

INVITATION TO BID

Bid Number 12PSX0242 Exhibit A, Soil Boring and Sub-Surface Environmental Exploration to Obtain Geotechnical Information

Contract Specialist: **Paul Greco**

Date Issued: 10/01/2012

Due Date: 11/05/2012

Department of Administrative Services



State of Connecticut

Department of Administrative Services

Announcement of Invitation to Bid for the CT DOT

Date: October 1, 2012

Bid No. 12PSX0242

Pursuant to the provisions of Section 4a-57 of the General Statutes of Connecticut as amended, sealed bids will be received by Procurement Services for the State of Connecticut, at the address provided in this Invitation to Bid (“Bid”) for furnishing the commodities and/or services herein listed.

The Department of Administrative Services welcomes the opportunity to work with our customers and suppliers to provide Soil Boring for the CT DOT to the State of Connecticut as outlined throughout this Bid document.

We invite you to be part of this effort.

Overview and Scope

Requirements for this bid and a subsequent contract consists of performing Subsurface Explorations to obtain geotechnical information for all forms of highway and facilities construction for the State of Connecticut Department of Transportation (ConnDOT). The work will consist of, but not be limited to, various types of soil borings, installation of instrumentation, and testing of insitu soil. Contractors will also be required to provide traffic control when requested. Contractor(s) must have the equipment specified in the Section titled, Contractor's Equipment, and must meet the requirements specified in the Section titled, Qualifications of Personnel.

The State may request supplemental pricing for services *or equipment* generally within the scope or intent of a resulting contract for which specific unit prices are not provided.

Bid / Contract Requirements

Bid prices/basis of payment:

All items must be bid and will be paid in accordance with the pay units shown on the Price Schedule for the corresponding item number and will include full compensation for all materials, equipment, tools, labor, obtaining, recording and submitting data as well as any incidental work necessary to complete the item to the satisfaction of the State. Bids may be submitted for either or both District areas.

Motor Carrier Safety Review:

If the performance of the Contract requires the use and operation of any commercial motor vehicle, as defined in section 14-1 of the Connecticut General Statutes, or other motor vehicle with a gross vehicle weight rating (GVWR) of 18,000 pounds or more, each bidder will be the subject of an evaluation, conducted by the Connecticut Department of Motor Vehicles (CTDMV) of its motor carrier safety fitness. The primary factor in the evaluation is the current SAFESTAT score, calculated by the U.S. Federal Motor Carrier Safety Administration (FMCSA) in accordance with the provisions of Title 49, Section 385.1, et seq., of the Code of Federal Regulations.

To be deemed qualified, the bidder must have an overall SAFESTAT category rating of "D" or better, on the date of evaluation. In addition, the bidder's driver and vehicle out-of-service rates will be consulted. The rates are determined by the number of out-of-service violations cited to the motor carrier in the course of all official, reported vehicle and/or driver inspections conducted during the preceding thirty (30) months. To be deemed qualified, the bidder must not have either a vehicle or driver out-of-service rate, by percentage of out-of-service violations per the total number of inspections reported, that is more than twice the national average. In addition, the bidder must have a current federal safety management practices rating of "Satisfactory," as defined in 49 CFR section 385.3, as amended.

Further information concerning the motor carrier safety evaluation, to which a bidder is subject, may be obtained from CTDMV, at <http://www.ct.gov/dmv/cwp/view.asp?a=798&q=413206&dmvPNavCtr=#49068>. All official inspection and rating data that is used in the performance of each evaluation is available to any motor carrier through the federal SAFESTAT website, at <http://www.ai.volpe.dot.gov/>.

Quantities and/or Usages:

Quantities are estimated quantities and/or usages only and in no way represent a commitment and/or intent to purchase. Actual quantities may vary and will be identified on individual purchase orders issued by the requesting state entity. The quantities listed in Exhibit B are based on an estimate for the contract period. They are provided to determine a low bidder based on total overall cost. All computation of compensation will be based on the actual quantity of work performed. It is also understood that no claim will be made against the State for an adjustment in the unit prices should the actual quantities be greater or less than those listed in the Price Schedule.

Contract Separately / Additional Savings Opportunities:

The State reserves the right to either seek additional discounts from the contractor(s) or to contract separately for a single purchase, if in the judgment of DAS/Procurement Services, the quantity required is sufficiently large, to enable the State to realize a cost savings, over and above the published contract prices, whether or not such a savings actually occurs.

Brand Name Specifications and/or References:

The use of the name of a manufacturer or of any particular make, model or brand in describing an item does not restrict bidders to that manufacturer or specific article unless limited by the term "no substitute". However, the article being offered must be of such character and quality so that it will serve the purpose for which it is to be used equally as well as that specified, and the bidder shall warrant to the State that it is fit for that purpose. Bids on comparable items must clearly state the exact article being offered including any and all applicable options and the bidder shall furnish such other information concerning the article being

offered as will be helpful in evaluating its acceptability for the purpose intended. If the bidder does not indicate that the article offered is other than as specified, it will be understood that the bidder is offering the article exactly as specified. Bidders must submit complete documentation on the specifications and quality levels of the proposed products. Bids submitted that do not contain this documentation are subject to rejection.

Contract

Contract Award:

The State reserves the right to award this Contract in a manner deemed to be in the best interest of the State and may include, but not be limited to:

- A. by item, group of items, or in its entirety
- B. geographic location to adequately service the entire State of Connecticut in the best possible manner
- C. Multiple Contractor Award

Basis of Award:

A single award for each geographic area will be made to the total lowest responsive and responsible Contractor as determined by the State for two (2) geographic areas. These geographic areas are defined as Districts (1 & 2) and Districts (3 & 4), (see the attached map for the towns in each area). Lowest cost will be determined by the estimated quantity multiplied by the line item bid price submitted and then sub-totaled as the overall cost for all items. Documented past performance can be used in determining a Contractor's ability to perform services. The State may interview bidders in an effort to determine if they are qualified to perform the required services that they are offering. Documented experience will also be used in assessing a Contractor's qualifications.

Contract Term:

The resulting contract period will be December 1, 2012 through November 30, 2013. The State reserves the right to extend this contract for a period up to the full original contract term or parts thereof.

Subcontracting:

The awarded contractor **will not** subcontract any part of their work, with the exception of Traffic Control, unless approved by ConnDOT.

Standards:

Contractors supplying equipment and/or services are required to comply with all Federal, State, Municipal and OSHA laws, ordinances and codes. The Contractor will pay for all permits, licenses and charges of similar nature.

Insurance certificates required:

Required insurance types and amounts can be found in the Contract Document.

- B. Commercial General Liability
- C. Automobile Liability
- D. Workers Compensation

Purchase orders:

Purchase orders will be issued by ConnDOT's Purchasing Processing Unit for services related to this contract. Contractors are cautioned NOT to perform services without receiving a purchase order number. Questions concerning purchase orders are to be directed to the Processing Unit at 860-594-2070. Technical questions regarding work specified on purchase orders should be directed to the Soils and Foundations Section at 860-594-3180.

Invoices and payments: The Accounts Payable Unit through the Comptroller's Office will issue Payments. Payment and invoicing inquiries should be directed to ConnDOT's Accounts Payable Unit at 860-594-2305.

