

AGREEMENT NO. XXXX
BETWEEN
STATE OF DELAWARE
AND
(Insert CONSULTANT Full Name)

This **AGREEMENT**, made and executed in triplicate, the day, month, and year affixed by the signature of the Department of Transportation's representative by and between the **DELAWARE DEPARTMENT OF TRANSPORTATION**, a Department created under the laws of the State of Delaware, herein after designated as **DEPARTMENT**, and **(INSERT CONSULTANT NAME)**, hereinafter referred to as the **CONSULTANT**, whose address is (Insert street/ mailing address and zip code).

WITNESSETH:

WHEREAS, the **DEPARTMENT** requires the need for subsurface investigations; and,

WHEREAS, the **CONSULTANT** will be responsible for all necessary materials, labor, and equipment to perform geotechnical investigations, geotechnical testing, and other incidentals including visual inspection (boring logs) on a state wide basis in accordance with the location, notes, and details provided by and as directed by the **DEPARTMENT**. The **CONSULTANT** shall follow all specifications for work as defined by **DEPARTMENT** manuals. The **CONSULTANT** is responsible for delivering all samples to the **DEPARTMENT'S** central lab in Dover unless otherwise specified. Work will be assigned on an as-needed as-required basis; and,

WHEREAS, the **DEPARTMENT** has determined that the professional services covered by this **AGREEMENT** are necessary and that the **DEPARTMENT** would be best served by procuring such professional services; and,

WHEREAS, the **CONSULTANT** has been selected pursuant to and the **DEPARTMENT** and **CONSULTANT** have complied with the Professional Services Negotiation Act, 29 Del C. Chapter 69, and this **AGREEMENT** is executed pursuant thereto.

NOW, THEREFORE, for and in consideration of the mutual covenants, hereinafter are stipulated to be kept and performed, and it is agreed between parties as follows:

The **CONSULTANT** has agreed and by these presents does agree with the **DEPARTMENT** for the consideration hereinafter mentioned to provide the services as hereinafter set forth.

SECTION 1. GENERAL PROVISIONS

- A. The **CONSULTANT** will be responsible for all drilling work (through unconsolidated or partly consolidated sediment, and or rock, or rock core drilling), any miscellaneous geotechnical testing required per project, all necessary permits, and proper maintenance of traffic set-ups on an on-call task order basis.
- B. The term of this **AGREEMENT** shall be for three (3) years from the effective date of this **AGREEMENT**.
- C. The Disadvantaged Business Enterprise (DBE) Goal for this **AGREEMENT** has been established by the **DEPARTMENT'S** DBE Program Office at 4%. The **CONSULTANT** assures the **DEPARTMENT** that it is committed to make a good faith effort to attain the DBE participation goal assigned to this **AGREEMENT**. DBE firms must be duly certified with the **DEPARTMENT** as a DBE and approved as a **SUBCONSULTANT** under this **AGREEMENT**. The **DEPARTMENT** will monitor DBE firm participation throughout the term of this **AGREEMENT** by reviewing the total payments made to DBE firms divided by the total federal funds expended on this **AGREEMENT**. The **CONSULTANT** will be responsible for managing its task orders to ensure that DBE participation is adequate to meet the established goal for the agreement. If the **DEPARTMENT** finds this is not being properly managed by the **CONSULTANT**, the **DEPARTMENT** reserves its right to begin assigning DBE goals on a task order basis.
- D. This **AGREEMENT**, Competitive Sealed Proposal (CSP) number 1692 and 1693, assigned Task Orders, and the firm's proposal to the **DEPARTMENT**, shall constitute the Contract between the **DEPARTMENT** and the firm. In the event there is any discrepancy between any of these contract documents, the following order of documents govern so that the former prevails over the later: Agreement, then CSP, then Task Orders, then firm's proposal. No

other documents shall be considered. These documents contain the entire contract between the **DEPARTMENT** and the firm.

SECTION 2. DETAILED REQUIREMENTS

Work assigned on this **AGREEMENT** will be by individual task orders for subsurface investigations, including drilling and geotechnical testing as outlined above, throughout the State of Delaware. The **CONSULTANT** will prepare a specific proposal for each task order assignment including a work plan, cost proposal, and schedule to be approved by the **DEPARTMENT**. Any changes in essential project management personnel shall be immediately brought to the attention of the **DEPARTMENT'S** project manager.

SECTION 3. PROJECT SCHEDULE

A. Within three (3) working days the **CONSULTANT** shall acknowledge each work assignment. The **CONSULTANT** shall contact the **DEPARTMENT** to discuss project requirements and will provide a work plan, schedule and cost proposal to the **DEPARTMENT** within five (5) working days following the initial project scoping meeting.

The **CONSULTANT** will proceed with the work and services for that task(s) within three (3) working days after receipt of a written Notice to Proceed issued by the **DEPARTMENT'S** Contract Administration section. The **CONSULTANT** shall submit a monthly status report for each assigned task (unless otherwise directed by the **DEPARTMENT**) and shall advise of any decisions needed concerning matters that appear to be preventing progress.

B. The Department retains the right to disallow payment of fixed fee profit on any task initiated by the **CONSULTANT** prior to receipt of a Notice to Proceed issued by the **DEPARTMENT'S** Contract Administration section.

SECTION 4. BID ITEM DESCRIPTIONS

Bid Item Description
605539 – SOIL BORING, WATER

Description:

This work consists of advancing soil borings (drillings) through unconsolidated or partly consolidated sediments or decomposed rock by use of Hollow Stem Augers (HSA) or Drive Casing and sampling with a split barrel sampling spoon at locations designated on the Plans or as directed by the Engineer. Those soil borings made over "deep" water requiring a barge or other special equipment, or in wet areas that cannot be accessed by a truck mounted rig, will be considered Soil Borings, Watering, all others will be considered Soil Borings, Land.

Standard Penetration Tests (SPT) and Split Barrel Sampling of the soils shall be taken at the ground surface and at 5 foot intervals thereafter in all hollow stem auger and drive casing holes.

Materials and Construction Methods:

Hollow Stem Auger Method

The Contractor shall use a power-driven, continuous, hollow-stem auger casing to advance and maintain the hole. The clear inside diameter of the hollow stem must be large enough to allow for the insertion of a 3.0 inch OD Shelby Tube soil sampler and attached rods through the in-place auger casing when elevations are reached for securing soil samples.

When using auger casings, the relative resistance to penetration, general feel and performance of the auger operation, and the cuttings obtained from the auger shall be observed and recorded for detection of changes in the materials encountered.

The plug point shall be withdrawn through the hollow stem, the sampler lowered through the full length of the auger, then driven or pressed below the auger bit and withdrawn. After replacing the plug point, the auger shall proceed to the next point of sampling. When the use of hollow stem augers is not feasible because of site conditions, the use of drive casings will be permitted.

All boreholes shall be preserved from collapse and bottom instability during advancement and sampling operations. When drilling below the natural ground water level, water shall be maintained inside the augers at a level above the ground water level at all times. If it is required to prevent bottom instability, water should be added to maintain a positive static water head inside the augers during drilling and withdrawal of the drilling rods. Cleaning out of the augers shall be required if the accumulation of material within the hollow-stem, between sampling intervals, is of a degree that is detrimental to the purpose of the sampling operation. Cleaning out the augers shall be performed with wash rods and a roller or side discharge chopping bit.

Drive Casing Method of Advancing Borings

All sampling and other procedures referencing the HSA method will also apply where drive casing is employed.

Casing shall be extra-strong steel pipe or flush-coupled casing with a nominal inside diameter of 4 inches.

Casing shall be sunk vertically through earth and other materials, including boulders and rock veins, to rock or, if not to rock, to such depth below ground as the Engineer may order. They shall be driven down without washing to the depth at which a sample is to be taken, after which the material shall be cleaned out to the bottom of the casing and the sampler driven or pushed below the bottom of the cleaned casing. After sampling, casing driving shall be resumed.

The use of clean water for cleaning out the casing between sample elevations will be required. Recirculated water shall not be used. The Contractor shall make suitable arrangements for properly procuring and disposing wash water.

The weight of hammer to be used in driving the casing shall be 300 pounds with a 24 inch height of free fall. The hammer shall be raised by means of a rope having one end wrapped (not more than three loops) around a winch head. Wire rope will not be permitted. A continuous record of the blows per 1 foot required for the driving of the casing shall be kept.

Simultaneously washing and driving of the casing will not be permitted except when the Engineer judges the driving requires the use of water. Where the use of water is permitted, borings shall be advanced by saw tooth, chopping, fishtail, or rollerbits, all having side discharge jets. In advancing the boring, return water circulation, resistance to penetration and general performance of the drill shall be observed for detection of change in material. The casing shall next be advanced, if needed for retaining the hole open, to the point of maximum penetration of the washed pilot hole. The casing shall be cleaned in a manner to result in minimum disturbance of the soil below the casing shoe. All sampling shall be performed in advance of the casing shoe. A record must be kept of the depths between which simultaneous washing and driving occurred.

