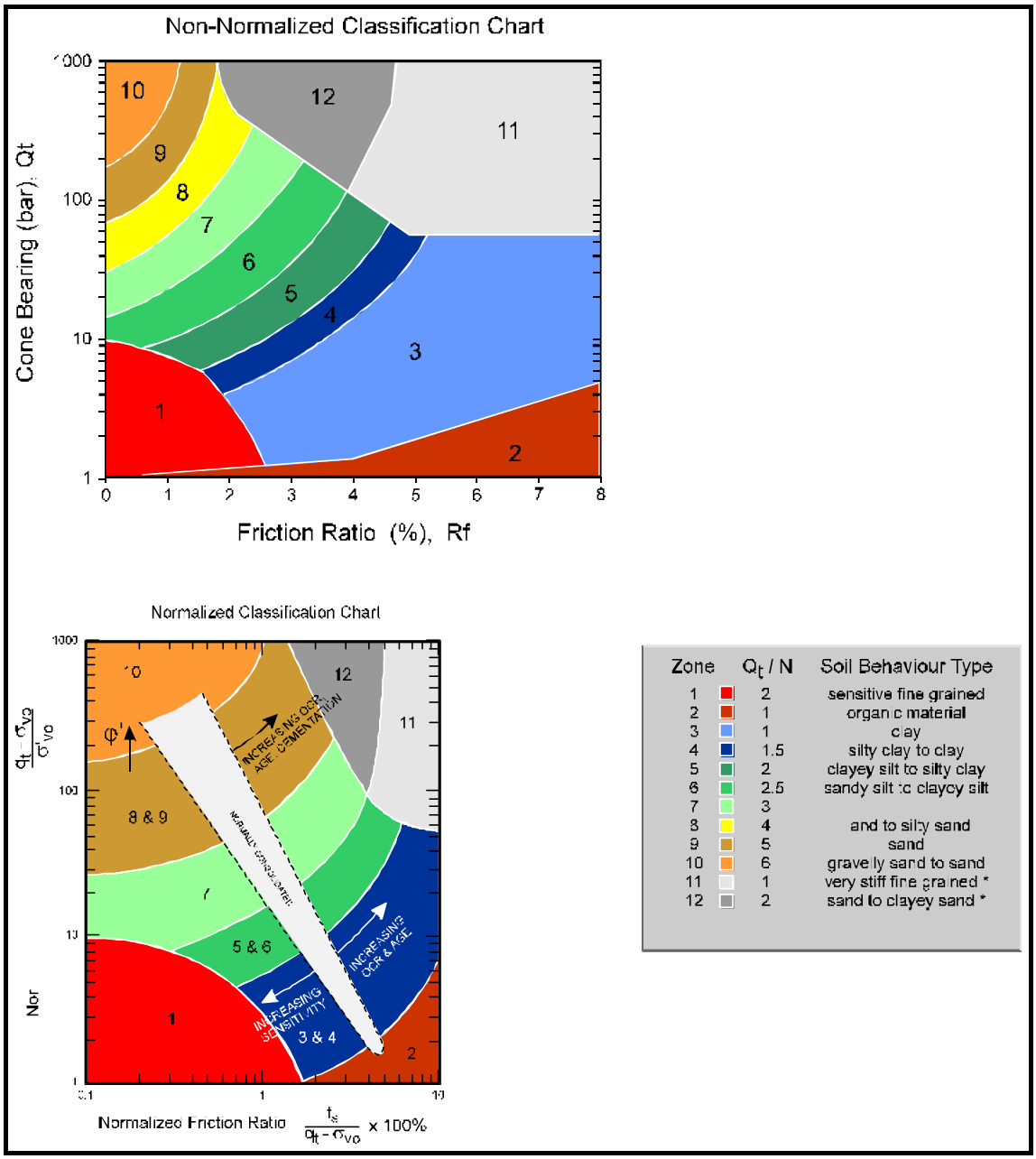


Figure 1 Non-Normalized and Normalized Soil Behavior Type Classification Charts

Table 2 References

No.	Reference
1	Robertson, P.K. and Campanella, R.G., 1986, "Guidelines for Use, Interpretation and Application of the CPT and CPTU", UBC, Soil Mechanics Series No. 105, Civil Eng. Dept., Vancouver, B.C., Canada
2	Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, "Use of Piezometer Cone Data", Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.
3	Robertson, P.K. and Campanella, R.G., 1989, "Guidelines for Geotechnical Design Using CPT and CPTU", UBC, Soil Mechanics Series No. 120, Civil Eng. Dept., Vancouver, B.C., Canada
4	Robertson, P.K., 1990, "Soil Classification Using the Cone Penetration Test", Canadian Geotechnical Journal, Volume 27.
5	Robertson, P.K. and Fear, C.E., 1995, "Liquefaction of Sands and its Evaluation", Keynote Lecture, First International Conference on Earthquake Geotechnical Engineering, Tokyo, Japan.
6	Gregg In Situ Internal Report
7	Robertson, P.K. and Wride, C.E., 1997, "Cyclic Liquefaction and its Evaluation Based on SPT and CPT", NCEER Workshop Paper, January 22, 1997
8	Wride, C.E. and Robertson, P.K., 1997, "Phase II Data Review Report (Massey and Kidd Sites, Fraser River Delta)", Volume 1 - Data Report (June 1997), University of Alberta.
9	Plewes, H.D., Davies, M.P. and Jefferies, M.G., 1992, "CPT Based Screening Procedure for Evaluating Liquefaction Susceptibility", 45th Canadian Geotechnical Conference, Toronto, Ontario, October 1992.

Gregg Drilling & Testing, Inc.
Interpretation Output - Release 1.00.19g
Run No: 00-0822-1528-0390
Job No: Seal Beach Mini CPT
Client: U.S. Army Corps of Engineers - Los Angeles District
Project: Surfside / Sunset Beach Borrow Material Survey
Site: Surfside/Sunset Beaches
Location: CPTH-93-00
Proj. Mgr: J. Devine
CPT Date: 00/15/08
CPT Time: 10:37
CPT File: CPTH-093.COR
Northing (Deg): 33.708
Easting (Deg): 118.100
Elevation (ft): -46.500