All invoices must include:

1. Contractor F.E.I.N. or Social Security number.
2. Complete Contractor name and billing address.
3. Project number, if applicable.
4. Invoice number and date.
5. Purchase order number.
6. Itemized description of services and/or material supplied.
7. Adjustments, if applicable.
8. Quantity, unit, unit price, and extended amount.
9. Ticket numbers corresponding to each invoice must be listed or attached to the company invoice as a separate sheet, if applicable.
10. Work periods and traffic control prices must be itemized, if applicable.

For prompt payment processing, please mail invoices to the following address:

The State of Connecticut
Department of Transportation
Attn: Accounts Payable SW1A
P.O. Box 317546
Newington, CT 06131-7546

Payments may be delayed if the invoice form is not properly completed in accordance with the instructions noted above.

Special Provisions

EQUIPMENT REGULATIONS:

Contractors renting or supplying equipment or vehicles are required to have the equipment or vehicles properly equipped for the job. Equipment is to be in compliance with all applicable Federal, State of Connecticut Department of Motor Vehicle (DMV) and Local regulations in effect at the time of the contract. All operators of specialized equipment will be properly trained and licensed, i.e. boom operators, etc.

Contractors must comply with all applicable provisions and regulations of Title 14, Motor Vehicles, Use of the Highway by Vehicles, of the Connecticut General Statutes.

Under Connecticut law, a commercial vehicle used by Contractors and vendors in conjunction with this contract may be subject to Connecticut registration requirements. Section 14-12a of the Connecticut General Statutes require such registration for any vehicle which is most frequently garaged in this State, or most frequently leaves from, and returns to one or more points within this State in the normal course of operations. In addition, a vehicle must obtain a Connecticut registration if it continuously receives and discharges cargo within the State. The DMV will monitor this regulation.

EQUIPMENT INSPECTION:

Equipment supplied by the Contractor must be in safe operating condition at all times. A ConnDOT representative reserves the right to inspect the Contractor's equipment prior to award and to confirm that equipment is in good operating condition. Contractors having equipment unavailable for inspection or determined to be unable to perform the specified work will be considered non-responsive. Contractors must have the capacity of furnishing the necessary equipment, supplies, labor, etc., required.

CONTACTING A CONTRACTOR:

The Contractor will start work when requested by a ConnDOT representative. In the case of a Declared Emergency, an immediate response may be required by the Contractor. Prior to the issuance of a Purchase Order, the Engineer may request an on-site Preconstruction Meeting to discuss the requirements of the proposed subsurface exploration. The timing of the meeting should be prior to the Contractor contacting Call Before You Dig (CBYD). For each Purchase Order issued, a time limit will be given for the length of time allowed for the Contractor to complete the assigned work. To aid the Contractor in determining if the work may be accomplished within the time allowed, the Engineer may supply the Contractor with additional plans and figures relative to the project site. To make this process as expedient as possible, the Engineer may furnish the additional information to the Contractor via e-mail.

Prior to the issuance of the Purchase Order, the Contractor will e-mail the Engineer a schedule of operations for the work. The Engineer will be notified at least two (2) working days in advance of deviations from the schedule of operations and such deviations will be subject to the approval of the Engineer.

WORK DAY:

No work will be performed by the Contractor without prior approval of the Engineer. Normal on-site working hours are 7:30 a.m. to 4:00 p.m., Monday through Friday. Normal on-site work hours may vary slightly by season. On-site work hours may vary, or be restricted for work on Interstates, Expressways, Railroads and Airports; on-site work deviating from normal work hours will be as directed by the Engineer. No additional premium or Standby Time will be paid.

Contractors **will not** be permitted to work on the following Legal Holidays: New Year's Day, Washington's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, Martin Luther King Day, Lincoln's Birthday, Columbus Day, and Veteran's Day.

Contractors **will not** be permitted to work on the day before and the day after any of the above Legal Holidays on Interstate Highways or Expressways.

CERTIFICATION(S):

It is the awarded Contractor's responsibility to ensure that any person engaged in work under this contract in a classification that requires special certifications or licenses, such as welders, divers, electricians, etc., that the persons in fact do possess these special licenses or certificates.

TRAFFIC CONTROL:

When Contractor furnished Traffic Control is used, the Contractor will supply and be responsible for all equipment, signs, supports, cones, and any other materials necessary. *When Trafficperson-Municipal or Trafficperson-Uniformed* are required by the State, they will be paid at the rate bid in the Price Schedule. Trafficperson-Uniformed must be trained and equipped for the proper performance of their duty. Traffic Control must comply with the *Manual of Uniform Traffic Control Devices (MUTCD)*, Revised 2003 edition, and "Traffic Control Patterns" booklet including the general notes. **Note: When required, ConnDOT will coordinate the hiring and payment of Connecticut State Police utilized for Traffic Control. The Contractor remains responsible for providing the installation and removal of all signs, sign supports, barricades, traffic cones, traffic delineators, and any other materials necessary as set forth in the provisions of the attached "Traffic Control During Maintenance Operations".**

QUALITY CONTROL:

Quality control of work will be the responsibility of the Contractor through his working supervisor. Work will be in conformance with the attached Technical Provisions, General Procedures and Specifications for Bid Items, Traffic Control Patterns and any related specifications.

USE OF SITE:

The Contractor will confine his operations, equipment and materials to the designated work area. The work area and site access will be maintained free and clear by the Contractor. The Contractor will take particular care in the performance of his work in order to prevent injury or defacement to property. Any damage caused by the Contractor in the performance of his work will be made good to the satisfaction of the Engineer and at the Contractor's own expense.

The Engineer will have access to the work area whenever it is in preparation or progress and the Contractor will provide proper facilities for such access and inspection.

HEALTH AND SAFETY PLAN

The Contractor will have a General Health and Safety Plan for the work to be performed and assumes full responsibility for site safety of the Contractor's Personnel. A copy of the Health and Safety Plan may be required by ConnDOT. The purpose of this requirement is to assure proper and safe conduct of drilling operations. Items to be covered in the Health and Safety Plan include, but are not limited to general safety practices of drill rig movement and operation.

EXTENUATING CIRCUMSTANCES WHICH AFFECT WORK PERFORMED AND PAYMENTS:

No payment will be made to the Contractor when work cannot be performed due to extenuating circumstances or adverse weather conditions as determined by the State, and the Contractor has been given adequate notification of the temporary shutdown of work. The term adequate notification will be discussed and agreed upon between ConnDOT and the Contractor prior to work.

Should ConnDOT direct the Contractor to standby at a project site, the Standby Time item will be used per rig/crew that is required to standby.

EXPIRATION OF CONTRACT/CONTINUANCE OF WORK UNTIL COMPLETION:

In the event the contract period expires and the awarded Contractor has not completed projects that are underway, the State may allow/or require the Contractor to complete these projects if the following conditions are met:

- 1) The State can require the Contractor to complete only ongoing/incomplete work, even if the previous contract period expired, as projects are bonded.
- 2) Prices bid under the original contract remain in effect until all work is completed.
- 3) All other contractual obligations and conditions remain the same, including insurance requirements and prevailing wage scales, if applicable.