In some cases where the characteristics of the soil are suitable, the Engineer may permit the Contractor to discontinue driving the casing and accept advancing the boring by means of wash rods with a roller bit or side discharge chopping bit to the elevations at which samples are to be taken. This procedure shall be noted in the boring record. Should there be any indication of the sides of the hole collapsing, thus blocking normal progress of the boring, driving of the casing shall be resumed.

When a boulder or a stratum of ledge rock is encountered before the required depth of boring has been reached, it shall be the Contractor's responsibility to carry the boring through or past these obstacles but only by methods approved by the Engineer. The Contractor may, in some cases, be permitted to core the boulder or rock stratum to determine its size and characteristics. The required size of sampler to be used below the obstacle shall determine the size of boring to be made. A log of the nature of the obstacle and the method used to carry the boring through the obstacle shall be recorded.

Sampling Device

The sampling device for ordinary, dry samples from Soil Borings shall be a standard split barrel sampler meeting the requirements of the "Penetration Test and Split-Barrel Sampling of Soils" AASHTO T206. The sampler shall be a split barrel tube with an outside diameter of 2 inches, an inside

diameter of 1-3/8 inches, a minimum length of 18 inches between the driving shoe and the smaller head, and a minimum total length of 27 inches. The drive shoe shall be hardened steel and shall be replaced or repaired when it becomes dented or distorted. The sampler head shall have a 1/2 inch minimum diameter vent ports and shall contain a reliable ball check valve.

Core retainers shall be used with the sampler, when necessary, to avoid loss of the sample. In cases where the material encountered is not sufficiently cohesive to permit the standard sampler to recover a sample on the first trial, a flapper valve, basket retainer, or other approved device shall be used to recover a sample. The use of such a device shall be noted on the boring log.

Should the Contractor, in securing samples, fail to provide the proper types of samplers, valves, traps and other special sampling devices, these samples will be deemed unacceptable by the Engineer.

Sampling Procedure

The HSA or casing shall be advanced to the sampling depth and the loose material within the casing cleaned to its bottom before driving the sampler. Clean out shall be roller bit or chipping bit.

The sampler shall be driven into the soil below the HSA or casing for a distance of 18 inches or until further penetration is impossible with a 140 pound hammer falling freely through a vertical distance of 30 inches. The number of blows of the hammer shall be recorded for each 6 inches of penetration and, if 6 inches is not penetrated in one hundred (100) blows, the sampler will be considered to have met refusal and the blows shall be recorded as 100/number of inches penetrated. The hammer shall be raised by the use of a manila rope which the driller shall pull by hand with the assistance of a power operated spool or drum about which the rope will freely slip during the drop of the hammer. Wire rope will not be permitted to lift the hammer. All sampling devices, including driving mechanisms, used by the Contractor shall be approved by the Engineer.

Samples of the soil retained in the split barrel sampler shall be taken from that portion of the soil column between 6 and 18 inches below the bottom of the casing. The sample so obtained shall be representative of the material from which it is taken and shall be in an unwashed condition. Samples recovered from wash water, commonly termed "wash samples" will be unacceptable. If less than 9 inches of soil is retained in the sampler, a second sample shall be taken immediately below the deficient sample, after first advancing the boring. If more than one soil type is present in the sampler, a sample shall be taken of each type, and the length of each type of soil in the sampler shall be noted on the boring log.

Preservation and Identification of Samples

The disturbed samples obtained with the split barrel sampler shall be removed with as little disturbance as possible, and immediately placed in a suitable approved container. Samples which retain form upon removal from the sampling spoon, shall not be jammed or forced into the approved container. Each approved container shall be clearly and permanently labeled to show the project and section numbers, boring number, station location, elevation or depth at which the sample was taken, the kind of material and the number of blows of the sampler.

If two or more materials are encountered in a sampler, separate approved containers shall be used for each material. The letters "A", "B", etc. shall be added to the sample number on each to designate the different materials.

The Contractor shall provide the sample containers, keeping a sufficient supply on hand to prevent any delay in the work.

The Contractor shall pack all samples in containers that are acceptable to the Engineer and of sufficient durability to withstand handling without breakage of the sample containers. On the top and one end of each container, the Contractor shall neatly and legibly paint or stencil, using waterproof paint, the following identifying data: title of project and designation of section thereof; location of site by name and/or survey station; boring numbers; and name of Contractor; all as required or directed by the Engineer.

During the period of active work in the field, the Contractor shall be responsible for storing all soil samples in a warm, dry, locked, temporary storage facility convenient to the work areas.

Determination of Running Sand

In order to determine whether the water pressure on sand is sufficient to cause the sand to run when unconfined, the Engineer may order a test for running sand.

The test shall consist of obtaining a sample of the sand with a split barrel sampler as specified in the sampling procedure. The casing shall then be drilled into the sand 2 feet below the elevation at which the sand was encountered, and carefully washed out to the bottom. The hole shall then be allowed to stand ten (10) minutes, and the elevation at which the sand then stands in the casing shall be measured. The water in the casing shall then be removed to a point 5 feet above the bottom of the casing to produce an unbalanced hydrostatic condition and the elevation of the top of the sand shall again be measured.

No more than one such test will be required at each structure when sand is encountered at depths near or above the anticipated elevation of the bottom pier or abutment excavation.

Ground Water

Depth to ground water shall be determined when initially encountered and upon completion of the boring. The Contractor shall also take a water level reading 24 hours after the augers are removed. In the event the hole collapses before the ground water is observed, the depth to the collapsed portion shall be recorded. For Soil Borings, ground water level measurements will not be made unless unusual circumstances are encountered.

Records and Logs

The Contractor shall keep a complete and accurate record of all details of the Soil Boring operations in a field book and on suitable boring log forms provided by the Contractor. Upon completion of each boring, two copies of the field log, on 8-1/2 x 11 inch paper, shall be given to the

Engineer. The description of the soil, rock and other material encountered in the boring shall be made by the Contractor or the Engineer's Representative. Each boring log shall record the information pertinent to the boring work being accomplished as outlined in the following sections. The following general information shall be recorded on each boring log:

- (a) Contract number, title of project and section designation
- (b) Location of boring by survey station, and offset, right or left of survey baseline
- (c) Boring number as specified on the Plans or as furnished by the Engineer
- (d) Names of the Engineer, Contractor, Inspector, and drilling crew
- (e) Date of starting and completing each boring
- (f) Ground elevation of the top of the hole as provided by the Engineer
- (g) Depth to the top of ground water, if present.

The following information shall be recorded on the boring logs for that portion of the boring penetrating unconsolidated or partly consolidated sediments or decomposed rock by drilling and sampling with a split barrel sampler:

- (a) Type of drill rig used
- (b) Size, type and length of augers used in each hole
- (c) Method used to clean out casing between sampling intervals
- (d) Size of split barrel sampler, weight of hammer, height of drop, and number of blows of the hammer for each 6 inches of penetration of the sampler out of a total minimum penetration of 18 inches for each sample. Where 6 inches is not penetrated in one hundred (100) blows of the hammer, the distance penetrated in one hundred (100) blows shall be recorded
- (e) Depth to beginning and end of sampling drive, and the length of sample recovered from the sampler
- (f) Depth to the top of each change or stratum of material
- (g) Description of the material encountered shall be in accordance with standard practice and shall include:
 - (1) Type - topsoil, sand, silt, clay, gravel, silty clay, sandy silt, etc.
 - (2) Color - light brown, dark reddish brown, etc.
 - (3) Moisture - dry, moist, wet, saturated,
 - (4) Consistency - soft, loose, medium, firm, stiff, etc. as determined by "N" values in Table 1 below.

TABLE 1

DEGREE OF DENSITY OR CONSISTENCY			
Non-Cohesive Soils Descriptive term	(Sand) Standard Penetration "N" - Blows/1 foot	Cohesive Soils Descriptive Term	(Clay) Standard Penetration "N" - Blows/1 foot
Very loose	0-4	Soft	0-4
Loose	5-10	Firm	5-8
Medium	11-30	Stiff	9-15
Dense	31-50	Very Stiff	16-30
Very Dense	51+	Hard	31+

False Starts

The Contractor is to verify the exact location of all known utilities prior to drilling. If the Contractor is unable to complete any boring due to encountering underground utilities or structures, the existence and location of which could not have been previously known, or because obstacles or obstructions are encountered which the Engineer considers are of an unusual nature and that failure to penetrate them is not the fault of the Contractor's methods or equipment, a false start will be measured and paid for at the applicable Contract unit price. The record of false starts shall be forwarded to the Engineer. For the new hole, bored to replace the abandoned hole, the Contractor shall operate as if a completely new hole was bored obtaining soil samples, standard penetrations tests, etc., in the depths reached by the abandoned hole.

Backfilling and Restoring

All holes from work performed shall be backfilled and acceptably restored.