Water Table (m): -14.17 (ft): -46.5
Su Nkt used: 12.50
Averaging Increment (m): 0.10
Phi Method : Robertson and Campanella, 1983
Dr Method : Jamiolkowski - All Sands
State Parameter M: 1.20
Used Unit Weights Assigned to Soil Zones
Values of 1.0E9 or UnDef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT	U.Wt. pcf	TStress (tsf)	EStress (tsf)	Ueq (tsf)	Cn	N60 (blows/ft)	(N1)60	Su (tsf)	CRR
0.16	3.5	0.03	0.81	0.0	1	79.6	1.46	0.00	1.46	2.00	1.7	3.4	0.16	0.00
0.49	10.6	0.03	0.28	0.0	6	114.6	1.47	0.01	1.47	2.00	4.1	8.1	0.73	0.00
0.82	23.1	0.02	0.09	0.0	7	117.8	1.49	0.02	1.48	2.00	7.4	14.8	UnDef	0.09
1.15	29.4	0.04	0.12	0.0	7	117.8	1.51	0.02	1.49	2.00	9.4	18.8	UnDef	0.10
1.48	32.4	0.02	0.07	0.0	7	117.8	1.53	0.03	1.50	2.00	10.3	20.7	UnDef	0.10
1.80	38.8	0.02	0.05	0.0	8	120.9	1.55	0.04	1.51	2.00	9.3	18.6	UnDef	0.12
2.13	32.1	0.03	0.09	0.0	7	117.8	1.57	0.05	1.52	2.00	10.3	20.5	UnDef	0.10
2.46	37.5	0.02	0.07	0.0	8	120.9	1.59	0.06	1.53	2.00	9.0	18.0	UnDef	0.11
2.79	42.5	0.06	0.13	0.0	8	120.9	1.61	0.07	1.54	2.00	10.2	20.4	UnDef	0.13
3.12	52.3	0.15	0.28	0.0	8	120.9	1.63	0.08	1.55	2.00	12.5	25.0	UnDef	0.17
3.44	60.2	0.17	0.28	0.0	8	120.9	1.65	0.09	1.56	2.00	14.4	28.8	UnDef	0.22
3.77	87.2	0.09	0.11	0.0	9	124.1	1.67	0.10	1.57	2.00	16.7	33.4	UnDef	0.00
4.10	115.5	0.12	0.11	0.0	9	124.1	1.69	0.11	1.58	2.00	22.1	44.3	UnDef	0.00
4.43	158.8	0.15	0.10	0.0	9	124.1	1.71	0.12	1.59	2.00	30.4	60.8	UnDef	0.00
4.76	190.8	0.17	0.09	0.0	9	124.1	1.73	0.13	1.60	2.00	36.5	73.1	UnDef	0.00
5.09	168.6	0.30	0.18	0.0	9	124.1	1.75	0.14	1.61	2.00	32.3	64.6	UnDef	0.00
5.41	199.8	0.22	0.11	0.0	10	127.3	1.77	0.15	1.62	2.00	31.9	63.8	UnDef	0.00
5.74	196.8	0.23	0.12	0.0	9	124.1	1.79	0.16	1.63	2.00	37.7	75.4	UnDef	0.00
6.07	180.5	0.46	0.25	0.0	9	124.1	1.81	0.17	1.64	2.00	34.6	69.1	UnDef	0.00
6.40	206.2	0.45	0.22	0.0	9	124.1	1.83	0.18	1.65	2.00	39.5	79.0	UnDef	0.00
6.73	226.1	0.27	0.12	0.0	10	127.3	1.85	0.19	1.66	2.00	36.1	72.2	UnDef	0.00
7.05	246.5	0.32	0.13	0.0	10	127.3	1.88	0.20	1.67	2.00	39.3	78.7	UnDef	0.00
7.38	245.6	0.30	0.12	0.0	10	127.3	1.90	0.21	1.68	2.00	39.2	78.4	UnDef	0.00
7.67	204.1	0.41	0.20	0.0	9	124.1	1.91	0.22	1.69	2.00	39.1	78.2	UnDef	0.00
7.96	185.8	0.31	0.17	0.0	9	124.1	1.93	0.23	1.70	2.00	35.6	71.2	UnDef	0.00
8.28	199.2	0.34	0.17	0.0	9	124.1	1.95	0.24	1.71	2.00	38.1	76.3	UnDef	0.00
8.61	211.4	0.65	0.31	0.0	9	124.1	1.97	0.25	1.72	1.99	40.5	80.6	UnDef	0.00
8.94	199.4	0.51	0.26	0.0	9	124.1	1.99	0.26	1.73	1.95	38.2	74.6	UnDef	0.00
9.27	208.0	0.66	0.32	0.0	9	124.1	2.01	0.27	1.74	1.92	39.8	76.3	UnDef	0.00
9.60	223.8	0.57	0.26	0.0	10	127.3	2.03	0.28	1.75	1.88	35.7	67.2	UnDef	0.00
9.92	242.6	0.78	0.32	0.0	10	127.3	2.06	0.29	1.76	1.85	38.7	71.5	UnDef	0.00
10.25	203.7	0.89	0.44	0.0	9	124.1	2.08	0.30	1.77	1.81	39.0	70.8	UnDef	0.00
10.58	181.1	0.79	0.44	0.0	9	124.1	2.10	0.31	1.78	1.79	34.7	61.9	UnDef	0.00
10.91	186.2	0.77	0.41	0.0	9	124.1	2.12	0.32	1.79	1.76	35.7	62.7	UnDef	0.00
11.24	184.7	0.65	0.35	0.0	9	124.1	2.14	0.33	1.80	1.73	35.4	61.2	UnDef	0.00
11.56	117.6	0.53	0.45	0.0	9	124.1	2.16	0.34	1.81	1.70	22.5	38.4	UnDef	0.00
11.89	67.3	0.35	0.52	0.0	8	120.9	2.18	0.35	1.82	1.68	16.1	27.1	UnDef	0.21
12.22	157.6	0.55	0.35	0.0	9	124.1	2.20	0.36	1.83	1.66	30.2	50.0	UnDef	0.00
12.55	268.8	0.60	0.23	0.0	10	127.3	2.22	0.37	1.84	1.63	42.9	70.1	UnDef	0.00
12.88	270.9	0.62	0.23	0.0	10	127.3	2.24	0.38	1.85	1.61	43.2	69.7	UnDef	0.00
13.21	274.8	0.89	0.32	0.0	10	127.3	2.26	0.40	1.86	1.59	43.9	69.8	UnDef	0.00
13.53	317.3	0.71	0.22	0.0	10	127.3	2.28	0.41	1.87	1.57	50.6	79.5	UnDef	0.00

Gregg Drilling & Testing, Inc.
Run No: 00-0822-1528-0390
CPT File: CPTH-093.COR

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT	U.Wt. pcf	TStress (tsf)	EStress (tsf)	Ueq (tsf)	Cn	N60 (blows/ft)	(N1)60	Su (tsf)	CRR
13.86	306.4	0.73	0.24	0.0	10	127.3	2.30	0.42	1.88	1.55	48.9	75.8	UnDef	0.00
14.19	291.6	0.89	0.30	0.0	10	127.3	2.32	0.43	1.89	1.53	46.5	71.2	UnDef	0.00
14.52	270.9	0.82	0.30	0.0	10	127.3	2.34	0.44	1.91	1.51	43.2	65.3	UnDef	0.00
14.85	312.1	1.02	0.33	0.0	10	127.3	2.36	0.45	1.92	1.49	49.8	74.4	UnDef	0.00
15.17	281.7	0.87	0.31	0.0	10	127.3	2.38	0.46	1.93	1.48	45.0	66.3	UnDef	0.00

Gregg Drilling & Testing, Inc.
Interpretation Output - Release 1.00.19g
Run No: 00-0822-1528-0390
Job No: Seal Beach Mini CPT
Client: U.S. Army Corps of Engineers - Los Angeles District
Project: Surfside / Sunset Beach Borrow Material Survey
Site: Surfside/Sunset Beaches
Location: CPTH-93-00
Proj. Mgr: J. Devine
CPT Date: 00/15/08
CPT Time: 10:37
CPT File: CPTH-093.COR
Northing (Deg): 33.708
Easting (Deg): 118.100
Elevation (ft): -46.500