SUPERVISION: The work will be performed under the supervision and direction of the Engineer. No subsurface explorations will be made except in the presence of the Engineer. The Engineer will check the logs of the explorations to determine that the information designated herein is being obtained and see that all samples are properly preserved, protected against damage, boxed and stored in a suitable place or immediately turned over to the Engineer.

CALL BEFORE YOU DIG (CBYD)-EXISTING CONDITIONS: Before any subsurface exploration is performed, the Contractor will contact CBYD at 800-922-4455 to obtain a request number and the names of the utility companies that are being notified. The request number expires in thirty (30) calendar days; therefore the Contractor will be responsible to maintain an active request number. The Contractor, upon request, will supply the Engineer with the request number(s). Any relocation of borings or other subsurface explorations will be cleared with CBYD at least two (2) days prior to drilling. The relocation of borings, including those due to utility conflict, must be approved by the Engineer.

The Contractor will locate all known utilities prior to work and will repair/replace all damage done to known utilities at no cost to the State.

BORING STAKEOUT: Work locations are to be laid out in the field by the Engineer prior to authorizing the Contractor to begin work. The Contractor will execute the work at these locations.

CONTRACTOR'S EQUIPMENT: All equipment and methods to be used by the Contractor will be subject to approval by the Engineer at all times during the work. Equipment must be in good and safe operating condition. However, approval of the equipment will not be construed as including the approval of the performance thereof. Additional equipment and methods will be provided where ordered by the Engineer if required to perform the work satisfactorily according to the Specifications.

The Contractor may be called upon to work on more than one (1) project at a time or field more than one (1) rig on a project. If a Contractor submits a bid on one (1) geographic area, they will have access to sufficient personnel, equipment and materials to provide two (2) manned drill rigs. If the Contractor submits bids for the two (2) geographic contract areas, they will have access to sufficient personnel, equipment and materials to provide three (3) manned drill rigs. The Contractor should note that in wetlands or environmentally sensitive areas the use of a flat track type vehicle may be specified for use on a project. The Contractor will have or have access to this type of rig for the duration of the contract. **The equipment owned or leased by the Bidders vendor must be listed on the attached Bidder's Qualification form.** The Bidder must have one (1) drill that has been rated by its manufacturer to have at least 6500 ft-lbs of torque. All other drill rigs listed in the Bidder's Qualification Form must be rated by its manufacturer to have at least 3500 ft-lbs of torque. A portable drill rig may be required to access wetlands and sensitive areas

The Contractor will be required at all times, when the work is in progress to have a minimum of one (1) drilling rig with complete crew at the site and engaged in field operations (Note: a minimum crew size will be considered as a lead driller and an assistant). On certain projects more than one (1) drilling rig may be required; the Contractor will be notified as to the minimum number of drilling rigs. **The Contractor's ability to provide the necessary personnel and equipment will be used in determining the low bidder.**

COOPERATION BY CONTRACTOR: The Contractor will at all times have on the work, as his agent, a competent lead driller, thoroughly experienced in the type of work being performed, who will receive instructions from the Engineer. The lead driller will have full authority to execute the orders or directions of the Engineer, without delay and to supply promptly such materials, equipment, tools, labor and incidentals as may be required.

QUALIFICATION OF PERSONNEL: The qualifications of personnel employed by the Contractor will be supplied on the attached Bidder's Qualification Form. The qualifications of lead driller will be considered as an individual with a minimum of five (5) years' experience in performing geotechnical borings, or a minimum of two (2) years' experience as a lead driller for a geotechnical boring Contractor.

RECORDS: The Contractor will keep complete, neat, accurate and legible field records of each boring and other subsurface exploration and these records will show his interpretation of the results of the explorations as to the nature of the subsurface conditions. The records will be made at the site and will be furnished to the Engineer as the work progresses. The records will contain the following information:

General

- (a) Date and time
- (b) Engineer, Contractor and Lead Driller
- (c) Location and identifying number of test boring or other subsurface exploration and reference to survey data (if supplied)

Soil Borings

- (a) Results of all boring details of each hole arranged in tabular form giving full information on the vertical arrangement, thickness and classification of the materials penetrated
- (b) Depth of bottom, type and number of each sample taken. All samples will be numbered consecutively
- (c) Height of drop and weight of drop hammer for taking drive samples and driving casing
- (d) Number of blows required for each 6 inch penetration of split tube sampler and for each 12 inch penetration of casing
- (e) Size, length and depth of bottom of each size of casing used in each bore hole
- (f) Depth of water level at each hole prior to removing casing; also for each observation the elapsed time since completion of drilling. Twenty-four (24) hour and forty-eight (48) hour readings after removing casing may be required by the Engineer.
- (g) Method used to press stationary piston sampling tubes and length of sample recovered
- (h) Description of samples (methods as directed by Engineer)

Drill Rod Probing

- (a) Depth probe pushed and elevation of bottom of probing
- (b) Size and type of probe used

Rock Cores

- (a) Type of core drill, including size of core
- (b) Length of core recovered for each length drilled, including number of pieces
- (c) Depth at which rock was encountered
- (d) Depth of each change in type of rock
- (e) Depth to bottom of hole
- (f) Time required to drill each foot
- (g) Description of rock in accordance with the following classifications:
 - 1. Origin: Basalt, Sandstone, Schist, etc.
 - 2. Jointing: unfractured, slightly fractured, moderately fractured, highly fractured, intensely fractured
 - 3. Qualitative: extremely weak, very weak, weak, medium strong, strong, very strong, extremely strong
 - 4. Weathering: residual soil, completely weathered, highly weathered, moderately weathered, slightly weathered, unweathered

Pavement Cores

- (a) Type of core drill, including size of core
- (b) Length of core recovered for each length drilled including number of pieces
- (c) Depth to bottom of pavement

Auger Borings (Machine and Hand)

- (a) Results of all boring details of each hole arranged in tabular form giving full information on the vertical arrangement, thickness and classification of the materials penetrated
- (b) Depth of bottom and number of each sample taken. All samples will be numbered consecutively
- (c) Depth of water level, if encountered, at time of auguring
- (d) Description of samples (methods as directed by Engineer)
- (e) Size and type of auger used

Test Pits

- (a) Full information in tabular form on the vertical arrangement, thickness and classification of the materials encountered
- (b) Depth of bottom, type and number of each sample taken. All samples will be numbered consecutively
- (c) Depth of water level, if encountered, at time of digging

Bar Soundings

- (a) Depth bar driven and elevation of bottom of sounding
- (b) Notation as to whether refusal or non-refusal reached when driving stopped
- (c) Depth of water level, if encountered, at time of making sounding

SUBMISSION OF REPORTS AND SAMPLES: One copy of the driller's field log will be given to the Engineer at the site at the end of each working day.

Complete typed boring logs referenced to ground surface with stratum classified as described above, together with all notes, remarks and pertinent information required by this Specification will be e-mailed to the Engineer by the Contractor at the end of the job. The complete logs of all subsurface explorations will be e-mailed to: leo.fontaine@ct.gov no later than five (5) days after the completion of the subsurface exploration program.