Method of Measurement:

The quantity of soil borings will be measured as the total depth in linear feet of each boring actually made either by use of driven casing or augered casing and accepted by the Engineer. Measurement will be from the surface of existing ground or ground level below water (i.e. streambed) to the bottom of the hole, or to the depth at which Rock Core Drilling starts. The bottom of the hole shall include the depth of the last ordinary disturbed sample when obtained below the bottom of the drilled hole. When the last sample is an undisturbed sample, the bottom of the hole shall not include the depth of such last undisturbed sample.

If the Contractor abandons a hole prior to approval of the Engineer, no measurement or payment will be made for the hole that has been abandoned.

Any method used to carry the boring through the obstacle other than rock core drilling in excess of 1 foot, shall be considered as Soil Boring.

If the Contractor abandons a boring before adequate information is obtained and starts another boring adjacent to it in preference to carrying the boring through the obstacle, or because of a shattered or misaligned casing, no measurement or payment will be made for the work done on the abandoned boring.

Basis of Payment:

The quantity of soil borings will be paid for at the Contract unit price per linear yard for the type of soil boring performed. Price and payment will constitute full compensation for the cost of all labor and materials necessary for furnishing and sinking of casing, as required; the cost of taking, packing, storing, and delivering ordinary dry samples; the cost of determination of running sand; the cost of taking and recording ground water observations; the cost of filling holes and surface restoration; and all else in connection with or incidental to the drilling.

Bid Item Description

605540 - ADDITIONAL STANDARD PENETRATION TESTS (SPT)

Description:

The Engineer may require additional Standard Penetration Tests (SPT's) be taken at defined depths between the specified 5 foot intervals. These are Additional Standard Penetration Tests.

Basis of Measurement and Payment:

Payment for additional Standard Penetration Tests (SPT) required by the Engineer, other than those taken at 5 foot intervals which are included in the soil boring price, shall be made on a per sample basis.

Bid Item Description

605541 - UNDISTURBED SAMPLING

Description:

This work consists of taking undisturbed soil samples from soil borings at locations and depths designated by the Engineer. An undisturbed sample shall be obtained by manually or mechanically pressing an acceptable thin walled stainless steel tube meeting the requirements for thin walled tubes in AASHTO T207 "Thin-Walled Tube Sampling of Soils", to obtain soil samples which, on testing, will show properties as close to in-place properties as possible. The sampled soil shall be subjected to a minimum degree of disturbance. The samples shall represent, as accurately as practical, the natural condition of the soil and shall be suitable in all respects for the conduction of consolidation and other tests in the laboratory. The Engineer will direct the Contractor to obtain a sample when the results of the standard split barrel sampling makes the undisturbed sample feasible and practical. A split spoon sample shall be obtained 1 foot prior to and immediately after each undisturbed sample.

Materials and Construction Methods:

Sampling Device

The sampling device to be used for obtaining undisturbed samples shall be a seamless, thin walled, metal tube meeting the requirements for thin walled tubes in AASHTO T207 "Thin-Walled Tube Sampling of Soils". The tube shall have a 16 or 18 gauge wall thickness, a minimum outside diameter of 3 inches, and a length of 30 inches. The tube shall be round and smooth without bumps, dents, or scratches and shall be clean and free from rust, dirt or corrosion. The end of the tube shall be machined into a cutting edge with an inside diameter that is 1/64 inch less than the inside diameter of the sampler tube. The top of the sampling tube shall be equipped with a coupling head with a check valve. Plastic materials too soft to be recovered by the thin wall sampler shall be sampled with a Stationary Piston Type Sampler or approved equivalent. Where the clayey soils are too stiff to be sampled with Shelby Tubes or a Piston Type Sampler, a Denison sampler shall be used.

Sampling Procedure

Before an undisturbed sample is to be taken, the auger casing shall be cleaned out to the bottom by any means acceptable to the Engineer that provides a reasonably clean hole, and does not disturb the soil to be sampled. The water level in the hole shall be maintained at or above the ground water level during the entire sampling operation. The sampling tube shall be connected to the string of drill rods and lowered slowly to the bottom of the hole. The tube shall then be pushed into the soil at a uniform rate by a continuous motion, without impact or twisting, to the depth necessary to obtain an undisturbed sample of soil at least 24 inches in length. In no case shall the tube be pressed to a depth in excess of the space available in the tube to accommodate the sample plus any disturbed material that may not have been cleaned from the hole.

To prevent distorting the upper portion of the sample by excessive pressure, particular care shall be taken to avoid a rate of penetration which exceeds the rate at which air or water can escape from the venting device at the top of the sampler. A maximum penetration rate of 1 inch per second will usually be satisfactory. Penetration shall be effected by hydraulic pressure approved by the Engineer. In no case shall the sampler be driven with a drop hammer.

When a Stationary Piston-Type Sampler is used, the sampling procedure shall be as recommended by the manufacturer and approved by the Engineer. Typically, the casing is cleaned out and the sampler, with the piston set flush with the bottom cutting edge, is carefully lowered to rest on the bottom of the hole. The piston rod is then rigidly clamped to the top of the casing, and the sampling tube forced into the soil to the proper depth. The piston rod and drill pipe are then locked together at the top prior to removal.

After penetration, allow sampler to set for at least 10 minutes. Rotate the sample tube 2 or 3 revolutions and withdraw slowly using moderate pull of the drill rod, avoiding sudden acceleration, shock or vibration. Piston samplers shall be capable of recovering a nominal 3 inch diameter sample.

When a Denison Sampler is used, the sampling procedure shall be as recommended by the manufacturer and approved by the Engineer. Samples shall be obtained by means of a Denison Sampler with a nominal inside diameter of 3 inches. The stationary inner tube shall project beyond the outer rotating tube with the length of the projection to be determined by the Engineer. Samples of the soil penetrated shall be obtained by rotary drilling with downward pressure in one smooth, continuous push. Alternate halting and starting the advance of the sampler will not be permitted. The actuating rod shall be removed prior to withdrawing the drill rods and sampler. Upon completion of the rotating pressing action, the Contractor will wait 10 minutes or whatever time is necessary, in the opinion of the Engineer, to permit the soil sample to swell inside the tube. During such time, the tube will remain undisturbed in the ground. After this period of time has elapsed, the drill rods shall be tightened and then rotated at least once to shear the soil at the bottom of the sampler.

Preservation and Identification of Sample

Immediately upon recovery, the sampling tube with sample shall be detached from the head of the mechanism in a manner to cause as little disturbance as possible to the sample. The undisturbed sample shall then be trimmed, measured, and sealed in the following manner:

1. The cutting edge of the tube shall be inspected. Any material extending beyond the cutting edge shall be trimmed away. The cutting edge end shall then be temporarily capped and wrapped with electrical tape. If the sample has sheared off inside the tube to a depth of 1/2 inch or more, insert packing material into the tube. If a porous material such as paper or rags is used for packing material, it shall be completely wrapped in impervious material (such as plastic food wrap material).
2. The top of the tube shall be inspected and all wash or other disturbed material shall be carefully removed.
3. The inner wall of the top of the tube shall be wiped clean of all soil and water.
4. The overall length of the tube and distance from the top of the tube to the top of the sample shall be measured and recorded to the nearest 1/16 inch.
5. The top of the tube shall be sealed using a mixture of equal parts of paraffin and micro-crystalline wax such as Petrowax (Gulf Oil Corp.) or Product 2300 (Socony Vacuum Oil Corp.) or an approved equal. The wax shall be heated to slightly above its melting point. It shall then be poured into the tube to a thickness of approximately 1/2 inch and allowed to harden. A second layer of the same thickness shall then be poured and allowed to harden.
6. Damp soil shall be used for packing the space between the top of the seal and the top of the tube. If this is not available, paper or rags may be used provided they are wrapped in an impervious material or dipped in molten wax before being inserted.
7. The top of the tube shall be capped, wrapped with plastic electrical tape and dipped in wax to coat the cap and tape.

8. The temporary cap shall then be removed from the bottom of the tube and the material cleaned out to a minimum depth of 1/2 inch.
9. The distance between the bottom of the sample and the bottom of the tube shall be measured and recorded to the nearest 1/16 inch.
10. The tube bottom shall be sealed and capped in the same manner as the top, except that a single 1/2 inch thickness of seal will suffice, if the space is no more than 1/2 inch.
11. After sealing is completed, the tube shall be kept vertical with cutting edge down at all times, both in storage and transportation.

The sample tubes shall be permanently and clearly labeled to show the date, the location of boring, the boring number, the sample number, top and bottom depth of sample, top end of sample, and recovery.

The sample tubes and crates used for transporting the undisturbed samples shall be labeled "Do Not Jar or Vibrate" and "Store and Transport in a Vertical Position", and if necessary, shall be well packed in excelsior or other equal material to prevent movement, vibration and freezing.