Water Table (m): -14.17 (ft): -46.5
Su Nkt used: 12.50
Averaging Increment (m): 0.10
Phi Method : Robertson and Campanella, 1983
Dr Method : Jamiolkowski - All Sands
State Parameter M: 1.20
Used Unit Weights Assigned to Soil Zones
Values of 1.0E9 or UnDef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	k (cm/s)	Bq	Qtn	Rfn	SBTn	Qc1N	DeltaQc1N	Qc1Ncs	Fc (%)	Phi (Deg)	Dr (%)	OCR	State Param	Del(n1)60	(N1)60cs
0.16	1.0E-07	-0.71	1000.0	1.38	12	6.7	UnDef	UnDef	0.0	UnDef	UnDef	10.0	UnDef	UnDef	UnDef
0.49	5.0E-05	-0.16	1000.0	0.32	10	20.3	0.0	20.3	0.0	50	73.3	10.0	-0.30	0.0	8.1
0.82	5.0E-04	-0.07	1000.0	0.10	10	44.3	0.0	44.3	0.0	50	84.1	1.0	-0.20	0.0	14.8
1.15	5.0E-04	-0.05	1000.0	0.13	10	56.4	0.0	56.4	0.0	50	84.5	1.0	-0.22	0.0	18.8
1.48	5.0E-04	-0.05	905.2	0.08	10	62.0	0.0	62.0	0.0	50	82.7	1.0	-0.16	0.0	20.7
1.80	5.0E-03	-0.04	859.2	0.05	10	74.4	0.0	74.4	0.0	50	84.5	1.0	-0.13	0.0	18.6
2.13	5.0E-04	-0.05	579.7	0.09	10	61.5	0.0	61.5	0.0	50	76.3	1.0	-0.14	0.0	20.5
2.46	5.0E-03	-0.04	579.4	0.07	10	71.9	0.0	71.9	0.0	50	78.4	1.0	-0.12	0.0	18.0
2.79	5.0E-03	-0.04	570.8	0.14	10	81.4	0.0	81.4	0.0	50	79.9	1.0	-0.17	0.0	20.4
3.12	5.0E-03	-0.03	623.6	0.29	10	100.2	0.0	100.2	0.0	50	84.1	1.0	-0.24	0.0	25.0
3.44	5.0E-03	-0.03	644.6	0.29	10	115.3	0.0	115.3	0.0	50	86.5	1.0	-0.25	0.0	28.8
3.77	5.0E-02	-0.02	849.6	0.11	10	167.1	0.0	167.1	0.0	50	95.0	1.0	-0.19	0.0	33.4
4.10	5.0E-02	-0.01	1000.0	0.11	10	221.3	0.0	221.3	0.0	50	95.0	1.0	-0.20	0.0	44.3
4.43	5.0E-02	-0.01	1000.0	0.10	10	304.1	0.0	304.1	0.0	50	95.0	1.0	-0.19	0.0	60.8
4.76	5.0E-02	-0.01	1000.0	0.09	10	365.4	0.0	365.4	0.0	50	95.0	1.0	-0.18	0.0	73.1
5.09	5.0E-02	-0.01	1000.0	0.18	10	322.9	0.0	322.9	0.0	50	95.0	1.0	-0.24	0.0	64.6
5.41	5.0E+00	-0.01	1000.0	0.11	10	382.6	0.0	382.6	0.0	50	95.0	1.0	-0.20	0.0	63.8
5.74	5.0E-02	-0.01	1000.0	0.12	10	376.9	0.0	376.9	0.0	50	95.0	1.0	-0.21	0.0	75.4
6.07	5.0E-02	-0.01	1000.0	0.26	10	345.7	0.0	345.7	0.0	50	95.0	1.0	-0.27	0.0	69.1
6.40	5.0E-02	-0.01	1000.0	0.22	10	395.0	0.0	395.0	0.0	50	95.0	1.0	-0.26	0.0	79.0
6.73	5.0E+00	-0.01	1000.0	0.12	10	433.0	0.0	433.0	0.0	50	95.0	1.0	-0.21	0.0	72.2
7.05	5.0E+00	-0.01	1000.0	0.13	10	472.1	0.0	472.1	0.0	50	95.0	1.0	-0.22	0.0	78.7
7.38	5.0E+00	-0.01	1000.0	0.12	10	470.3	0.0	470.3	0.0	50	95.0	1.0	-0.21	0.0	78.4
7.67	5.0E-02	-0.01	907.1	0.20	10	391.0	0.0	391.0	0.0	50	95.0	1.0	-0.24	0.0	78.2
7.96	5.0E-02	-0.01	793.2	0.17	10	355.8	0.0	355.8	0.0	50	95.0	1.0	-0.22	0.0	71.2
8.28	5.0E-02	-0.01	815.3	0.17	10	381.5	0.0	381.5	0.0	50	95.0	1.0	-0.22	0.0	76.3
8.61	5.0E-02	-0.01	830.8	0.31	10	404.8	0.0	404.8	0.0	50	95.0	1.0	-0.27	0.0	80.6
8.94	5.0E-02	-0.01	752.8	0.26	10	381.0	0.0	381.0	0.0	50	95.0	1.0	-0.25	0.0	74.6
9.27	5.0E-02	-0.01	756.4	0.32	10	390.0	0.0	390.0	0.0	50	95.0	1.0	-0.27	0.0	76.3
9.60	5.0E+00	-0.01	784.7	0.26	10	412.0	0.0	412.0	0.0	50	95.0	1.0	-0.25	0.0	67.2
9.92	5.0E+00	-0.01	820.2	0.32	10	438.4	0.0	438.4	0.0	50	95.0	1.0	-0.28	0.0	71.5
10.25	5.0E-02	-0.01	663.9	0.44	10	361.7	0.0	361.7	0.0	50	95.0	1.0	-0.28	0.0	70.8
10.58	5.0E-02	-0.01	570.6	0.44	10	316.4	0.0	316.4	0.0	50	95.0	1.0	-0.27	0.0	61.9
10.91	5.0E-02	-0.01	568.4	0.42	10	320.2	0.0	320.2	0.0	50	95.0	1.0	-0.27	0.0	62.7
11.24	5.0E-02	-0.01	546.5	0.36	10	312.7	0.0	312.7	0.0	50	95.0	1.0	-0.25	0.0	61.2
11.56	5.0E-02	-0.02	335.4	0.46	10	196.2	0.0	196.2	0.3	48	86.6	1.0	-0.23	0.0	38.4
11.89	5.0E-03	-0.03	184.1	0.54	9	110.8	0.0	110.8	3.3	44	70.2	1.0	-0.19	0.0	27.1
12.22	5.0E-02	-0.01	427.0	0.35	10	255.6	0.0	255.6	0.0	48	94.2	1.0	-0.23	0.0	50.0
12.55	5.0E+00	-0.01	712.4	0.23	10	430.0	0.0	430.0	0.0	50	95.0	1.0	-0.23	0.0	70.1
12.88	5.0E+00	-0.01	698.0	0.23	10	427.3	0.0	427.3	0.0	50	95.0	1.0	-0.23	0.0	69.7
13.21	5.0E+00	-0.01	689.1	0.33	10	427.6	0.0	427.6	0.0	50	95.0	1.0	-0.26	0.0	69.8
13.53	5.0E+00	-0.01	775.6	0.23	10	487.2	0.0	487.2	0.0	50	95.0	1.0	-0.24	0.0	79.5

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Run No: 00-0822-1528-0390
CPT File: CPTH-093.COR

Depth (ft)	k (cm/s)	Bq	Qtn	Rfn	SBTn	Qc1N	DeltaQc1N	Qc1Ncs	Fc (%)	Phi (Deg)	Dr (%)	OCR	State Param	Del(n1)60	(N1)60cs
13.86	5.0E+00	-0.01	729.5	0.24	10	464.4	0.0	464.4	0.0	50	95.0	1.0	-0.24	0.0	75.8
14.19	5.0E+00	-0.01	676.8	0.31	10	436.5	0.0	436.5	0.0	50	95.0	1.0	-0.25	0.0	71.2
14.52	5.0E+00	-0.01	613.1	0.31	10	400.6	0.0	400.6	0.0	50	95.0	1.0	-0.25	0.0	65.3
14.85	5.0E+00	-0.01	690.2	0.33	10	455.9	0.0	455.9	0.0	50	95.0	1.0	-0.26	0.0	74.4
15.17	5.0E+00	-0.01	608.0	0.31	10	406.7	0.0	406.7	0.0	50	95.0	1.0	-0.25	0.0	66.3

Gregg Drilling & Testing, Inc.
Interpretation Output - Release 1.00.19g
Run No: 00-0822-1528-0357
Job No: Seal Beach Mini CPT
Client: U.S. Army Corps of Engineers - Los Angeles District
Project: Surfside / Sunset Beach Borrow Material Survey
Site: Surfside/Sunset Beaches
Location: CPTH-94-00
Proj. Mgr: J. Devine
CPT Date: 00/16/08
CPT Time: 07:52
CPT File: CPTH-094.COR
Northing (Deg): 33.705
Easting (Deg): 118.104
Elevation (ft): -49.500