All samples except as otherwise specified below will be stored at or near the site as directed by the Engineer. All soil and rock samples will be given to the Engineer on completion of the last hole or as directed by the Engineer. If samples are not turned over by the Contractor, ConnDOT will consider that the hole or holes were not drilled and no payment will be made for those borings.

After sealing by the Contractor, all stationary piston tube samples will be immediately transferred to the custody of the Engineer or his representative at the site.

Technical Requirements

ITEM 1.01 Soil Boring, Type A (0-75 feet)

ITEM 1.02 Soil Boring, Type A (over 75 feet)

ITEM 1.03 Soil Boring, Type B

General Boring Procedures: Sequence of borings and the type or types of samples to be taken at each hole will be as directed by the Engineer. In general, borings will be as follows:

- (a) For determination of soil strata, borings will normally be 3 inch minimum diameter holes in which 2 inch outer diameter split tube samples will be taken. The 2 inch sampler will be used regardless of the size of casing being employed if, in the opinion of the Engineer, such sampler will recover a representative sample. Undisturbed samples may also be taken. For recovering such samples, a 3 inch stationary piston sampler will be required.
- (b) For determination of depth to and soundness of bedrock, borings will be 3 inch minimum diameter holes through which NX type rock cores can be recovered.
- (c) If pilot borings are shown on the plans, such boring or borings at a site of a bridge or highway cut or fill will be completed not less than three (3) working days prior to commencing the other borings at that site.
- (d) Borings designated as Soil Borings, Type A (0-75 feet) or Soil Borings, Type A (over 75 feet) will be cased holes performed in accordance with the requirements of these specifications for such work.

For borings designated as Soil Borings - Type B the Contractor, at his option, may employ drilling methods involving uncased holes or use of hollow-stem augers or use of the methods required for Soil Borings - Type A or any combination of these methods, provided he can also perform split tube sampling, stationary piston sampling and rock coring as required in the bore hole.

In boring methods using a heavy drilling fluid, casing will be driven to such depths below ground surface as required to maintain the top of bore holes. Thereafter, heavy drilling fluid may be used to maintain the holes. At the completion of such holes, the heavy drilling fluid will be removed by flushing or bailing in order that the true water level may be accurately determined.

In soil borings using hollow-stem auger methods, holes will be advanced using hollow-stem auger flights capable of accommodating 2 inch outer diameter samplers at locations where 3 inch borings are specified. The inner rod-center plug assembly will be used to prevent disturbed soil from entering the stem.

Hollow-stem auger borings or uncased borings which fail to penetrate to the specified depth will be continued by other methods which may include use of the cased methods described herein.

Payment for borings specified as "Soil Borings - Type B" will be made at the contract unit price for this item regardless of the method or combination of methods necessary to achieve the required depth.

- (e) No soil samples will be obtained by driving and removing casing.

Casing:

(a) Sinking: Casing will be driven vertically through earth or other materials to such depth below the surface of the ground as required to maintain the sides of bore holes or as directed by the Engineer. The blows per foot required for the penetration of the casing will be recorded and included in the Contractor's drill record. Simultaneous washing and driving of the casing will not be permitted except by order of the Engineer and where so permitted the elevations between which water was used in driving the casing must be recorded on the Contractor's logs.

It will be the Contractor's responsibility when boulders or other obstacles are encountered to carry the drilling through or past such obstacles.

Blasting with small charges will not be permitted.

(b) Size: Casing will be of a size that will permit the specified soil sample, soil test, rock core, or monitoring device to be installed or to allow for the telescoping and spinning of casing.

(c) Weight of Hammer for Casing: The weight of hammer for driving the casing will be 300 pounds and the drop will be 24 inches.

(d) Removal: The casing will be removed on completion of the work and it will remain the property of the Contractor. However, no casing will be removed until measurements of the water level have been made and the Engineer has approved such removal. In addition, water level measurements will be made at twenty-four (24) hours and forty-eight (48) hours after the casing has been removed, provided the hole has not collapsed. Bore holes will not be backfilled until the final water level measurement has been made unless ordered by the Engineer. Casing may be removed upon completion of soil borings at which the Engineer directs that observation wells be installed.

Should the casing or apparatus be removed from a bore hole or should the hole be abandoned, without the permission of the Engineer or should a boring be started and for any reason not carried to the depth required by the Engineer or should the Contractor fail to keep complete records of materials encountered or furnish the Engineer the required samples and cores, the Contractor will make an additional soil boring at a location selected by the Engineer and no payment will be made for either the abandoned hole or any samples or cores obtained therein. However, the Contractor will make a record of abandoned bore holes and note thereon the reasons for the abandonment.

Method of Measurement: Soil Borings when completed as such will be measured by the actual number of vertical linear feet bored for each accepted boring between the ground surface at the boring and the bottom of the accepted bore hole or the bottom of the last soil sample taken, whichever is deeper. This measurement will include the portion(s) of the boring in boulder(s), if any, regardless of their thickness, but will not include the portion of the hole in bedrock, if any.

Soil Boring, Type A (0-75 feet) will be the accepted linear feet of soil boring less than 75 feet deep, or the first 75 feet in soil borings that extend deeper than 75 feet. Soil Boring, Type A(over 75 feet) will be the accepted linear feet of soil boring that extends deeper than 75 feet. Soil Boring, Type B will be the accepted linear feet of soil boring.

Item 2.01 Auger Boring – 4 Inch to 8 Inch Diameter

Auger borings will be made with earth augers ranging in size from 4 inches to 8 inches in diameter, depending upon the type of soil encountered and the amount of soil required for a disturbed sample. Earth augers may be hand or power operated. Unless otherwise permitted in writing by the Engineer, a power auger, if used, will be a type which does not mix the soil in advancing the hole, such as a short flight section single flight auger which is withdrawn without rotation from the hole after each new advancement of the auger into undisturbed material. The augers will be turned under a downward pressure, but in no case will the augers be pushed or driven below the soil layers encountered by the twist of the auger in turning the auger into the soil. The auger will be removed when it is filled and a disturbed sample obtained of each soil type and for every 5 feet in depth of the auger hole if there is no change in soil type. Auger borings will be carried to such depths below the ground surface as are directed by the Engineer.

A careful log will be made for each auger boring with the location of each boring noted, as well as elevations of the top and bottom of the hole and each change of material, as well as the water level when encountered. Materials will be carefully described and identified in the log of every hole. This item will include the procurement of split tube samples. Samples from auger holes will be preserved and submitted as specified for split tube samples unless otherwise directed.

Payment will not be made for any auger holes from which, in the opinion of the Engineer, satisfactory soil samples are not obtained.

If gravel or cobbles or other obstacles are encountered, the Contractor will make all reasonable efforts to carry the auger boring past such obstacles. However, if such efforts fail and the hole must be abandoned before adequate information is obtained, another auger boring will be tried nearby where directed by the Engineer.

Method of Measurement: This work will be measured for payment by the actual number of vertical linear feet between the ground surface and the deepest point penetrated by the auger for each accepted auger boring. Abandoned auger holes will be accepted and measured for payment from the ground surface to the top of the obstacle which caused abandonment of the hole, provided the Contractor made all reasonable efforts to advance the hole before abandoning it.