Particular care shall be taken at all times in the handling of undisturbed samples to avoid dropping, jarring or rolling so as to eliminate the possibility of any shock or sudden movement altering the original condition of the sample.

The Contractor shall properly store the sample tube in a vertical position until delivered to the Engineer.

Acceptable Sample

Undisturbed soil samples shall have a minimum recovery of 75 percent to be acceptable. If an acceptable sample cannot be obtained on the first attempt in any particular stratum, the Contractor shall make a second attempt and, if still unsuccessful, further attempts to obtain an acceptable sample shall be made until discontinuance is ordered by the Engineer.

If the Contractor does not obtain an acceptable sample due to improper sampling procedures, another boring shall be performed by the Contractor near the initial boring location in order to obtain an acceptable sample at the same depth as the initial boring at no additional cost to the Department.

After an acceptable undisturbed soil sample is obtained, the hole shall be cleaned out and a split spoon sample shall be taken.

Representative trimmings from each undisturbed sample shall be preserved in an approved sample container and packaged in sequence with the respective ordinary, dry samples.

The Engineer reserves the right to reject and refuse payment for any sample which received excessive disturbance due to the Contractor's carelessness or method of operation.

Record Data

A complete description of the sample and pertinent sampling data shall be recorded on the boring log. This information shall include the rate of penetration of the sampler, method used to advance the sampler, the pressure used if advanced hydraulically, the total depth of penetration, and the length of sample recovered.

Method of Measurement:

The quantity of undisturbed samples will be measured as the actual number of undisturbed samples obtained and accepted.

Basis of Payment:

The quantity of undisturbed samples will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for all cost of securing the samples and providing tubes, caps, etc., necessary for preservation of samples, labels, records, storage, and delivery of the samples.

Bid Item Description **605542 – AUGER DRILL WITHOUT SAMPLING**

Description:

Drilling to certain depths from previous drilling to continue sampling, or starting at certain depth for sampling.

Method of Measurement:

The quantity of linear feet drilled will be measured.

Basis of Payment:

The quantity of linear feet drilled (added to another Item Description) will be paid for at the Contract unit price per foot. Price and payment will constitute full compensation for all additional feet drilled with no sampling. All other costs are covered in the original Item.

Bid Item Description **605543 - ROCK CORE DRILLING (NXM)**

Description:

This work consists of core drilling rock by any approved standard and accepted method of rotary diamond core drilling capable of obtaining continuous and complete cores not smaller than NX size from any subsurface interval or rock or boulders designated for investigation. Coring shall begin where it is impractical or impossible to advance the hole by driving the standard split barrel sampler or at refusal on the roller bit, as determined by the Engineer. Fragments of rock, large gravel, hard strata, or boulders that require one foot or less of drilling will not be considered as Rock Core Drilling and payment for such footage will be made at the Contract unit price per linear foot for Soil Borings. Rock coring shall be carried to the depths directed by the Engineer and will usually go a minimum of 10 feet into competent rock below the bottom of structure founding elevation.

Where material capable of being sampled or tested is encountered below a rock stratum, boulder, etc., the Engineer may direct the Contractor to enlarge the bore hole through the rock stratum, boulder, etc., to permit sampling and/or testing of such material.

The use of clean water for core drilling will be required. Recirculated water shall not be used. The Contractor shall make suitable arrangements satisfactory to the Engineer for the procuring and disposing of this water.

Materials and Construction Methods:

Equipment

All core drilling shall be done with a hydraulic feed, rotary core drill using a "M" series double tube core barrel with diamond-set, bottom discharge core bits.

Casing

In order to prevent the overburden from seeping into the hole from which the core is to be taken, the hollow stem auger or drive casing, as required for Soil Borings, shall be seated tightly on the rock or boulder at the elevation where rock or a boulder is encountered prior to beginning the coring operation. If a stratum of bedrock material is encountered, which in the opinion of the Engineer required penetration and subsequent soil sampling below, blasting with small charges of dynamite will be permitted for the removal of this stratum and small boulders or other obstructions which cannot be conveniently removed otherwise. Before blasting, the augers shall be pulled up at least 8 feet to avoid damage. Blasting will be approved by the Engineer only where it is definitely known that there are no subsurface or surface structures in the vicinity that may be affected and it shall be performed strictly at the Contractor's responsibility. Any damages occurring to any surface or underground structure caused by such blasting will be repaired by the Contractor at no cost to the Department.

Any method used to carry the boring through the obstacle other than rock core drilling as required by the Engineer and in excess of 1 foot, shall be considered as Soil Boring and will be measured and paid for at the unit price per linear yard bid in the proposal. If rock core drilling is

required, it will be measured and paid for at the unit price per linear yard bid in the proposal for Rock Core Drilling, when the obstacle drilled is in excess of 1 foot.

If the Contractor abandons a boring before adequate information is obtained and starts another boring adjacent to it in preference to carrying the boring through the obstacle, or because of a shattered or misaligned casing, no payment will be made for the work done on the abandoned boring.

Coring Procedure

Drilling shall be done to assure maximum percentage of core recovery from both hard and soft rocks. Should it be impracticable at any depth of penetration of rock to obtain a core, or should a seam of disintegrated rock or filled voids be encountered, particular care shall be taken to obtain the best samples possible of the material. Drilling shall be stopped, the core barrel shall be removed from the hole, and the standard 2 inch O.D. drive sampler, described hereinafter, shall be used to obtain samples and penetration resistance blow counts as specified in the section entitled "Soil Borings". Correct measurement of the interval or depth for which no core is obtainable shall be carefully determined and recorded. The core shall be pulled at intervals not exceeding 5 feet. The Contractor shall control his/her drill fluid pressure and rate of flow, speed of bit rotation and pressure on the bit at all times in such a manner to assure maximum core recovery in whatever kind of rock being drilled. Where soft or broken rock is encountered, the Contractor shall reduce the length of "runs" in order to reduce core loss and core disturbance to a minimum. Failure to comply with the foregoing procedures shall constitute justification for the Engineer to require re-drilling at the Contractor's expense of any boring from which the core recovery is unsatisfactory. If solid rock is encountered (recovery 80% or greater), 10 feet of coring shall usually be sufficient. When soft or broken rock is encountered, the borings shall go to depths greater than the 10 feet. The Contractor shall exercise particular care in recording water losses, rod jerks, drips, changes in rotation speed and other unusual coring experiences that may help identify the nature and the extent of any fracturing, soft seams, voids, and any other characteristics of the formation being cored.

Ground Water

The Contractor shall remove the core and all tools at the end of each day's drilling and measure and record water levels just prior to resumption of drilling operations. The Engineer may also require water level determinations at any time during the drilling operations when such measurements will not interfere with normal work such as between "core runs". The Contractor shall also take a water level reading 24 hours after the auger/casing is removed. In the event the hole collapses before the ground water is observed, the depth to the collapsed portion shall be recorded. Ground water determinations as described in this paragraph will not be paid for separately, but will be considered incidental to the work.

Preservation and Identification of Cores

All cores of rock and consolidated material shall be carefully handled to insure their proper identification and sequence and shall be placed in suitable core boxes in the exact order of their removal from the bore hole. Boxes shall be of uniform size, shall be substantially constructed of dressed lumber, and shall have hinged number lids with suitable hook and eye or hasp and staple

fastenings so as to prevent accidental opening of the lid during handling and shipment. Suitable partitions or rigid division strips shall be inserted in the box and permanently fastened in place to prevent the possibility of any section of core from becoming dislocated from its proper sequence. Blocks shall be placed at the top and bottom of each "core run" in the box, and shall be securely fastened in place and marked at the time the core is placed in the box directly from the core barrel. Cavities and large fractures shall also be recorded in the boxes. The cores shall be placed from left to right, beginning at the top hinged side of the core box, as in writing. Only the samples from one hole shall be packed in any one box unless otherwise authorized by the Engineer. No core drilling shall begin without having core boxes on hand at the boring site.

In the top and at one end of each core box, the Contractor shall clearly and legibly paint or stencil, using waterproof paint the following identifying data: title of project, location of site by name/or survey station and offset, boring number and name of Contractor.

During the period of active work in the field, the Contractor shall provide and be responsible for storing all core boxes in a warm, dry, locked, temporary storage facility convenient to the work areas. Within 72 hours after the completion of boring work at the project site, the Contractor shall transport all boxed samples to the Engineer.

Records and Logs

The Contractor shall keep a complete and accurate record of all details of the Rock Core Drilling operations in a field book and on suitable boring log forms provided by the Contractor. Upon completion of each boring, two copies of the field log, on 8-1/2 x 11 inch paper shall be given the Engineer. The description of the soil, rock, and other material encountered in the boring shall be made by the driller with the assistance of the Engineer. Each boring log shall record the information pertinent to the type of boring work being accomplished as outlined in the following sections. The following general information shall be recorded on each and every boring log:

- (a) Title of project and section designation
- (b) Location of site by name, and/or survey station and offset, if any, right or left of survey baseline
- (c) Hole number as specified on the Plans, or as furnished by the Engineer.
- (d) Names of the Engineer, Contractor, Inspector and drilling crew.
- (e) Date of starting and completing each boring
- (f) Ground elevation of the top of the hole as provided by the Engineer.
- (g) Depth to the top of ground water, if present.
- (h) Diameter and description of casing used.
- (i) Depth to which casing is advanced.