Water Table (m): -15.09 (ft): -49.5
Su Nkt used: 12.50
Averaging Increment (m): 0.10
Phi Method : Robertson and Campanella, 1983
Dr Method : Jamiolkowski - All Sands
State Parameter M: 1.20
Used Unit Weights Assigned to Soil Zones
Values of 1.0E9 or UnDef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT	U.Wt. pcf	TStress (tsf)	EStress (tsf)	Ueq (tsf)	Cn	N60 (blows/ft)	(N1)60	Su (tsf)	CRR
0.16	2.0	0.02	1.00	0.0	1	79.6	1.55	0.00	1.55	2.00	1.0	1.9	0.04	0.00
0.49	6.5	0.03	0.42	0.0	1	79.6	1.57	0.00	1.56	2.00	3.1	6.2	0.39	0.00
0.82	14.1	0.05	0.35	0.0	6	114.6	1.58	0.01	1.57	2.00	5.4	10.8	1.00	0.00
1.15	21.2	0.05	0.25	0.0	7	117.8	1.60	0.02	1.58	2.00	6.8	13.6	UnDef	0.09
1.48	21.0	0.05	0.25	0.0	7	117.8	1.62	0.03	1.59	2.00	6.7	13.4	UnDef	0.09
1.80	22.1	0.09	0.42	0.0	7	117.8	1.64	0.04	1.60	2.00	7.1	14.1	UnDef	0.09
2.13	19.4	0.04	0.21	0.0	7	117.8	1.66	0.05	1.61	2.00	6.2	12.4	UnDef	0.08
2.46	22.6	0.15	0.66	0.0	7	117.8	1.68	0.06	1.62	2.00	7.2	14.4	UnDef	0.09
2.79	48.2	0.32	0.65	0.0	7	117.8	1.70	0.06	1.63	2.00	15.4	30.8	UnDef	0.15
3.12	71.5	0.25	0.36	0.0	8	120.9	1.72	0.07	1.64	2.00	17.1	34.2	UnDef	0.32
3.44	87.9	0.40	0.45	0.0	8	120.9	1.74	0.08	1.65	2.00	21.0	42.1	UnDef	0.00
3.77	118.3	0.69	0.58	0.0	9	124.1	1.76	0.09	1.66	2.00	22.7	45.3	UnDef	0.00
4.10	125.3	0.75	0.60	0.0	9	124.1	1.78	0.10	1.67	2.00	24.0	48.0	UnDef	0.00
4.43	125.1	0.75	0.60	0.0	9	124.1	1.80	0.11	1.68	2.00	24.0	47.9	UnDef	0.00
4.76	123.6	0.80	0.65	0.0	9	124.1	1.82	0.12	1.69	2.00	23.7	47.3	UnDef	0.00
5.09	133.5	0.85	0.64	0.0	9	124.1	1.84	0.13	1.70	2.00	25.6	51.2	UnDef	0.00
5.41	139.3	0.87	0.63	0.0	9	124.1	1.86	0.14	1.71	2.00	26.7	53.4	UnDef	0.00
5.74	147.1	0.95	0.65	0.0	9	124.1	1.88	0.15	1.72	2.00	28.2	56.4	UnDef	0.00
6.07	160.1	1.05	0.66	0.0	9	124.1	1.90	0.16	1.74	2.00	30.7	61.3	UnDef	0.00
6.40	159.9	0.98	0.61	0.0	9	124.1	1.92	0.17	1.75	2.00	30.6	61.2	UnDef	0.00
6.73	169.2	1.08	0.64	0.0	9	124.1	1.94	0.18	1.76	2.00	32.4	64.8	UnDef	0.00
7.05	159.8	1.14	0.71	0.0	9	124.1	1.96	0.19	1.77	2.00	30.6	61.2	UnDef	0.00
7.38	175.3	1.24	0.71	0.0	9	124.1	1.98	0.20	1.78	2.00	33.6	67.1	UnDef	0.00
7.67	177.6	1.20	0.68	0.0	9	124.1	2.00	0.21	1.78	2.00	34.0	68.0	UnDef	0.00
7.96	177.6	1.16	0.65	0.0	9	124.1	2.02	0.22	1.79	2.00	34.0	68.0	UnDef	0.00
8.28	184.6	1.20	0.65	0.0	9	124.1	2.04	0.23	1.80	2.00	35.4	70.7	UnDef	0.00
8.61	171.7	1.23	0.72	0.0	9	124.1	2.06	0.24	1.81	2.00	32.9	65.8	UnDef	0.00
8.94	178.4	1.25	0.70	0.0	9	124.1	2.08	0.25	1.82	1.99	34.2	68.1	UnDef	0.00
9.27	184.8	1.36	0.74	0.0	9	124.1	2.10	0.26	1.83	1.95	35.4	69.1	UnDef	0.00
9.60	189.0	1.49	0.79	0.0	9	124.1	2.12	0.27	1.85	1.92	36.2	69.4	UnDef	0.00
9.92	213.5	1.35	0.63	0.0	9	124.1	2.14	0.28	1.86	1.88	40.9	76.9	UnDef	0.00
10.25	199.5	1.44	0.72	0.0	9	124.1	2.16	0.29	1.87	1.85	38.2	70.6	UnDef	0.00
10.58	166.7	1.41	0.84	0.0	9	124.1	2.18	0.30	1.88	1.82	31.9	58.0	UnDef	0.00
10.91	147.1	1.23	0.84	0.0	9	124.1	2.20	0.31	1.89	1.79	28.2	50.4	UnDef	0.00
11.24	172.6	1.58	0.92	0.0	9	124.1	2.22	0.32	1.90	1.76	33.0	58.2	UnDef	0.00
11.56	234.0	1.43	0.61	0.0	9	124.1	2.24	0.33	1.91	1.73	44.8	77.7	UnDef	0.00
11.89	284.2	1.42	0.50	0.0	10	127.3	2.26	0.34	1.92	1.71	45.4	77.4	UnDef	0.00
12.22	312.5	1.51	0.48	0.0	10	127.3	2.28	0.35	1.93	1.68	49.9	83.8	UnDef	0.00
12.55	364.1	1.70	0.47	0.0	10	127.3	2.30	0.36	1.94	1.66	58.1	96.2	UnDef	0.00
12.88	336.1	1.64	0.49	0.0	10	127.3	2.32	0.38	1.95	1.63	53.6	87.6	UnDef	0.00
13.21	307.7	1.50	0.49	0.0	10	127.3	2.34	0.39	1.96	1.61	49.1	79.0	UnDef	0.00
13.53	252.2	1.22	0.48	0.0	10	127.3	2.36	0.40	1.97	1.59	40.2	63.9	UnDef	0.00

new-6.tif (2550x3310x2 tiff)

Gregg Drilling & Testing, Inc.
Run No: 00-0822-1528-0357
CPT File: CPTH-094.COR

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT	U.Wt. pcf	TStress (tsf)	EStress (tsf)	Ueq (tsf)	Cn	N60 (blows/ft)	(N1)60	Su (tsf)	CRR
13.86	288.4	1.49	0.52	0.0	10	127.3	2.39	0.41	1.98	1.57	46.0	72.1	UnDef	0.00
14.19	271.9	1.24	0.46	0.0	10	127.3	2.41	0.42	1.99	1.55	43.4	67.1	UnDef	0.00
14.52	219.3	1.13	0.51	0.0	9	124.1	2.43	0.43	2.00	1.53	42.0	64.2	UnDef	0.00
14.85	288.8	1.53	0.53	0.0	10	127.3	2.45	0.44	2.01	1.51	46.1	69.6	UnDef	0.00
15.17	282.0	1.42	0.50	0.0	10	127.3	2.47	0.45	2.02	1.49	45.0	67.1	UnDef	0.00
15.50	291.3	1.43	0.49	0.0	10	127.3	2.49	0.46	2.03	1.47	46.5	68.6	UnDef	0.00
15.83	251.2	1.30	0.52	0.0	9	124.1	2.51	0.47	2.04	1.46	48.1	70.2	UnDef	0.00
16.16	227.6	1.40	0.62	0.0	9	124.1	2.53	0.48	2.05	1.44	43.6	62.9	UnDef	0.00
16.49	195.5	1.62	0.83	0.0	9	124.1	2.55	0.49	2.06	1.43	37.4	53.5	UnDef	0.00
16.81	152.4	1.48	0.97	0.0	9	124.1	2.57	0.50	2.07	1.41	29.2	41.3	UnDef	0.00
17.14	93.7	1.55	1.66	0.0	7	117.8	2.59	0.51	2.08	1.40	29.9	41.9	UnDef	0.39
17.47	132.1	1.80	1.36	0.0	8	120.9	2.61	0.52	2.09	1.39	31.6	43.9	UnDef	0.00
17.80	127.3	1.43	1.12	0.0	8	120.9	2.63	0.53	2.10	1.37	30.5	41.9	UnDef	0.00
18.13	97.2	1.54	1.58	0.0	7	117.8	2.65	0.54	2.11	1.36	31.0	42.3	UnDef	0.39
18.45	114.0	1.78	1.56	0.0	8	120.9	2.67	0.55	2.12	1.35	27.3	36.9	UnDef	0.00
18.78	55.6	1.09	1.95	0.0	7	117.8	2.69	0.56	2.13	1.34	17.8	23.8	UnDef	0.19
19.11	61.1	1.42	2.32	0.0	6	114.6	2.71	0.57	2.14	1.33	23.4	31.1	4.67	0.25
19.44	152.9	1.68	1.10	0.0	8	120.9	2.73	0.58	2.15	1.32	36.6	48.3	UnDef	0.00
19.77	137.3	1.27	0.93	0.0	9	124.1	2.75	0.59	2.16	1.31	26.3	34.4	UnDef	0.00
20.09	136.1	1.84	1.35	0.0	8	120.9	2.77	0.59	2.17	1.30	32.6	42.2	UnDef	0.00
20.42	167.9	1.64	0.98	0.0	9	124.1	2.79	0.60	2.18	1.29	32.1	41.3	UnDef	0.00
20.75	165.4	1.69	1.02	0.0	9	124.1	2.81	0.61	2.19	1.28	31.7	40.4	UnDef	0.00
21.08	151.6	1.68	1.11	0.0	8	120.9	2.83	0.62	2.20	1.27	36.3	45.9	UnDef	0.00
21.41	73.4	1.64	2.24	0.0	7	117.8	2.85	0.63	2.21	1.26	23.4	29.4	UnDef	0.29
21.74	107.4	1.55	1.44	0.0	8	120.9	2.87	0.64	2.22	1.25	25.7	32.1	UnDef	0.40
22.06	93.6	1.25	1.33	0.0	8	120.9	2.89	0.65	2.23	1.24	22.4	27.7	UnDef	0.30
22.39	81.2	1.53	1.89	0.0	7	117.8	2.91	0.66	2.24	1.23	25.9	31.8	UnDef	0.29
22.72	188.4	1.77	0.94	0.0	9	124.1	2.93	0.67	2.25	1.22	36.1	44.0	UnDef	0.00