Item 3.01 Split Tube Sample

While performing soil or auger borings, the Contractor will take split tube samples at approximately 1 foot below the ground surface and at the beginning of every change of stratum and at the intervals not to exceed 5 feet, unless otherwise directed by the Engineer. At these points, advancement of the bore hole will be stopped and all material removed from inside the casing or bore hole. The sampler will be driven in accordance with equipment and procedures outlined in ASTM D-1586-84 or AASHTO T 206-87, Standard Penetration Test. The use of water for cleaning out between samples will generally be allowed and approved chopping bits, augers or sampling spoons may be used for cleaning the casing or bore hole preparatory to taking split tube samples. The reuse of wash water will not be permitted except in unusual cases and then only with the written approval of the Engineer. The pump used for wash water will have sufficient capacity to adequately clean the bore holes before sampling the material which has been loosened. The samples will be obtained by driving a split tube sampler 18 inches into the undisturbed material below the bottom of the casing or bore hole.

When sampling in granular materials, the casing will be kept full of water at all times, unless otherwise directed by the Engineer. The casing will be filled with water and covered at the end of the working day and the drop recorded when work is resumed.

Split tube samplers will be equipped at the top with a reliable check valve and will have a minimum inside sampling length of 18 inches. They will have minimum inside diameter of 1 1/2 inches. If difficulty is experienced in the first attempt to recover a sample, the split tube sampler for the second attempt will be equipped at the bottom with a basket shoe or other spring type sample retainer. Flap (trap) valves will be allowed only with the approval of the Engineer. If the earth is very compact and cannot be sampled using the split tube sampling methods required herein, the Contractor will resort to coring methods to obtain a sample.

To facilitate determination of the relative resistance of the various strata, the 2 inch split tube samplers will be driven by a 140 pound weight hammer having a 30 inch drop. The number of blows for each 6 inches of penetration will be recorded.

Representative specimens of each sample will be preserved. The containers for preserving drive samples will be large-mouth, round, screw top, air tight, clear glass jars. Size of jars will be 8 ounce for all drive samples. The specimens will be placed in the jars and tightly capped with gasket sealed caps as soon as they are taken in order to preserve the original moisture in the material. Samples which retain their form upon removal from the sampling spoon will not be jammed or forced into the jar. The jars will be suitably boxed in cardboard boxes, twelve (12) to a box, marked and identified with legible labels. These labels will show the date, town, project name, road name, project number, station and offset, boring number, sample number, depth at which the sample was taken, the drillers' names, number of blows for each 6 inches of penetration and soil classification of the sample. The samples will be protected against freezing and the jars protected against breaking.

When a split tube sample contains material from more than one (1) distinct soil stratum, a representative specimen from each stratum will be placed in separate jars. Additional identification will be as required by the Engineer.

Method of Measurement: Split Tube Samples will be paid at the contract unit price each. The quantity of split tube samples will be the actual number of completed samples actually taken and accepted.

ITEM 4.01 Stationary Piston Sample

While performing soil borings, it may be necessary to obtain stationary piston samples. Stationary piston samples will be taken with a sampler containing a close fitting piston operated by a separate piston, rod and a sampler head with appropriate spring and piston rod check. The sampler will meet AASHTO T 207-87. The sampler tube will have a No. 16 wall thickness, will be 30 TO 36 inches long and 3.0 inches outer diameter, will be provided with a sharp cutting edge and positive inside clearance and will be bright, clean and free from rust. The end of the tube will be drawn in so the inner diameter of the cutting edge will be 1/64 inch less than the inner diameter of the sampler tube.

Samples will be taken in a "piston clamped flush position," unless otherwise directed by the Engineer to produce samples 24 inches long.

Before each sample is taken, the casing or bore hole will be thoroughly cleaned with a cleanout jet auger.

The sampler will be jacked or forced into the ground without rotation in one continuous operation under steady pressure at a rate of from 1/2 to 1 foot per second.

The sampler tube with sample will be detached from the head of the mechanism in a manner so as to cause as little disturbance as possible to the sample.

Samples having less than 50 percent recovery of undisturbed soil will not be accepted for payment under this item.

All samples will be preserved. In preserving samples, a maximum of 1 inch of material will be removed from the bottom of the tube and used to make up a jar sample. All disturbed material will be removed from the top of the tube. A 1 inch wax seal will be placed at the top and bottom of the remaining undisturbed material and allowed to harden. Empty portions of the tube will then be filled with firmly pressed damp sand and the tube ends will be sealed with a metal or plastic cap, friction tape and wax.

Stationary piston samples will be marked upon removal from the ground to indicate the upper end of the sample and will be transported and stored in the same relative position as they existed in the ground.

The weights of all stationary piston samples will be determined and recorded immediately after they are sealed and ready for transfer to the custody of the Engineer. The utmost care will be used in protecting the stationary piston samples from freezing, jarring or disturbance of any kind.

Method of Measurement: Stationary Piston Samples will be paid at the contract unit price each. The quantity of stationary piston samples will be the actual number of completed samples actually taken and accepted.

ITEM 5.01 Rock Coring - NX

Wherever rock is encountered, the Contractor will take continuous core samples to a depth directed by the Engineer. Each core run will be 5 feet in length or greater and drilled by means of a rotary method and diamond bit of such size as will yield cores not less than 2 1/8 inch in diameter (NX).

The diamond core bit will be started in the hole and the bedrock will be drilled until the required depth is reached. When the core is broken off, it will be withdrawn, labeled and stored before the drilling is continued. The holes will be carried into the bedrock to a depth sufficient to permit the Engineer to determine to his satisfaction the character of the bedrock penetrated. In general, it is expected that the depth of the core holes in bedrock will be 5 feet, but it may be required in some cases to penetrate the bedrock as much as 45 feet or as directed by the Engineer. The maximum length of each coring run will be 5 feet. However, the Engineer reserves the right to reduce the length of core run as necessary to effect maximum recovery.

Cores will be carefully handled to insure their proper identification and placed in the order in which they are removed from the hole. Care will be taken to recover as large a percentage of core as possible. The Contractor will regulate the speed of the drill and remove the core as often as necessary to insure the maximum percentage of recovery. The drilling time for each successive foot of rock drilling will be recorded.

Should the recovered length of core be less than 50 percent of the depth cored for any run, the Contractor will adopt such measures as may be necessary to improve the percentage of recovery. These measures may include, but will not necessarily be limited to changes in type of diamond bit, feed rate, speed of rotation, volume of circulation, use of a triple tube core barrel, length of run per removal and change in machine operator. In those cases where, in the opinion of the Engineer, the competency, structure and condition of the bedrock are critical to the design, the Engineer reserves the right to direct that the triple tube core barrel be used.

Rock cores will be stored in wooden boxes or other durable material, constructed rigidly enough to prevent flexing of the core when the box is picked up by its ends. The boxes will be provided with hinged covers and with longitudinal spacers that will separate the core into compartments. Small blocks which fit between the spacers will be provided to mark the beginning and end of each run or pull of core. The top of the first core run will start at the uppermost left corner of the box [hinge side]. Any break in a core that occurs during handling should be marked with three parallel lines across the mechanical break.