The following information shall be recorded on the boring logs for that portion of the boring penetrating rock or boulders more than 1 foot thick by the diamond bit rock core boring method:

- (a) Size and depth of core barrel used
- (b) Depth at which rock or boulder was encountered

- (c) Depth of each change in rock
- (d) Length of coring run in feet, length of rock recovered, and percentage of core recovery (equal length of core recovered divided by the length of the coring run).
- (e) Rate at which run was cored in minutes per 1 foot.
- (f) Depth to top and bottom of all voids, cavities and soft seams
- (g) Description of the rock encountered shall be in accordance with standard geologic terms and shall include:
 - (1) Type - shale, sandstone, gneiss, schist, diabase, granite, etc.
 - (2) Color - red, brown, gray, dark gray, light yellowish brown, etc.
 - (3) Hardness - soft, medium soft, medium hard, hard and very hard
 - (4) Fracturing - very badly broken, badly broken, broke, slightly broken and solid.
 - (5) Texture - fine grained, medium grained, coarse grained, brecciated, porous, dense, etc.
 - (6) Bedding - thin bedded, medium bedded, thick bedded, massive, layered (banding, schistosity, fissility)
 - (7) Weathering - fresh, slightly weathered, moderately weathered, highly weathered and completely weathered.
- (h) Description of any unusual incidents encountered during the drilling operations such as caving, loss of water and where possible, and explanation for poor core recovery.
- (i) Rock quality designations (RQD) - an indirect measure of fractures and other imperfections of the rock mass. It is calculated by summing up the total length of core recovered but counting only those pieces of core 4 inches in length or longer, and which are hard and sound. It is expressed as a percentage of the total run.

Method of Measurement:

The quantity of rock core drilling will be measured in feet as the actual length of rock cored and accepted. The length will be measured from the top of the boulder or rock to the lowest elevation penetrated exclusive of all intervals of depth where actual drilling was not performed.

Basis of Payment:

The quantity of rock core drilling will be paid for at the Contract Price and payment will constitute full compensation for the cost of providing labor, materials and plant necessary for rock core drilling as required; the cost of securing, packing, storing, and delivering all rock core samples; the cost of moving plant and equipment within the site, the cost of taking and recording ground water observations; the cost of surface restoration; and all else in connection with or incidental to the drilling operation.

Payment will not be made for rock cores in excess of the required depth.

Fragments of rock, large gravel, hard strata or boulders that may require drilling in the amount of 1 foot or less and intervals of depth not actually covered as excluded above will not be considered as rock, and measurement for payment for such length will be made as specified for soil borings.

Bid Item Description
605544 - OBSERVATION WELLS

Description:

This work consists of installing observation wells in borings selected by the Engineer. Notice to install an observation well will be given prior to the time of completion of the borings selected.

Materials:

- (a) Main pipe shall be solid 2 inch minimum outside diameter, straight, rigid polyethylene or PVC, Schedule 40.
- (b) Open pipe shall be 5 feet long, slotted 2 inch minimum outside diameter, straight, rigid polyethylene or PVC, Schedule 40.
- (c) External couplings, capable of tight connections without causing twisting, kinking, or collapsing the main and open pipes shall be used to connect the pipes.
- (d) A bottom cap shall be used to tightly close off the bottom end of the connected pipes.
- (e) A metal, lockable cover shall be cemented to the top end of the connected pipes.
- (f) Clean granular sand shall be used around the outside of the pipe below and along the length of the slotted pipe.
- (g) Bentonite pellets shall be used on top of the sand above the slotted pipe.

Construction Methods:

Installation

The installation shall be protected at all times so that water and debris cannot enter the boring or the pipe from the surface. If the pipe does not extend to the bottom of the borehole, then the borehole shall be backfilled to the required bottom elevation of the pipe.

The slotted PVC pipe shall extend to the depth directed by the Engineer. The assembled pipe shall be lowered into the cased boring and the casing withdrawn from the hole. The pipe shall be kept centered in the boring while the casing is withdrawn.

The annulus between the pipe and the borehole shall be filled with clean granular material. The granular material shall extend 1 foot below and 1 foot above the section of the slotted pipe. A 1 foot thick layer of bentonite pellets shall be placed on top of the granular material above the section of slotted pipe.

Installation of the granular material and bentonite pellets shall be performed while withdrawing the drill casing. Care shall be taken to minimize the increments of casing withdrawal so that collapse of the borehole does not occur. Sand and bentonite pellets shall be placed slowly enough so that bridging does not occur and the pipe is not lifted as the casing is withdrawn.

Backfill above the bentonite pellets may consist of available material and must be placed so that no voids or bridging occurs above the pellets. A cover shall be cemented to the top of the pipe, flush with the ground surface.

Observation

The groundwater elevation at these borings is to be observed by the Engineer 24 hours after completion of the boring and daily thereafter until the groundwater elevation has stabilized. The groundwater observation wells shall be maintained during the duration of the Contract and shall be left in place at the end of the Contract period.

Method of Measurements:

The quantity of observation wells will be measured as the actual number of linear feet of PVC pipe (solid and slotted) installed and accepted.

Basis of Payment:

The quantity of observation wells will be paid for at the Contract unit price per linear yard. Price and payment will constitute full compensation for furnishing and installing all materials, maintaining the wells, and for all labor, equipment, tools and incidentals necessary to complete the work.

Bid Item Description **605545 – SOIL BORINGS, LAND**

Description:

This work consists of advancing soil borings (drillings) through unconsolidated or partly consolidated sediments or decomposed rock by use of Hollow Stem Augers (HSA) or Drive Casing and sampling with a split barrel sampling spoon at locations designated on the Plans or as directed by the Engineer. Those soil borings made over "deep" water requiring a barge or other special equipment, or in wet areas that cannot be accessed by a truck mounted rig, will be considered Soil Borings, Watering, all others will be considered Soil Borings, Land.

Standard Penetration Tests (SPT) and Split Barrel Sampling of the soils shall be taken at the ground surface and at 5 foot intervals thereafter in all hollow stem auger and drive casing holes.

Materials and Construction Methods:

Hollow Stem Auger Method

The Contractor shall use a power-driven, continuous, hollow-stem auger casing to advance and maintain the hole. The clear inside diameter of the hollow stem must be large enough to allow for the insertion of a 3.0 inch OD Shelby Tube soil sampler and attached rods through the in-place auger casing when elevations are reached for securing soil samples.

When using auger casings, the relative resistance to penetration, general feel and performance of the auger operation, and the cuttings obtained from the auger shall be observed and recorded for detection of changes in the materials encountered.

The plug point shall be withdrawn through the hollow stem, the sampler lowered through the full length of the auger, then driven or pressed below the auger bit and withdrawn. After replacing the plug point, the auger shall proceed to the next point of sampling. When the use of hollow stem augers is not feasible because of site conditions, the use of drive casings will be permitted.

All boreholes shall be preserved from collapse and bottom instability during advancement and sampling operations. When drilling below the natural ground water level, water shall be maintained inside the augers at a level above the ground water level at all times. If it is required to prevent bottom instability, water should be added to maintain a positive static water head inside the augers during drilling and withdrawal of the drilling rods. Cleaning out of the augers shall be required if the accumulation of material within the hollow-stem, between sampling intervals, is of a degree that is detrimental to the purpose of the sampling operation. Cleaning out the augers shall be performed with wash rods and a roller or side discharge chopping bit.

Drive Casing Method of Advancing Borings

All sampling and other procedures referencing the HSA method will also apply where drive casing is employed.

Casing shall be extra-strong steel pipe or flush-coupled casing with a nominal inside diameter of 4 inches.

Casing shall be sunk vertically through earth and other materials, including boulders and rock veins, to rock or, if not to rock, to such depth below ground as the Engineer may order. They shall be driven down without washing to the depth at which a sample is to be taken, after which the material shall be cleaned out to the bottom of the casing and the sampler driven or pushed below the bottom of the cleaned casing. After sampling, casing driving shall be resumed.

The use of clean water for cleaning out the casing between sample elevations will be required. Recirculated water shall not be used. The Contractor shall make suitable arrangements for properly procuring and disposing wash water.

The weight of hammer to be used in driving the casing shall be 300 pounds with a 24 inch height of free fall. The hammer shall be raised by means of a rope having one end wrapped (not more than three loops) around a winch head. Wire rope will not be permitted. A continuous record of the blows per 1 foot required for the driving of the casing shall be kept.