Gregg Drilling & Testing, Inc.
Interpretation Output - Release 1.00.19g
Run No: 00-0822-1528-0357
Job No: Seal Beach Mini CPT
Client: U.S. Army Corps of Engineers - Los Angeles District
Project: Surfside / Sunset Beach Borrow Material Survey
Site: Surfside/Sunset Beaches
Location: CPTH-94-00
Proj. Mgr: J. Devine
CPT Date: 00/16/08
CPT Time: 07:52
CPT File: CPTH-094.COR
Northing (Deg): 33.705
Easting (Deg): 118.104
Elevation (ft): -49.500

Water Table (m): -15.09 (ft): -49.5
Su Nkt used: 12.50
Averaging Increment (m): 0.10
Phi Method : Robertson and Campanella, 1983
Dr Method : Jamiolkowski - All Sands
State Parameter M: 1.20
Used Unit Weights Assigned to Soil Zones
Values of 1.0E9 or UnDef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	k (cm/s)	Bq	Qtn	Rfn	SBTn	Qc1N	DeltaQc1N	Qc1Ncs	Fc (%)	Phi (Deg)	Dr (%)	OCR	State Param	Del(n1)60	(N1)60cs
0.16	1.0E-07	-3.42	322.4	4.43	12	3.8	UnDef	UnDef	0.0	UnDef	UnDef	10.0	UnDef	UnDef	UnDef
0.49	1.0E-07	-0.32	1000.0	0.56	10	12.4	0.0	12.4	0.0	UnDef	UnDef	10.0	UnDef	0.0	6.2
0.82	5.0E-05	-0.13	1000.0	0.40	10	27.0	0.0	27.0	0.0	50	76.6	10.0	-0.32	0.0	10.8
1.15	5.0E-04	-0.08	1000.0	0.27	10	40.7	0.0	40.7	0.0	50	79.3	1.0	-0.28	0.0	13.6
1.48	5.0E-04	-0.08	696.1	0.27	10	40.1	0.0	40.1	0.0	50	73.2	1.0	-0.25	0.0	13.4
1.80	5.0E-04	-0.08	556.1	0.45	10	42.4	0.0	42.4	0.0	50	70.7	1.0	-0.28	0.0	14.1
2.13	5.0E-04	-0.09	386.7	0.23	10	37.2	0.0	37.2	0.0	48	63.8	1.0	-0.19	0.0	12.4
2.46	5.0E-04	-0.08	380.0	0.72	9	43.2	0.0	43.2	1.5	48	65.6	1.0	-0.29	0.0	14.4
2.79	5.0E-04	-0.04	725.4	0.68	10	92.3	0.0	92.3	0.0	50	85.1	1.0	-0.34	0.0	30.8
3.12	5.0E-03	-0.02	950.0	0.37	10	136.9	0.0	136.9	0.0	50	94.5	1.0	-0.30	0.0	34.2
3.44	5.0E-03	-0.02	1000.0	0.46	10	168.4	0.0	168.4	0.0	50	95.0	1.0	-0.33	0.0	42.1
3.77	5.0E-02	-0.01	1000.0	0.59	10	226.6	0.0	226.6	0.0	50	95.0	1.0	-0.35	0.0	45.3
4.10	5.0E-02	-0.01	1000.0	0.61	10	240.0	0.0	240.0	0.0	50	95.0	1.0	-0.35	0.0	48.0
4.43	5.0E-02	-0.01	1000.0	0.61	10	239.6	0.0	239.6	0.0	50	95.0	1.0	-0.35	0.0	47.9
4.76	5.0E-02	-0.01	988.2	0.66	10	236.7	0.0	236.7	0.0	50	95.0	1.0	-0.36	0.0	47.3
5.09	5.0E-02	-0.01	987.8	0.64	10	255.8	0.0	255.8	0.0	50	95.0	1.0	-0.36	0.0	51.2
5.41	5.0E-02	-0.01	958.4	0.63	10	266.9	0.0	266.9	0.0	50	95.0	1.0	-0.35	0.0	53.4
5.74	5.0E-02	-0.01	945.9	0.66	10	281.8	0.0	281.8	0.0	50	95.0	1.0	-0.35	0.0	56.4
6.07	5.0E-02	-0.01	966.6	0.66	10	306.7	0.0	306.7	0.0	50	95.0	1.0	-0.36	0.0	61.3
6.40	5.0E-02	-0.01	908.6	0.62	10	306.2	0.0	306.2	0.0	50	95.0	1.0	-0.35	0.0	61.2
6.73	5.0E-02	-0.01	909.5	0.64	10	324.1	0.0	324.1	0.0	50	95.0	1.0	-0.35	0.0	64.8
7.05	5.0E-02	-0.01	813.2	0.72	10	306.0	0.0	306.0	0.0	50	95.0	1.0	-0.35	0.0	61.2
7.38	5.0E-02	-0.01	848.7	0.72	10	335.7	0.0	335.7	0.0	50	95.0	1.0	-0.35	0.0	67.1
7.67	5.0E-02	-0.01	824.4	0.68	10	340.2	0.0	340.2	0.0	50	95.0	1.0	-0.35	0.0	68.0
7.96	5.0E-02	-0.01	791.4	0.66	10	340.2	0.0	340.2	0.0	50	95.0	1.0	-0.34	0.0	68.0
8.28	5.0E-02	-0.01	786.9	0.66	10	353.5	0.0	353.5	0.0	50	95.0	1.0	-0.34	0.0	70.7
8.61	5.0E-02	-0.01	700.7	0.72	10	328.9	0.0	328.9	0.0	50	95.0	1.0	-0.34	0.0	65.8
8.94	5.0E-02	-0.01	699.2	0.71	10	341.8	0.0	341.8	0.0	50	95.0	1.0	-0.34	0.0	68.1
9.27	5.0E-02	-0.01	696.5	0.75	10	353.1	0.0	353.1	0.0	50	95.0	1.0	-0.34	0.0	69.1
9.60	5.0E-02	-0.01	685.9	0.80	10	354.3	0.0	354.3	0.3	50	95.0	1.0	-0.35	0.0	69.4
9.92	5.0E-02	-0.01	747.8	0.64	10	393.0	0.0	393.0	0.0	50	95.0	1.0	-0.33	0.0	76.9
10.25	5.0E-02	-0.01	674.1	0.73	10	360.8	0.0	360.8	0.0	50	95.0	1.0	-0.33	0.0	70.6
10.58	5.0E-02	-0.01	543.3	0.85	9	296.5	0.0	296.5	1.1	50	95.0	1.0	-0.33	0.0	58.0
10.91	5.0E-02	-0.01	463.0	0.85	9	257.3	0.0	257.3	1.6	48	94.4	1.0	-0.32	0.0	50.4
11.24	5.0E-02	-0.01	527.2	0.93	9	297.1	0.0	297.1	1.6	48	95.0	1.0	-0.34	0.0	58.2
11.56	5.0E-02	-0.01	695.7	0.62	10	396.8	0.0	396.8	0.0	50	95.0	1.0	-0.32	0.0	77.7
11.89	5.0E+00	-0.01	820.6	0.51	10	474.4	0.0	474.4	0.0	50	95.0	1.0	-0.32	0.0	77.4
12.22	5.0E+00	-0.01	875.8	0.49	10	513.8	0.0	513.8	0.0	50	95.0	1.0	-0.32	0.0	83.8
12.55	5.0E+00	-0.01	991.7	0.47	10	589.9	0.0	589.9	0.0	50	95.0	1.0	-0.33	0.0	96.2
12.88	5.0E+00	-0.01	889.0	0.49	10	536.8	0.0	536.8	0.0	50	95.0	1.0	-0.32	0.0	87.6
13.21	5.0E+00	-0.01	790.8	0.49	10	484.6	0.0	484.6	0.0	50	95.0	1.0	-0.31	0.0	79.0
13.53	5.0E+00	-0.01	629.6	0.49	10	391.8	0.0	391.8	0.0	50	95.0	1.0	-0.29	0.0	63.9