An indelible marker will be used to note the project number, boring number, core run numbers, depth interval, and box number on the top, front, inside lid, and both ends of the core box. The inside lid will also include a listing of the recovery and RQD for each core run. Each sample attempted, regardless of recovery, will be designated with a name and number and recorded on a field log.

Method of Measurement: This work will be measured for payment by the actual number of vertical linear feet of acceptably drilled hole in bedrock and in individual boulders 2 feet or more in thickness.

Item 6.01 Pavement Core-4 inch Diameter

Item 6.02 Pavement Core-8 inch Diameter

At each location indicated on the plans, the Contractor will take continuous core samples of the pavement to a depth directed by the Engineer by means of a rotary method and a bit of such size as to yield a core not less than 4 inches in diameter for a Pavement Core-4 Inch Diameter and 7 3/4 inches in diameter for a Pavement Core-8 Inch Diameter.

The core bit will be started at the pavement surface and the pavement will be drilled until the required depth is reached. When the core is broken off, it will be withdrawn, labeled and stored before drilling is continued. The holes will be carried to the bottom of the pavement.

However, the Engineer reserves the right to reduce the length of core run as necessary to affect maximum recovery. Upon removal of core, the hole will be backfilled with a suitable patch.

Cores will be carefully handled to insure their proper identification and placed in the order in which they are removed from the hole. Care will be taken to recover as large a percentage of core as possible. The Contractor will regulate the speed of the drill and remove the core as often as necessary to insure the maximum percentage of recovery.

Should the recovered length of core be less than 80 percent of the depth cored for any run, the Contractor will adopt such measures as may be necessary to improve the percentage of recovery. These measures may include, but will not be limited to changes in type of bit, feed rate, speed of rotation, volume of circulation, length of run per removal and change in machine operator.

Each pavement core will be placed in suitable cardboard box. Pavement cores will be suitably labeled and arranged neatly in the boxes in the sequence in which the material was removed from the hole. The boxes will be properly labeled showing the date the core was taken, town, project name, road name, project number, station and offset, boring number, depth of core and driller's names.

Method of Measurement: Pavement Cores, of the size specified, will be paid at the contract unit price each. The quantity of Pavement Cores will be the actual number completed and accepted.

Item 7.01 Test Pits

Test pits, 3 feet by 5 feet minimum horizontal dimensions at the bottom and as specified below or ordered by the Engineer, will be dug at locations as directed by the Engineer. Test pits will be dug to a maximum depth of 5 feet. Test pits will be properly sheathed to protect the workers and will be large enough to allow easy inspection of soil conditions and procurement of soil samples, if necessary. A detailed log of soil and water conditions will be made for each test pit, including the location of each pit and elevation of the top and bottom of each pit and the elevation at each change of material therein. This item will include the procurement of samples which will be preserved and submitted as directed.

When the test pit is approved and accepted by the Engineer and the necessary samples taken, it will be backfilled.

Method of Measurement: This work will be measured for payment by the actual number of completed and accepted test pits.

Item 8.01 Bar Soundings

Bar soundings will be taken where and to such depths as directed by the Engineer. The estimated maximum depth of bar soundings is 15 feet.

If boulders or other obstacles are encountered, the Contractor will make all reasonable efforts to drive the bar past such obstacles. However, if such efforts fail and the sounding must be abandoned before adequate information is obtained, another sounding will be made nearby where directed by the Engineer. A careful log will be made for each bar sounding with the location of each sounding and elevations noted for the ground surface at the sounding location and for the bottom of the sounding.

Method of Measurement: This work will be measured for payment by the actual number of vertical linear feet sounded for each accepted bar sounding between the ground surface, bottom of test pit, bottom of auger boring or bottom of other boring at the sounding and the bottom of the bar sounding. Abandoned bar soundings will be accepted and measured for payment from the ground surface or other starting elevation, if lower, to the top of the obstacle which caused abandonment of the sounding, provided the Contractor made all reasonable effort to drive the bar and the bar met refusal before the sounding was abandoned.

Item 9.01 Drill Rod Probe

Drill rod probes will be made to determine the depth and lateral extent of organic material in swamps or marshes. A drill rod or appropriate equal will be used in such areas to obtain the extent of the organic material. These probings will extend to firm-bearing soil. A careful log will be made for each probing, including the elevation at the ground surface and at the bottom of the probing.

Method of Measurement: This work will be measured for payment by the actual number of vertical linear feet probed for each accepted drill rod probe between the ground surface and the bottom of the probe.

Item 10.01 Observation Wells

Observation wells, consisting of schedule 40 Polyvinyl Chloride (PVC) monitoring well casing and slotted screen of 3/4 to 2 inch outside diameter, will be installed in borings designated by the Engineer. Soil Borings in which observation wells are to be installed will be determined as the work proceeds. Notice to install an observation well will be given prior to time of completion of the borings selected. The total length of casing required for any observation well will not exceed 60 feet.

If the casing is to be left above ground, a riser pipe consisting of 5 feet of 3 inch nominal inner diameter steel casing with a locking cap will be required at the ground surface for protection. If the well is to remain flush with the ground, it will be encased in a bolt down, locking, water tight curb box or manhole. The curb boxes will be supplied by the Contractor and clearly labeled as a monitoring well. Curb boxes will be 8 inches to 12 inches in diameter and meet or exceed AASHTO standard for "H-20" truck loadings. The curb boxes will be encased in a concrete pad 12 inches X 12 inches X 12 inches to prevent the destruction of the unit. The Contractor will supply the Engineer with a key or wrench that is designed to open the curb box.

The PVC will be new, clean 3/4 inch to 2 inch outside diameter and made of Type I, Schedule 40, flush joint threaded PVC with an O-Ring seal. The bottom 5 feet or greater as determined by the Engineer, will be factory slotted with 0.010 or 0.020 high capacity slots. A suitable PVC threaded point and O-Ring seal will close the bottom of the well screen.

Filter material will consist of fine aggregate used for portland cement concrete or Number 0 New Jersey sands.

The boring will be filled with filter material to the elevation directed by the Engineer at which the bottom of well will be located. Dependent upon the depth of boring, there will be at least 2 feet of filter material below the bottom of PVC. The assembled well will be lowered into the cased boring and additional filter material will be placed around the PVC as the casing is withdrawn from the hole. The well will be kept centered in the boring during the backfilling operation. The filter material will be placed up to an elevation approximately 5 feet below the ground surface and the remaining depth of boring

will be backfilled with firmly-tamped suitable impervious material, unless otherwise directed by the Engineer. The 5 foot length of casing and the PVC will be set flush with or extended above the ground surface to such height as the Engineer may direct.

Method of Measurement: This work will be measured for payment by the actual number of linear feet from the Observation Well bottom to the top of the riser pipe, but not more than 2 feet above the ground surface or to the top of the curb box, for each accepted well installed in accordance with these specifications, or as directed by the Engineer.

Item 11.01 Piezometer

Piezometers may be required to be installed in Soil Borings, Type A. The borings, which will require the installation of a Piezometer, will be specified prior to the issuance of the Purchase Order. The piezometer unit to be installed will be supplied by the Engineer.