Simultaneously washing and driving of the casing will not be permitted except when the Engineer judges the driving requires the use of water. Where the use of water is permitted, borings shall be advanced by saw tooth, chopping, fishtail, or rollerbits, all having side discharge jets. In advancing the boring, return water circulation, resistance to penetration and general performance of the drill shall be observed for detection of change in material. The casing shall next be advanced, if needed for retaining the hole opening, to the point of maximum penetration of the washed pilot hole. The casing shall be cleaned in a manner to result in minimum disturbance of the soil below the casing shoe.

All sampling shall be performed in advance of the casing shoe. A record must be kept of the depths between which simultaneous washing and driving occurred.

In some cases where the characteristics of the soil are suitable, the Engineer may permit the Contractor to discontinue driving the casing and accept advancing the boring by means of wash rods

with a roller bit or side discharge chopping bit to the elevations at which samples are to be taken. This procedure shall be noted in the boring record. Should there be any indication of the sides of the hole collapsing, thus blocking normal progress of the boring, driving of the casing shall be resumed.

When a boulder or a stratum of ledge rock is encountered before the required depth of boring has been reached, it shall be the Contractor's responsibility to carry the boring through or past these obstacles but only by methods approved by the Engineer. The Contractor may, in some cases, be permitted to core the boulder or rock stratum to determine its size and characteristics. The required size of sampler to be used below the obstacle shall determine the size of boring to be made. A log of the nature of the obstacle and the method used to carry the boring through the obstacle shall be recorded.

Sampling Device

The sampling device for ordinary, dry samples from Soil Borings shall be a standard split barrel sampler meeting the requirements of the "Penetration Test and Split-Barrel Sampling of Soils" AASHTO T206. The sampler shall be a split barrel tube with an outside diameter of 2 inches, an inside diameter of 1-3/8 inches, a minimum length of 18 inches between the driving shoe and the smaller head, and a minimum total length of 27 inches. The drive shoe shall be hardened steel and shall be replaced or repaired when it becomes dented or distorted. The sampler head shall have a 1/2 inch minimum diameter vent ports and shall contain a reliable ball check valve.

Core retainers shall be used with the sampler, when necessary, to avoid loss of the sample. In cases where the material encountered is not sufficiently cohesive to permit the standard sampler to recover a sample on the first trial, a flapper valve, basket retainer, or other approved device shall be used to recover a sample. The use of such a device shall be noted on the boring log.

Should the Contractor, in securing samples, fail to provide the proper types of samplers, valves, traps and other special sampling devices, these samples will be deemed unacceptable by the Engineer.

Sampling Procedure

The HSA or casing shall be advanced to the sampling depth and the loose material within the casing cleaned to its bottom before driving the sampler. Clean out shall be roller bit or chipping bit.

The sampler shall be driven into the soil below the HSA or casing for a distance of 18 inches or until further penetration is impossible with a 140 pound hammer falling freely through a vertical distance of 30 inches. The number of blows of the hammer shall be recorded for each 6 inches of penetration and, if 6 inches is not penetrated in one hundred (100) blows, the sampler will be considered to have met refusal and the blows shall be recorded as 100/number of inches penetrated. The hammer shall be raised by the use of a manila rope which the driller shall pull by hand with the assistance of a power operated spool or drum about which the rope will freely slip during the drop of the hammer. Wire rope will not be permitted to lift the hammer. All sampling devices, including driving mechanisms, used by the Contractor shall be approved by the Engineer.

Samples of the soil retained in the split barrel sampler shall be taken from that portion of the soil column between 6 and 18 inches below the bottom of the casing. The sample so obtained shall be representative of the material from which it is taken and shall be in an unwashed condition. Samples recovered from wash water, commonly termed "wash samples" will be unacceptable. If less than 9 inches of soil is retained in the sampler, a second sample shall be taken immediately below the deficient sample, after first advancing the boring. If more than one soil type is present in the sampler, a sample

shall be taken of each type, and the length of each type of soil in the sampler shall be noted on the boring log.

Preservation and Identification of Samples

The disturbed samples obtained with the split barrel sampler shall be removed with as little disturbance as possible, and immediately placed in a suitable approved container. Samples which retain form upon removal from the sampling spoon, shall not be jammed or forced into the container. Each sample container shall be clearly and permanently labeled to show the project and section numbers, boring number, station location, elevation or depth at which the sample was taken, the kind of material and the number of blows of the sampler.

If two or more materials are encountered in a sampler, separate approved containers shall be used for each material. The letters "A", "B", etc. shall be added to the sample number on each container to designate the different materials.

The Contractor shall provide the sample containers, keeping a sufficient supply on hand to prevent any delay in the work.

The Contractor shall pack all samples in containers that are acceptable to the Engineer and of sufficient durability to withstand handling without breakage of the sample containers. On the top and one end of each container, the Contractor shall neatly and legibly paint or stencil, using waterproof paint, the following identifying data: title of project and designation of section thereof; location of site by name and/or survey station; boring numbers; and name of Contractor; all as required or directed by the Engineer.

During the period of active work in the field, the Contractor shall be responsible for storing all soil samples in a warm, dry, locked, temporary storage facility convenient to the work areas.

Determination of Running Sand

In order to determine whether the water pressure on sand is sufficient to cause the sand to run when unconfined, the Engineer may order a test for running sand.

The test shall consist of obtaining a sample of the sand with a split barrel sampler as specified in the sampling procedure. The casing shall then be drilled into the sand 2 feet below the elevation at which the sand was encountered, and carefully washed out to the bottom. The hole shall then be allowed to stand ten (10) minutes, and the elevation at which the sand then stands in the casing shall be measured. The water in the casing shall then be removed to a point 5 feet above the bottom of the casing to produce an unbalanced hydrostatic condition and the elevation of the top of the sand shall again be measured.

No more than one such test will be required at each structure when sand is encountered at depths near or above the anticipated elevation of the bottom pier or abutment excavation.

Ground Water

Depth to ground water shall be determined when initially encountered and upon completion of the boring. The Contractor shall also take a water level reading 24 hours after the augers are removed. In the event the hole collapses before the ground water is observed, the depth to the collapsed portion shall be recorded. For Soil Borings, ground water level measurements will not be made unless unusual circumstances are encountered.

Records and Logs

The Contractor shall keep a complete and accurate record of all details of the Soil Boring operations in a field book and on suitable boring log forms provided by the Contractor. Upon completion of each boring, two copies of the field log, on 8-1/2 x 11 inch paper, shall be given to the Engineer. The description of the soil, rock and other material encountered in the boring shall be made by the Contractor or the Engineer's Representative. Each boring log shall record the information pertinent to the boring work being accomplished as outlined in the following sections. The following general information shall be recorded on each boring log:

- (a) Contract number, title of project and section designation
- (b) Location of boring by survey station, and offset, right or left of survey baseline
- (c) Boring number as specified on the Plans or as furnished by the Engineer
- (d) Names of the Engineer, Contractor, Inspector, and drilling crew
- (e) Date of starting and completing each boring
- (f) Ground elevation of the top of the hole as provided by the Engineer
- (g) Depth to the top of ground water, if present.

The following information shall be recorded on the boring logs for that portion of the boring penetrating unconsolidated or partly consolidated sediments or decomposed rock by drilling and sampling with a split barrel sampler:

- (a) Type of drill rig used
- (b) Size, type and length of augers used in each hole
- (c) Method used to clean out casing between sampling intervals
- (d) Size of split barrel sampler, weight of hammer, height of drop, and number of blows of the hammer for each 6 inches of penetration of the sampler out of a total minimum penetration of 18 inches for each sample. Where 6 inches is not penetrated in one hundred (100) blows of the hammer, the distance penetrated in one hundred (100) blows shall be recorded
- (e) Depth to beginning and end of sampling drive, and the length of sample recovered from the sampler
- (f) Depth to the top of each change or stratum of material
- (g) Description of the material encountered shall be in accordance with standard practice and shall include:
 - (1) Type - topsoil, sand, silt, clay, gravel, silty clay, sandy silt, etc.
 - (2) Color - light brown, dark reddish brown, etc.
 - (3) Moisture - dry, moist, wet, saturated,
 - (4) Consistency - soft, loose, medium, firm, stiff, etc. as determined by "N" values in Table 1 below.

TABLE 1

DEGREE OF DENSITY OR CONSISTENCY			
Non-Cohesive Soils Descriptive term	(Sand) Standard Penetration "N" - Blows/1 foot	Cohesive Soils Descriptive Term	(Clay) Standard Penetration "N" - Blows/1 foot
Very loose	0-4	Soft	0-4
Loose	5-10	Firm	5-8
Medium	11-30	Stiff	9-15
Dense	31-50	Very Stiff	16-30
Very Dense	51+	Hard	31+

False Starts

The Contractor is to verify the exact location of all known utilities prior to drilling. If the Contractor is unable to complete any boring due to encountering underground utilities or structures, the existence and location of which could not have been previously known, or because obstacles or obstructions are encountered which the Engineer considers are of an unusual nature and that failure to penetrate them is not the fault of the Contractor's methods or equipment, a false start will be measured and paid for at the applicable Contract unit price. The record of false starts shall be forwarded to the Engineer. For the new hole, bored to replace the abandoned hole, the Contractor shall operate as if a completely new hole was bored obtaining soil samples, standard penetrations tests, etc., in the depths reached by the abandoned hole.