Gregg Drilling & Testing, Inc.
Run No: 00-0822-1528-0357
CPT File: CPTH-094.COR

Depth (ft)	k (cm/s)	Bq	Qtn	Rfn	SBTn	Qc1N	DeltaQc1N	Qc1Ncs	Fc (%)	Phi (Deg)	Dr (%)	OCR	State Param	Del(n1)60	(N1)60cs
13.86	5.0E+00	-0.01	702.0	0.52	10	442.2	0.0	442.2	0.0	50	95.0	1.0	-0.31	0.0	72.1
14.19	5.0E+00	-0.01	644.6	0.46	10	411.5	0.0	411.5	0.0	50	95.0	1.0	-0.29	0.0	67.1
14.52	5.0E-02	-0.01	506.3	0.52	10	327.9	0.0	327.9	0.0	48	95.0	1.0	-0.28	0.0	64.2
14.85	5.0E+00	-0.01	652.6	0.53	10	426.7	0.0	426.7	0.0	50	95.0	1.0	-0.30	0.0	69.6
15.17	5.0E+00	-0.01	621.9	0.51	10	411.6	0.0	411.6	0.0	50	95.0	1.0	-0.29	0.0	67.1
15.50	5.0E+00	-0.01	627.8	0.49	10	420.3	0.0	420.3	0.0	50	95.0	1.0	-0.29	0.0	68.6
15.83	5.0E-02	-0.01	528.6	0.52	10	358.4	0.0	358.4	0.0	48	95.0	1.0	-0.28	0.0	70.2
16.16	5.0E-02	-0.01	468.3	0.62	10	321.2	0.0	321.2	0.3	48	95.0	1.0	-0.29	0.0	62.9
16.49	5.0E-02	-0.01	393.1	0.84	9	273.1	0.0	273.1	2.0	48	95.0	1.0	-0.30	0.0	53.5
16.81	5.0E-02	-0.01	299.2	0.99	9	210.8	0.0	210.8	3.9	46	88.6	1.0	-0.29	0.0	41.3
17.14	5.0E-04	-0.02	178.6	1.70	9	128.4	21.0	149.4	10.3	44	74.4	1.0	-0.31	4.0	45.9
17.47	5.0E-03	-0.02	249.1	1.39	9	179.3	9.0	188.3	6.8	46	84.0	1.0	-0.31	1.4	45.2
17.80	5.0E-03	-0.02	235.6	1.14	9	171.3	3.9	175.2	5.8	46	82.7	1.0	-0.28	0.6	42.5
18.13	5.0E-04	-0.02	175.6	1.63	9	129.6	20.1	149.7	10.0	44	74.7	1.0	-0.30	3.9	46.2
18.45	5.0E-03	-0.02	203.2	1.60	9	150.7	17.8	168.5	9.0	46	79.0	1.0	-0.31	2.6	39.5
18.78	5.0E-04	-0.04	95.0	2.05	7	72.9	34.4	107.3	17.0	42	58.2	1.0	-0.27	6.0	29.7
19.11	5.0E-05	-0.04	103.1	2.43	7	79.4	41.9	121.4	17.9	42	60.7	10.0	-0.30	8.6	39.7
19.44	5.0E-03	-0.01	261.0	1.12	9	197.2	1.0	198.2	5.2	46	86.7	1.0	-0.29	0.1	48.4
19.77	5.0E-02	-0.02	230.0	0.95	9	175.7	0.0	175.7	4.9	46	83.4	1.0	-0.26	0.0	34.4
20.09	5.0E-03	-0.02	224.1	1.38	9	172.7	11.4	184.1	7.3	46	82.9	1.0	-0.30	1.7	44.0
20.42	5.0E-02	-0.01	272.9	0.99	9	211.2	0.0	211.2	4.3	46	88.7	1.0	-0.28	0.0	41.3
20.75	5.0E-02	-0.01	264.4	1.04	9	206.4	0.0	206.4	4.7	46	88.0	1.0	-0.28	0.0	40.4
21.08	5.0E-03	-0.01	238.1	1.13	9	187.7	3.7	191.3	5.7	46	85.3	1.0	-0.28	0.6	46.5
21.41	5.0E-04	-0.03	111.2	2.33	7	90.2	41.5	131.7	16.8	42	64.3	1.0	-0.30	7.2	36.6
21.74	5.0E-03	-0.02	162.5	1.48	9	131.1	19.3	150.4	9.8	44	75.0	1.0	-0.28	2.8	34.9
22.06	5.0E-03	-0.02	138.9	1.37	9	113.3	18.9	132.3	10.4	44	70.9	1.0	-0.25	2.7	30.5
22.39	5.0E-04	-0.03	118.1	1.96	7	97.6	33.6	131.2	14.6	42	66.6	1.0	-0.28	6.1	37.9
22.72	5.0E-02	-0.01	276.1	0.95	9	225.0	0.0	225.0	4.0	46	90.5	1.0	-0.28	0.0	44.0

Gregg Drilling & Testing, Inc.
Interpretation Output - Release 1.00.19g
Run No: 00-0822-1528-0071
Job No: Seal Beach Mini CPT
Client: U.S. Army Corps of Engineers - Los Angeles District
Project: Surfside / Sunset Beach Borrow Material Survey
Site: Surfside/Sunset Beaches
Location: CPTH-103-00
Proj. Mgr: J. Devine
CPT Date: 00/15/08
CPT Time: 11:42
CPT File: CPTH-103.COR
Northing (Deg): 33.702
Easting (Deg): 118.097
Elevation (ft): -51.500