The piezometer will be installed in accordance with the manufacturer's specifications and AASHTO specification T252-96.

To protect the Piezometer from damage, a riser pipe consisting of 5 feet of 3 inch nominal inner diameter steel casing with a locking cap, will be required at the ground surface.

A Piezometer will be accepted if the unit functions during the length of the drilling contract.

Method of Measurement: This work will be measured for payment by the actual number of linear feet from the piezometer tip to the top of the riser pipe, but not more than 2 feet above the ground surface for each accepted Piezometer installed in accordance with these specifications, or as directed by the Engineer.

Item 12.01 Inclinometer

The Contractor is to install grooved inclinometer casing and appurtenances. The casing will be comprised of 2.75 inch outer diameter x 2.32 inch inner diameter acrylonitrile butadiene styrene (ABS) plastic telescoping coupling. The casing will have two (2) vertical, perpendicular sets of grooves on the inside surface to guide the inclinometer monitoring unit. The casing will have recessed ends to allow the coupling to freely slide for a minimum of 3 inches per 10 foot casing section. The casing will have screws set at the 1/4 points and mid-point between groove centers.

The inclinometer will be installed in accordance with AASHTO specification T 254-80 and the manufacturer's specifications.

For protection, the inclinometer is to be cut flush with the ground and encased in a bolt down locking, water tight curb box or manhole. The curb boxes will be supplied by the Contractor and clearly labeled as monitoring wells. Curb boxes will be 8 inches to 12 inches in diameter and meet or exceed AASHTO standard for "H-20" truck loadings. The curb boxes will remain flush to the ground and be encased in a concrete pad 12 inches X 12 inches X 12 inches to prevent the destruction of the unit.

The inclinometer will be accepted if the unit functions for the duration of the drilling contract.

Method of Measurement: This work will be measured for payment by the actual number of linear feet from the bottom of the inclinometer casing to the ground surface for each accepted Inclinometer installed in accordance with these specifications, or as directed by the Engineer.

Item 13.01 Trafficperson-Uniformed

The Contractor will provide the services of Trafficpersons-Uniformed of the type and number, and for such periods, as the Engineer approves for the control and direction of vehicular traffic and pedestrians.

The Contractor will inform the Engineer of their scheduled operations and the number and type of Trafficpersons-Uniformed requested and/or required by permit. A Trafficperson-Uniformed, when scheduled, will be on site during installation and removal of traffic control devices (signs, etc.).

If the Contractor changes or cancels any scheduled operations without prior notice of same as required by the agency providing the Trafficperson-Uniformed, and such that Trafficperson-Uniformed services are no longer required, the Contractor will be responsible for payment at no cost to ConnDOT of any shown-up cost for any Trafficperson-Uniformed not used because of the change. Exceptions, as approved by the Engineer, may be granted for adverse weather conditions and unforeseeable causes beyond the control and without the fault or negligence of the Contractor.

Trafficpersons-Uniformed assigned to a work site are to only take direction from the Engineer.

Trafficpersons-Uniformed will wear a high visibility safety garment that complies with OSHA, MUTCD and ASTM Standards

Method of measurement: Only Trafficperson-Uniformed services approved by the Engineer will be measured for payment. Services of Trafficpersons-Uniformed will be measured for payment by the actual number of hours for each person rendering services in accordance with these specifications. Services of Trafficpersons-Uniformed utilized by the Contractor, for which the Engineer did not approve, will not be measured for payment. In cases where the Trafficperson-Uniformed is an employee on the Contractor's payroll, payment for the Trafficperson-Uniformed will be made only for those hours when the Contractor's employee is performing Trafficperson-Uniformed duties.

Safety garments and STOP/SLOW paddles will not be measured for payment.

Item 13.02 Trafficperson - Municipal Police Officers

Trafficperson-Municipal Police Officers will be sworn Municipal Police Officers or Uniformed Constables who perform criminal law enforcement duties from the Municipality in which the project is located. Their services will also include an official police vehicle. Trafficperson-Municipal Police Officers, when available in a municipality will be used on non-limited access highways and local roads. When Trafficperson-Municipal Police Officers are unavailable, other Trafficperson-Uniformed may be used when authorized in writing by the Engineer.

Trafficperson-Municipal Police Officers will be used at such locations and for such periods as the Engineer deems necessary to control traffic operations and promote increased safety to motorists through the work site.

Trafficperson-Municipal Police Officers may conduct motor vehicle enforcement operations in and around work areas as directed and approved by the Engineer.

Trafficperson-Municipal Police Officers will wear the high visibility safety garment provide by their law enforcement agency. If no high visibility safety garment is provided, the Contractor will provide the law enforcement personnel with a garment meeting the requirements stated above for the Trafficperson-Uniformed garment.

Method of measurement: Only Trafficperson services approved by the Engineer will be measured for payment. Services of Trafficpersons will be measured for payment by the actual number of hours for each person rendering services in accordance with these specifications. Services of Trafficpersons utilized by the Contractor, for which the Engineer did not approve, will not be measured for payment. In cases where the Trafficperson is an employee on the Contractor's payroll, payment for the Trafficperson will be made only for those hours when the Contractor's employee is performing Trafficperson duties.

The minimum hours of payment for each Trafficperson supplied by a law enforcement agency in any one day will be four hours.

No travel time will be allowed or paid.

Safety garments and STOP/SLOW paddles will not be measured for payment.

Item 14.01 Mobilization and Dismantling-Land

This item will include the initial mobilization of the drill rig at the project site and the final dismantling after all borings are complete. The Contractor is required to furnish the drill rig and tools, in good condition and all other equipment necessary to carry on and complete the work properly. The Contractor may be required to mobilize and dismantle his equipment at existing highway structures, highway embankments, highway rights of way, off the traveled way, wooded areas and other difficult sites. The Contractor will have the necessary equipment and personnel to assemble his drilling equipment at the desired locations.

The Mobilization and Dismantling-Land item will include full compensation for all traffic control devices, cones, signs, etc. When the Contractor's operations obtrude onto any part of the roadway, the Contractor is to adhere to ConnDOT's publication "Traffic Control Patterns for Highway Maintenance" revised July 2002. Traffic Control will not include crash trucks, arrow boards or message signs.

All material or equipment furnished under this item will remain the property of the Contractor and will be maintained and disposed of by him. This item will carry all charges incidental to such plant setup and removal, in order that the charges need not be distributed among the more variable items of the contract.

Method of Measurement: This item will be measured for payment by the actual number of boring rigs and/or crews specified in the Purchase Order or as directed by the Engineer. This item will be due for payment at the time of final payment after removal of all materials and equipment from the project.

Item 15.01 Mobilization and Dismantling-Water

This item will include the initial mobilization of the drill rig at the project site, the launching, positioning and moving of rafts and other equipment necessary for making borings over water and the final dismantling after all borings are complete. The Contractor is required to furnish the drill rig and tools, in good condition and all other equipment necessary to carry on and complete the work properly. The Contractor will have the necessary equipment and personnel to assemble his drilling equipment at the desired locations.