Backfilling and Restoring

All holes from work performed shall be backfilled and acceptably restored.

Method of Measurement:

The quantity of soil borings will be measured as the total depth in linear feet of each boring actually made either by use of driven casing or augered casing and accepted by the Engineer. Measurement will be from the surface of existing ground or ground level below water (i.e. streambed) to the bottom of the hole, or to the depth at which Rock Core Drilling starts. The bottom of the hole shall include the depth of the last ordinary disturbed sample when obtained below the bottom of the drilled hole. When the last sample is an undisturbed sample, the bottom of the hole shall not include the depth of such last undisturbed sample.

If the Contractor abandons a hole prior to approval of the Engineer, no measurement or payment will be made for the hole that has been abandoned.

Any method used to carry the boring through the obstacle other than rock core drilling in excess of 1 foot, shall be considered as Soil Boring.

If the Contractor abandons a boring before adequate information is obtained and starts another boring adjacent to it in preference to carrying the boring through the obstacle, or because of a shattered or misaligned casing, no measurement or payment will be made for the work done on the abandoned boring.

Basis of Payment:

The quantity of soil borings will be paid for at the Contract unit price per linear yard for the type of soil boring performed. Price and payment will constitute full compensation for the cost of all labor and materials necessary for furnishing and sinking of casing, as required; the cost of taking, packing, storing, and delivering ordinary dry samples; the cost of determination of running sand; the cost of taking and recording ground water observations; the cost of filling holes and surface restoration; and all else in connection with or incidental to the drilling.

Bid Item Description

763587 - MAN-HOURS OF MISCELLANEOUS WORK

Description:

The work of this item includes non-management work such as performing percolation tests, coring bridge decks or roadways to gain access to soil, recording observation well water levels, preparing sites for access when such preparation requires more than incidental preparation (less than one hour of crew time is considered incidental; this miscellaneous work does not include reconnaissance, utility clearance, planning, or equipment movement work). Temporary Traffic Control planning and execution, protection and delivery of samples, and other work specifically included in other items of work are not included in this work item.

Method of Measurement:

The quantity of man hours will be measured as the actual number of man-hours approved by the Engineer.

Basis of Payment:

The quantity of man-hours will be paid for at the contract price per hour. Price and payment will constitute full compensation for wages, all employment expenses, and necessary incidentals.

Bid Item Description

763589 - MOBILIZATION FOR TRUCK MOUNTED BORING RIG

Description:

This work includes mobilization to project sites that are accessible by a truck mounted boring rig. Clearing to access a project site shall be included in this item.

Basis of Measurement and Payment:

The item, mobilization for truck mounted boring rig, will be paid for at the Contract unit price per each mobilization for truck mounted boring rig which price and payment shall constitute full compensation for furnishing all equipment, material, and manpower required to acceptably perform all the work involved.

Bid Item Description

763590 - MOBILIZATION FOR ALL TERRAIN VEHICLE OR SKID MOUNTED BORING RIG

Description:

This work includes mobilization to project sites requiring an all terrain, skid mounted, or other boring rig, as determined by the Engineer. Work areas may include wetland sites, marshes, low lying areas, or the "shallow" water locations. Wetland maps may be used to delineate wetland areas. Also included under this item shall be mobilization to steep embankment areas, or other areas that are inaccessible to truck mounted rigs.

Basis of Measurement and Payment:

The item, mobilization for all terrain vehicle or skid mounted boring rig, will be paid for at the Contract unit price per mobilization for all terrain vehicle or skid mounted boring rig which price and payment shall constitute full compensation for furnishing all equipment, material, and manpower required to acceptably perform all the work involved.

Bid Item Description

763591 - MOBILIZATION FOR BARGE MOUNTED BORING RIG

Description:

This work includes mobilization to project sites over water requiring a barge or a platform. Typical work shall include drilling in areas of "deep" water such as navigable waterways, ponds, lakes, and other location inaccessible to all terrain or skid vehicles.

Basis of Measurement and Payment:

The item, mobilization for barge mounted boring rigs, will be paid for at the Contract unit price per mobilization for barge mounted boring rigs which price and payment shall constitute full compensation for furnishing all equipment, material, and manpower required to acceptably perform all the work involved.

Bid Item Description

Item: 18 - MAN-HOURS OF PROJECT MANAGEMENT

Description:

The work of this item includes management related work such as initial site review, scoping of jobs, special requests from Engineer, vendor manager additional time, etc. (less than one hour of time is considered incidental). Previous approval of the Engineer is required.

Method of Measurement:

The quantity of man hours will be measured as the actual number of man-hours used and approved by the Engineer.

Basis of Payment:

The quantity of man-hours will be paid for at the contract price per hour. Price and payment will constitute full compensation for wages, all employment expenses, and necessary incidentals.

Bid Item Description

Item: 19 - PIEZOMETER INSTALLATION & REMOVAL

Description:

The work of this item includes placement of instrument at specified depth, initial and final reading of results, recording of initial and final readings, recovery of instrument and closing of sample hole. Time spent recording readings of instruments beyond the day of installation and prior to day of removal are billed at Man-Hour of Miscellaneous Work Item Description rates.

Method of Measurement:

The quantity of piezometer installation and removal will be measured as each.

Basis of Payment:

The quantity of piezometer installation and removal will be paid for at the contract price per each.

Bid Item Description

Item: 27, 28, 29 – DOUBLE-RING INFILTRATION TEST

Description:

To provide in situ infiltration rates for design of storm water management systems. The apparatus consists of two concentric rings, driving caps, two graduated Mariotte tubes, depth gauges, and metal tamp for soil. The two rings are driven into the ground in an already prepared site to a predetermine depth by Engineer. Both ring areas are filled with water and the outer ring acts as a barrier to encourage only vertical flow from the inner ring. The information gathered from this test is converted by the consultant into an infiltration rate. Testing shall be done in accordance with

ASTM D5126 “Comparison of Field Methods for Determining Hydraulic Conductivity in the Vadose Zone.”

This test includes the above mentioned equipment, water source, mobilization, use of a backhoe to dig and prepare the testing area, site remediation, data collection by a trained technician, all labor associated with this test, any and all associated mathematical computations and conversions, and other incidentals. The test is expected to last at least six (6) hours (or until after a relatively constant rate is obtained.) Readings from the mariotte tubes shall be recorded on an approved worksheet that has the project title and contract number, technicians who performed the test, date, weather conditions, location of test (GPS coordinates and initial ground elevation), ID number (of test), depth of test, any abnormal conditions during test, and all relevant data collection. A bulk sample shall be collected at the test depth and given to the central Dover laboratory for index testing.

Payment: Payment for this item is per test, per County and includes all equipment, labor, and incidentals as mentioned above.

Bid Item Description
Item: 30 – BACKHOE OPERATION

Description:

Mobilization and operation of a “backhoe” as needed and deemed by the Engineer.

Basis of Payment: Payment for this item is per day (nine (9) hours).

Bid Item Description
Item: 31 –DOZER OPERATION

Description:

Mobilization and operation of a “dozer” as needed and deemed by the Engineer.

Basis of Payment: Payment for this item is per day (nine (9) hours).

Bid Item Description
Item: 32, 33 –HAND AUGER SAMPLING

Description:

Soil sampling in areas where drill rigs cannot access (poor vehicle access), utility conflicts that cannot be resolved, and/or determining initial soil conditions through the use of a hand operated device. Generally, this type of soil sampling is limited to shallower depths than depths with a drill rig. The type of hand auger depends on the type of soil encountered and shall be directed by the Engineer. Soil samples shall be collected per 6” or 12” as directed by the Engineer. Testing procedure shall follow ASTM D4700 “Standard Guide for Soil Sampling from the Vadose Zone”.

Basis of Payment: Payment for this item shall include a mobilization to site, a per lineal foot price from top of ground elevation to end of sampling depth, and site remediation. Mobilization shall not be charged if existing drill rigs have already been mobilized at the site at the time of hand augering.

Bid Item Description
Item: 34 – BOREHOLE ABANDONMENT

Description:

All labor and material associated with filling borehole with a cement and bentonite mixture. Generally used for deep borings and need to grout and is also based on keeping the quality of the aquifer intact.

Basis of Payment: Price is per linear foot and for all counties.

Bid Item Description
Item: 35– TEST PITS, GREATER THAN 10’ IN DEPTH

Description:

Includes heavy equipment rental and labor associated with performing test pits greater than 10’ in depth.

Basis of Payment: Price is per linear foot and includes all counties.

Bid Item Description
Item: 36 – MAN-HOUR, WEEKEND/OVERTIME RATE

Description:

Man-hour, weekend/overtime pay rate.