Water Table (m): -15.70 (ft): -51.5
Su Nkt used: 12.50
Averaging Increment (m): 0.10
Phi Method : Robertson and Campanella, 1983
Dr Method : Jamiolkowski - All Sands
State Parameter M: 1.20
Used Unit Weights Assigned to Soil Zones
Values of 1.0E9 or UnDef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT	U.Wt. pcf	TStress (tsf)	EStress (tsf)	Ueq (tsf)	Cn	N60 (blows/ft)	(N1)60	Su (tsf)	CRR
0.16	17.8	0.04	0.22	0.0	7	117.8	1.62	0.00	1.61	2.00	5.7	11.4	UnDef	0.08
0.49	25.0	0.02	0.08	0.0	7	117.8	1.64	0.01	1.62	2.00	8.0	16.0	UnDef	0.09
0.82	25.7	0.02	0.08	0.0	7	117.8	1.66	0.02	1.63	2.00	8.2	16.4	UnDef	0.09
1.15	30.4	0.04	0.12	0.0	7	117.8	1.68	0.03	1.64	2.00	9.7	19.4	UnDef	0.10
1.48	35.2	0.02	0.07	0.0	8	120.9	1.70	0.04	1.65	2.00	8.4	16.9	UnDef	0.11
1.80	37.2	0.05	0.14	0.0	8	120.9	1.72	0.05	1.66	2.00	8.9	17.8	UnDef	0.11
2.13	36.2	0.05	0.13	0.0	8	120.9	1.73	0.06	1.67	2.00	8.7	17.3	UnDef	0.11
2.46	40.1	0.04	0.09	0.0	8	120.9	1.75	0.07	1.68	2.00	9.6	19.2	UnDef	0.12
2.79	39.6	0.03	0.07	0.0	8	120.9	1.77	0.08	1.70	2.00	9.5	19.0	UnDef	0.12
3.12	41.3	0.09	0.21	0.0	8	120.9	1.79	0.09	1.71	2.00	9.9	19.8	UnDef	0.13
3.44	65.2	0.13	0.20	0.0	8	120.9	1.81	0.10	1.72	2.00	15.6	31.2	UnDef	0.26
3.77	109.7	0.20	0.18	0.0	9	124.1	1.83	0.11	1.73	2.00	21.0	42.0	UnDef	0.00
4.10	139.5	0.29	0.21	0.0	9	124.1	1.85	0.12	1.74	2.00	26.7	53.5	UnDef	0.00
4.43	156.9	0.22	0.14	0.0	9	124.1	1.88	0.13	1.75	2.00	30.1	60.1	UnDef	0.00
4.76	150.8	0.37	0.25	0.0	9	124.1	1.90	0.14	1.76	2.00	28.9	57.8	UnDef	0.00
5.09	188.7	1.22	0.65	0.0	9	124.1	1.92	0.15	1.77	2.00	36.1	72.3	UnDef	0.00
5.41	240.0	1.11	0.46	0.0	9	124.1	1.94	0.16	1.78	2.00	46.0	91.9	UnDef	0.00
5.74	236.5	0.86	0.36	0.0	10	127.3	1.96	0.17	1.79	2.00	37.8	75.5	UnDef	0.00
6.07	168.4	2.97	1.76	0.0	8	120.9	1.98	0.18	1.80	2.00	40.3	80.6	UnDef	0.00
6.40	230.4	0.76	0.33	0.0	10	127.3	2.00	0.19	1.81	2.00	36.8	73.6	UnDef	0.00
6.73	194.2	0.67	0.35	0.0	9	124.1	2.02	0.20	1.82	2.00	37.2	74.4	UnDef	0.00
7.05	216.2	0.87	0.40	0.0	9	124.1	2.04	0.21	1.83	2.00	41.4	82.8	UnDef	0.00
7.38	203.1	1.08	0.53	0.0	9	124.1	2.06	0.22	1.84	2.00	38.9	77.8	UnDef	0.00
7.67	192.5	0.94	0.49	0.0	9	124.1	2.08	0.23	1.85	2.00	36.9	73.7	UnDef	0.00
7.96	209.7	1.08	0.51	0.0	9	124.1	2.09	0.24	1.86	2.00	40.2	80.3	UnDef	0.00
8.28	215.1	0.99	0.46	0.0	9	124.1	2.11	0.25	1.87	2.00	41.2	82.4	UnDef	0.00
8.61	211.2	0.97	0.46	0.0	9	124.1	2.14	0.26	1.88	1.97	40.5	79.6	UnDef	0.00
8.94	193.7	0.92	0.48	0.0	9	124.1	2.16	0.27	1.89	1.93	37.1	71.6	UnDef	0.00
9.27	218.0	0.94	0.43	0.0	9	124.1	2.18	0.28	1.90	1.89	41.8	79.1	UnDef	0.00
9.60	192.1	0.92	0.48	0.0	9	124.1	2.20	0.29	1.91	1.86	36.8	68.5	UnDef	0.00
9.92	150.6	0.87	0.58	0.0	9	124.1	2.22	0.30	1.92	1.83	28.8	52.8	UnDef	0.00
10.25	137.2	0.66	0.48	0.0	9	124.1	2.24	0.31	1.93	1.80	26.3	47.3	UnDef	0.00
10.58	115.9	0.69	0.59	0.0	9	124.1	2.26	0.32	1.94	1.77	22.2	39.3	UnDef	0.00
10.91	117.6	0.37	0.31	0.0	9	124.1	2.28	0.33	1.95	1.74	22.5	39.3	UnDef	0.00
11.24	211.5	0.59	0.28	0.0	9	124.1	2.30	0.34	1.96	1.72	40.5	69.6	UnDef	0.00
11.56	214.5	1.10	0.51	0.0	9	124.1	2.32	0.35	1.97	1.69	41.1	69.5	UnDef	0.00
11.89	166.5	1.17	0.70	0.0	9	124.1	2.34	0.36	1.98	1.67	31.9	53.2	UnDef	0.00
12.22	166.5	0.94	0.56	0.0	9	124.1	2.36	0.37	1.99	1.65	31.9	52.5	UnDef	0.00
12.55	190.3	0.78	0.41	0.0	9	124.1	2.38	0.38	2.00	1.62	36.4	59.2	UnDef	0.00
12.88	246.8	0.87	0.35	0.0	10	127.3	2.40	0.39	2.01	1.60	39.4	63.1	UnDef	0.00
13.21	253.6	0.97	0.38	0.0	10	127.3	2.42	0.40	2.02	1.58	40.5	64.0	UnDef	0.00
13.53	245.4	0.95	0.39	0.0	10	127.3	2.44	0.41	2.03	1.56	39.2	61.1	UnDef	0.00

new-10.tif (2550x3310x2 tiff)

Gregg Drilling & Testing, Inc.
Run No: 00-0822-1528-0071
CPT File: CPTH-103.COR

Depth (ft)	AvgQt (tsf)	AvgFs (tsf)	AvgRf (%)	AvgUd (ft)	SBT	U.Wt. pcf	TStress (tsf)	EStress (tsf)	Ueq (tsf)	Cn	N60 (blows/ft)	(N1)60 (blows/ft)	Su (tsf)	CRR
13.86	232.4	1.29	0.55	0.0	9	124.1	2.46	0.42	2.04	1.54	44.5	68.5	UnDef	0.00
14.19	224.9	1.21	0.54	0.0	9	124.1	2.48	0.43	2.05	1.52	43.1	65.6	UnDef	0.00
14.52	217.3	1.26	0.58	0.0	9	124.1	2.50	0.44	2.06	1.50	41.6	62.6	UnDef	0.00
14.85	188.9	1.20	0.63	0.0	9	124.1	2.52	0.45	2.07	1.49	36.2	53.8	UnDef	0.00
15.17	191.9	1.01	0.52	0.0	9	124.1	2.54	0.46	2.08	1.47	36.8	54.1	UnDef	0.00
15.50	122.4	0.87	0.71	0.0	9	124.1	2.56	0.47	2.09	1.46	23.4	34.1	UnDef	0.00

Gregg Drilling & Testing, Inc.
Interpretation Output - Release 1.00.19g
Run No: 00-0822-1528-0071
Job No: Seal Beach Mini CPT
Client: U.S. Army Corps of Engineers - Los Angeles District
Project: Surfside / Sunset Beach Borrow Material Survey
Site: Surfside/Sunset Beaches
Location: CPTH-103-00
Proj. Mgr: J. Devine
CPT Date: 00/15/08
CPT Time: 11:42
CPT File: CPTH-103.COR
Northing (Deg): 33.702
Easting (Deg): 118.097
Elevation (ft): -51.500

Water Table (m): -15.70 (ft): -51.5
Su Nkt used: 12.50
Averaging Increment (m): 0.10
Phi Method : Robertson and Campanella, 1983
Dr Method : Jamiolkowski - All Sands
State Parameter M: 1.20
Used Unit Weights Assigned to Soil Zones
Values of 1.0E9 or UnDef are printed for parameters that are not valid for the material type (SBT)