The Mobilization and Dismantling-Water item will include full compensation for all traffic control devices, cones, signs, etc. When the Contractor's operations obtrude onto any part of the roadway, the Contractor is to adhere to ConnDOT's publications "Traffic Control Patterns for Highway Maintenance, revised July 2002. Traffic Control will not include crash trucks, arrow boards or message signs.

All material or equipment furnished under this item will remain the property of the Contractor and will be maintained and disposed of by him. This item will carry all charges incidental to such plant setup and removal, in order that the charges need not be distributed among the more variable items of the contract.

Method of Measurement: This item will be measured for payment by the actual number of boring rigs and/or crews specified in the Purchase Order or as directed by the Engineer. This item will be due for payment at the time of final payment after removal of all materials and equipment from the project.

ITEM 16.1 Mobilization and Dismantling-Portable Boring Equipment

For sensitive areas such as residential, landscaped or wetland areas the Engineer may require the use of portable boring equipment [not skid rigs] that can be carried by workmen to and from each boring site. The use of hay bales, platforms, filter cloth, planks, etc. to contain the operation may be required.

The unit bid price for this work as submitted by the Contractor will include all labor including transporting the equipment, use of portable equipment and incidentals necessary to mobilize and dismantle the portable boring equipment at each boring in these areas.

Compensation for this work as mentioned, in addition to any other work necessary to mobilize and dismantle the boring equipment in wetland or sensitive areas, repair any damage as a result of the Contractors operation or to clean up and complete the borings will be included in the unit bid price for each mobilization and dismantling of portable equipment at each boring.

Borings made with portable equipment will be paid at the contract unit bid price for Type B Borings for the actual depth made as determined by the Engineer. If willow refusals are encountered, additional borings in the immediate area may be called for by the Engineer. For these additional borings in the immediate area (no greater than 20 feet away) no additional mobilization and dismantling will be paid.

Method of Measurement: This item will be measured for payment by the actual number of boring rigs and/or crews specified in the Purchase Order or as directed by the Engineer. This item will be due for payment at the time of final payment after removal of all materials and equipment from the project.

ITEM 17.1 Mobilization and Dismantling-Skid Rig on Land

This item will include the set up and breakdown of a skid rig on borings that require such a set up, as determined by the Engineer. If after examination of the site the Contractor feels a boring location warrants use of a skid rig, the Contractor will confirm approval for use of a skid rig under this item with the Engineer.

Method of Measurement: This item will be measured for payment by each number of boring rigs and/or crews specified in the Purchase Order or as directed by the Engineer. This item will be due for payment at the time of final payment after removal of all materials and equipment from the project.

ITEM 18.1 Automatic Hammer For Standard Penetration Test (SPT)

The work under this item when requested by the Engineer will include the use of a fully automatic hammer to conduct the SPT. The automatic hammer system will lift a 140 pound drive weight and completely release the weight for a 30 inch free fall. The drive weight will not have a cable or rope attached that may impede the fall.

Method of Measurement: This item will be measured for payment by the actual number of boring rigs required to be equipped with an Automatic Hammer for SPT. This item will be due for payment at the time of final payment after removal of all materials and equipment from the project.

Item 19.01 Standby Time

Certain projects may require the Contractor to curtail operations during the normal work day due to restricted working hours imposed by ConnDOT or for other reasons such as traffic control including air and rail traffic, weather conditions, tides or other conditions. Construction projects may require that the Contractor stop the boring operations.

When Standby Time occurs for any purpose it will be determined by the Engineer.

No Standby Time will be paid when work cannot be performed due to adverse weather conditions as determined by the State, breakdowns, etc. Should the State deem the equipment or workers to be unsafe no Standby Time will be paid for the Contractor to furnish replacement workers or equipment.

Standby Time will not be paid to assemble or remove a traffic control pattern.

If more than one (1) drill rig is being used on a project this item will be paid per hour per drill rig when applicable, as determined by the Engineer.

Method of Measurement: The item Standby Time will be measured for payment by the actual number of hours each drill rig is required by the Engineer to Standby. Standby Time will be measured to the nearest 15 minute interval.

ITEM 20.01 Truck Mounted Impact Attenuator Vehicles (TMAs)

Operations on limited access, high volume roadways which require the use of a TMA (commonly referred to as a crash truck) will be provided in accordance with this item. The TMA will be placed prior to the first work area in the traffic control pattern. If there are multiple drill rigs working within the same pattern then each drill rig will have a TMA positioned at a sufficient distance (25 to 100 feet), as directed by the Engineer, to protect the workers and traveling public. The Contractor will document and demonstrate to the Engineer's satisfaction that the system conforms to the requirements of a new system, or NCHRP Report 230 or NCHRP 350 (TL-2)

The attenuation device will be mounted on a truck or service vehicle similar in size and weight to the truck that was used in the crash testing that was submitted and approved by the FHWA. In addition, the truck will have a minimum weight (mass) of 15,000 pounds (6,800 kilograms) and a maximum weight (mass) in accordance with the manufacturer's recommendations. Any ballast used to obtain the minimum weight requirement, or any other object that is placed on the vehicle will be anchored so that it will be retained on the vehicle during an impact.

The truck will be equipped with an internally illuminated flashing arrow visible from the rear. The bottom of the illuminated arrow sign will be installed a minimum of 7 feet above the ground. The illuminated arrow will conform to the requirements of Part VI MUTCD, Advance Warning Flashing Sequencing Arrow panels, Type C.

The truck will be equipped with a minimum of two (2) amber strobe type flashers mounted above the internally illuminated flashing arrow.

The TMA unit will have a chevron pattern that covers the rear face of the unit. The standard chevron pattern will consist of stripes, alternating non-reflective black and Type III retro-reflective yellow sheeting, slanted at 45 degrees in an inverted "V" pattern, centered on the rear of the unit. The width of the stripes will be between 4 and 8 inches.

The disposal of crushed or damaged systems is the responsibility of the Contractor. The disposal method employed will be approved by the Engineer.

Method of Measurement: This item will be measured for payment by the actual number of TMA(s) that are used on a daily basis when determined necessary by the Engineer. This item will be due for payment at the time of the final payment.

ITEM 21.1 Light Plant

Operations which will be performed during hours of darkness will require either equipment mounted or stand alone illumination. Illumination will include a minimum of two (2) flood/wide lights and two (2) narrow/spot lights. The lighting will be UL listed as suitable for wet locations and be either 250 watt metal Halide Lamps with integral ballast or 1000 watt Quartz PAR64, or approved lighting fixtures of equivalent light output characteristics.

All mounts will provide a secure connection that allows for adjustable positioning and aiming of the light fixture. Lighting must be capable of maximizing the illumination on each task, while minimizing glare to the passing traffic.

Lighting will be provided continuously during the entire operation and a sufficient number of spare lamps will be available on site in the event of failures.

Method of Measurement: Lighting will be measured for payment by the actual number of days that each drill rig requires illumination during the hours of darkness.

Questions: Questions regarding this bid shall be made in writing and must be submitted to Paul Greco, DAS Contract Specialist at paul.greco@ct.gov no later than 10 days prior to the due date of this bid. Answers will be presented via contract addendum.