Depth (ft)	k (cm/s)	Bq	Qtn	Rfn	SBTn	Qc1N	DeltaQc1N	Qc1Ncs	Fc (%)	Phi (Deg)	Dr (%)	OCR	State Param	Del(n1)60	(N1)60cs
0.16	5.0E-04	-0.10	1000.0	0.24	10	34.1	0.0	34.1	0.0	50	94.5	1.0	-0.27	0.0	11.4
0.49	5.0E-04	-0.07	1000.0	0.09	10	47.9	0.0	47.9	0.0	50	88.5	1.0	-0.18	0.0	16.0
0.82	5.0E-04	-0.07	1000.0	0.08	10	49.2	0.0	49.2	0.0	50	81.9	1.0	-0.18	0.0	16.4
1.15	5.0E-04	-0.06	904.5	0.13	10	58.2	0.0	58.2	0.0	50	82.0	1.0	-0.21	0.0	19.4
1.48	5.0E-03	-0.05	816.4	0.07	10	67.5	0.0	67.5	0.0	50	82.5	1.0	-0.15	0.0	16.9
1.80	5.0E-03	-0.05	700.4	0.14	10	71.3	0.0	71.3	0.0	50	81.1	1.0	-0.20	0.0	17.8
2.13	5.0E-03	-0.05	571.4	0.13	10	69.3	0.0	69.3	0.0	50	77.8	1.0	-0.17	0.0	17.3
2.46	5.0E-03	-0.04	549.2	0.10	10	76.9	0.0	76.9	0.0	50	78.6	1.0	-0.14	0.0	19.2
2.79	5.0E-03	-0.04	476.5	0.08	10	75.9	0.0	75.9	0.0	48	76.4	1.0	-0.11	0.0	19.0
3.12	5.0E-03	-0.04	443.2	0.22	10	79.0	0.0	79.0	0.0	48	75.9	1.0	-0.19	0.0	19.8
3.44	5.0E-03	-0.03	641.9	0.21	10	124.8	0.0	124.8	0.0	50	87.6	1.0	-0.22	0.0	31.2
3.77	5.0E-02	-0.02	993.5	0.19	10	210.0	0.0	210.0	0.0	50	95.0	1.0	-0.24	0.0	42.0
4.10	5.0E-02	-0.01	1000.0	0.21	10	267.3	0.0	267.3	0.0	50	95.0	1.0	-0.26	0.0	53.5
4.43	5.0E-02	-0.01	1000.0	0.14	10	300.5	0.0	300.5	0.0	50	95.0	1.0	-0.22	0.0	60.1
4.76	5.0E-02	-0.01	1000.0	0.25	10	288.8	0.0	288.8	0.0	50	95.0	1.0	-0.27	0.0	57.8
5.09	5.0E-02	-0.01	1000.0	0.65	10	361.4	0.0	361.4	0.0	50	95.0	1.0	-0.36	0.0	72.3
5.41	5.0E-02	-0.01	1000.0	0.47	10	459.7	0.0	459.7	0.0	50	95.0	1.0	-0.33	0.0	91.9
5.74	5.0E+00	-0.01	1000.0	0.37	10	453.0	0.0	453.0	0.0	50	95.0	1.0	-0.30	0.0	75.5
6.07	5.0E-03	-0.01	926.6	1.78	12	322.6	UnDef	UnDef	0.0	50	95.0	1.0	-0.48	UnDef	UnDef
6.40	5.0E+00	-0.01	1000.0	0.33	10	441.3	0.0	441.3	0.0	50	95.0	1.0	-0.29	0.0	73.6
6.73	5.0E-02	-0.01	960.3	0.35	10	371.9	0.0	371.9	0.0	50	95.0	1.0	-0.30	0.0	74.4
7.05	5.0E-02	-0.01	1000.0	0.41	10	414.0	0.0	414.0	0.0	50	95.0	1.0	-0.31	0.0	82.8
7.38	5.0E-02	-0.01	912.5	0.54	10	389.1	0.0	389.1	0.0	50	95.0	1.0	-0.33	0.0	77.8
7.67	5.0E-02	-0.01	830.8	0.49	10	368.7	0.0	368.7	0.0	50	95.0	1.0	-0.32	0.0	73.7
7.96	5.0E-02	-0.01	872.1	0.52	10	401.7	0.0	401.7	0.0	50	95.0	1.0	-0.32	0.0	80.3
8.28	5.0E-02	-0.01	858.3	0.46	10	412.0	0.0	412.0	0.0	50	95.0	1.0	-0.31	0.0	82.4
8.61	5.0E-02	-0.01	809.6	0.47	10	404.6	0.0	404.6	0.0	50	95.0	1.0	-0.31	0.0	79.6
8.94	5.0E-02	-0.01	713.7	0.48	10	365.9	0.0	365.9	0.0	50	95.0	1.0	-0.30	0.0	71.6
9.27	5.0E-02	-0.01	775.0	0.44	10	404.3	0.0	404.3	0.0	50	95.0	1.0	-0.30	0.0	79.1
9.60	5.0E-02	-0.01	658.0	0.49	10	350.0	0.0	350.0	0.0	50	95.0	1.0	-0.29	0.0	68.5
9.92	5.0E-02	-0.01	496.5	0.59	10	269.6	0.0	269.6	0.0	48	95.0	1.0	-0.29	0.0	52.8
10.25	5.0E-02	-0.01	437.1	0.49	10	241.7	0.0	241.7	0.0	48	92.6	1.0	-0.26	0.0	47.3
10.58	5.0E-02	-0.02	356.3	0.61	9	200.8	0.0	200.8	1.1	48	87.3	1.0	-0.26	0.0	39.3
10.91	5.0E-02	-0.02	350.4	0.32	10	200.6	0.0	200.6	0.0	48	87.2	1.0	-0.20	0.0	39.3
11.24	5.0E-02	-0.01	616.6	0.28	10	355.3	0.0	355.3	0.0	50	95.0	1.0	-0.24	0.0	69.6
11.56	5.0E-02	-0.01	607.3	0.52	10	355.1	0.0	355.1	0.0	50	95.0	1.0	-0.29	0.0	69.5
11.89	5.0E-02	-0.01	456.8	0.71	9	271.8	0.0	271.8	0.9	48	95.0	1.0	-0.30	0.0	53.2
12.22	5.0E-02	-0.01	444.1	0.57	10	268.0	0.0	268.0	0.2	48	95.0	1.0	-0.27	0.0	52.5
12.55	5.0E-02	-0.01	494.9	0.42	10	302.2	0.0	302.2	0.0	48	95.0	1.0	-0.25	0.0	59.2
12.88	5.0E+00	-0.01	626.5	0.36	10	386.7	0.0	386.7	0.0	50	95.0	1.0	-0.26	0.0	63.1
13.21	5.0E+00	-0.01	626.9	0.39	10	392.1	0.0	392.1	0.0	50	95.0	1.0	-0.27	0.0	64.0
13.53	5.0E+00	-0.01	590.6	0.39	10	374.5	0.0	374.5	0.0	50	95.0	1.0	-0.26	0.0	61.1

Gregg Drilling & Testing, Inc.
Run No: 00-0822-1528-0071
CPT File: CPTH-103.COR

Depth (ft)	k (cm/s)	Bq	Qtn	Rfn	SBTn	Qc1N	DeltaQc1N	Qc1Ncs	Fc (%)	Phi (Deg)	Dr (%)	OCR	State Param	Del(n1)60	(N1)60cs
13.86	5.0E-02	-0.01	545.1	0.56	10	350.2	0.0	350.2	0.0	50	95.0	1.0	-0.29	0.0	68.5
14.19	5.0E-02	-0.01	515.1	0.54	10	334.9	0.0	334.9	0.0	48	95.0	1.0	-0.28	0.0	65.6
14.52	5.0E-02	-0.01	485.9	0.59	10	319.8	0.0	319.8	0.0	48	95.0	1.0	-0.28	0.0	62.6
14.85	5.0E-02	-0.01	412.3	0.64	10	275.0	0.0	275.0	0.8	48	95.0	1.0	-0.28	0.0	53.8
15.17	5.0E-02	-0.01	409.6	0.53	10	276.2	0.0	276.2	0.2	48	95.0	1.0	-0.26	0.0	54.1
15.50	5.0E-02	-0.02	253.7	0.72	9	174.3	0.0	174.3	3.1	46	83.2	1.0	-0.24	0.0	34.1