Basis of Payment: Per hour rate for weekend or overtime work per person per hour.

Bid Item Description
Item: 37– WELL DEVELOPMENT

Description:

Includes labor and equipment to clean out the well of any sediment and water until clear so that monitoring of well is accurate.

Basis of Payment: Price is per hour and is for all counties.

Bid Item Description
Item: 38 – SLOPE INCLINOMETERS, 3” OR GREATER

Description:

Includes pipe, pipe fittings, and grout, furnished and installed. Testing equipment and readings (monitoring) by others.

Basis of Payment: Price is per linear foot and is for all counties.

Item Description
Item: 39 – SETTLEMENT PLATES

Description:

Includes steel plate and initial pipe to initial depth, furnished and installed.

Basis of Payment: Price does not include any other instrumentation or readings (monitoring).

Bid Item Description
Item: 40 – STANDPIPES OR CURB-BOXES FURNISHED AND INSTALLED

Description:

Includes steel pipe with cap (or metal curb-box) and lock to protect well from damage or vandalism.

Basis of Payment: Price is per each and for all three counties.

Bid Item Description
Item: 41, 42, 43 – BOREHOLE INFILTRATION TEST

Description:

This test method covers field measurement of limiting values for vertical and horizontal hydraulic conductivities (also referred to as coefficients of permeability) of porous materials using the two-stage, cased borehole technique. These limiting hydraulic conductivity values are the maximum possible for the vertical direction and minimum possible for the horizontal direction. Testing procedure shall follow ASTM D6391 - 06 Standard Test Method for Field Measurement of Hydraulic Conductivity Limits of Porous Materials Using Two Stages of Infiltration from a Borehole. This test includes the use of any associated equipment, water source, mobilization, use of necessary equipment for test preparation, site remediation, data collection by a trained technician, all labor associated with this test, any and all associated mathematical computations and conversions, and other incidentals. The test is expected to last at least six (6) hours (or until after a relatively

constant rate is obtained). Readings shall be recorded on an approved worksheet that has the project title and contract number, technicians who performed the test, date, weather conditions, location of test (GPS coordinates and initial ground elevation), ID number (of test), depth of test, any abnormal conditions during test, and all relevant data collection.

Basis of Payment: Payment for this item shall include a mobilization to site and all service and will be as lump sum.

Bid Item Description

Item: 44 – MOBILIZATION FOR CONE PENETROMETER EQUIPMENT

Description:

This work includes mobilization to project sites that are accessible by a truck mounted cone penetrometer. Clearing to access a project site shall be included in this item.

Basis of Measurement and Payment: The item, mobilization for truck mounted cone penetrometer, will be paid for at the Contract unit price per each mobilization for truck mounted cone penetrometer which price and payment shall constitute full compensation for furnishing all equipment, material, and manpower required to acceptably perform all the work involved.

Bid Item Description

Item: 45 – SOIL BORING “CPT”

Description:

This work consists of advancing to detriment of the end bearing and side friction drive the Cone penetration tests “CPT” through unconsolidated or partly consolidated sediments or soft rock by use of mechanical or electric type at locations designated on the Plans or as directed by the Engineer. Those soil borings made over "deep" water requiring a barge or other special equipment, or in wet areas that cannot be accessed by a truck mounted CPT, will be considered Soil Borings CPT.

Cone Penetration Tests (CPT) shall be continues reading every two centimeter at the ground surface and drive to the requested depth.

Materials and Construction Methods: Hollow Stem Auger Method

The Contractor shall use equipment met the standard specification of the test method ASTM D-3441-04, contractor is response to detriment and calculate all the data as follow:

- 1- Cone resistance q_c
- 2- Friction Resistance f_s
- 3- Friction Ratio R_f
- 4- Pore pressure U_o

Records and Logs

The Contractor shall keep a complete and accurate record of all details of the Soil Boring operations in a field book and on suitable boring log forms provided by the Contractor. Upon completion of each boring, two copies of the field log, on 8-1/2 x 11 inch paper, shall be given to the Engineer. The description of the soil, rock and other material encountered in the boring shall be made by the Contractor or the Engineer's Representative. Each boring log shall record the information pertinent to the boring work being accomplished as outlined in the following sections. The following general information shall be recorded on each boring log:

- (a) Contract number, title of project and section designation
- (b) Location of boring by survey station, and offset, right or left of survey baseline
- (c) Boring number as specified on the Plans or as furnished by the Engineer
- (d) Names of the Engineer, Contractor, Inspector, and drilling crew
- (e) Date of starting and completing each boring
- (f) Ground elevation of the top of the hole as provided by the Engineer
- (g) Depth to the top of ground water, if present.

The following information shall be recorded on the boring logs for that portion of the boring penetrating unconsolidated or partly consolidated sediments or soft decomposed rock by the CPT method:

- (a) Type of CPT used
- (b) Size, type and length of rods used in each hole
- (c) Method used to clean out after finish.
- (d) Description of the material encountered shall be in accordance with standard practice and shall include:
 - (1) Type - topsoil, sand, silt, clay, gravel, silty clay, sandy silt, etc.
 - (2) Moisture - dry, moist, wet, saturated,
 - (3) Consistency - soft, loose, medium, firm, stiff, etc.
- (e) graph and data to meet the report section at ASTM D-3441-04

False Starts

The Contractor is to verify the exact location of all known utilities prior to drive the CPT. If the Contractor is unable to complete any boring due to encountering underground utilities or structures, the existence and location of which could not have been previously known, or because obstacles or obstructions are encountered which the Engineer considers are of an unusual nature and that failure to penetrate them is not the fault of the Contractor's methods or equipment, a false start will be measured and paid for at the applicable Contract unit price. The record of false starts shall be forwarded to the Engineer. For the new hole, bored to replace the abandoned hole, the Contractor shall operate as if a completely new hole was bored obtaining soil samples, standard penetrations tests, etc., in the depths reached by the abandoned hole.

Backfilling and Restoring

All holes from work performed shall be backfilled and acceptably restored.

Method of Measurement:

The quantity of soil borings will be measured as the total depth in linear feet of each boring actually made use the CPT. Measurement will be from the surface of existing ground or ground level below water (i.e. streambed) to the bottom of the hole, or to the depth at which Rock Core Drilling starts

If the Contractor abandons a hole prior to approval of the Engineer, no measurement or payment will be made for the hole that has been abandoned.

Any method used to carry the boring through the obstacle other than rock core drilling in excess of 1 foot, shall be considered as Soil Boring.

If the Contractor abandons a boring before adequate information is obtained and starts another boring adjacent to it in preference to carrying the boring through the obstacle, or because of a shattered or misaligned casing, no measurement or payment will be made for the work done on the abandoned boring.

Payment: The quantity of soil borings will be paid for at the Contract unit price per linear feet. Price and payment will constitute full compensation for the cost of all labor and materials necessary for furnishing and sinking of casing, as required; the cost of determination of running sand; the cost of taking and recording ground water observations; the cost of filling holes and surface restoration; and all else in connection with or incidental to the test.

Bid Item Description

Item: 46 – LIGHT DUTY SUPPORT VEHICLE

Description:

Mobilization and operation of a light duty vehicle as needed and deemed by the Engineer to support drilling operations. Examples of this item include but are not limited to: ATV's and small boats.

Basis of Payment: Payment for this item is per day (nine (9) hours).

Bid Item Description

Item: 47 MOT (WEEKEND/OVERTIME) RATE

Description:

MOT, weekend/overtime pay rate.

Basis of Payment: Per hour rate for weekend or overtime work.

Temporary Traffic Control (TTC) Descriptions

- 763605 - TEMPORARY TRAFFIC CONTROL–TWO-LANE, TWO-WAY TRAFFIC SHOULDER CLOSURE (DE MUTCD CASE 2)**
- 763606 - TEMPORARY TRAFFIC CONTROL – TWO-LANE, TWO-WAY TRAFFIC LANE CLOSURE (DE MUTCD CASE 6)**
- 763607 - TEMPORARY TRAFFIC CONTROL –MULTILANE, DIVIDED, NON ACCESS CONTROLLED HIGHWAYS – SHOULDER CLOSURE (DE MUTCD CASE 3)**
- 763608 - TEMPORARY TRAFFIC CONTROL – MULTILANE, DIVIDED HIGHWAYS AND INTERSTATES – LANE CLOSURE (DE MUTCD CASE 7)**
- 763609 - TEMPORARY TRAFFIC CONTROL – MULTILANE, ACCESS CONTROLLED HIGHWAYS AND INTERSTATES SHOULDER WORK – OFF SHOULDER (DE MUTCD CASE 4)**
- 763610 - TEMPORARY TRAFFIC CONTROL – MULTILANE, ACCESS CONTROLLED HIGHWAYS AND INTERSTATES SHOULDER WORK – ON SHOULDER (DE MUTCD CASE 5)**
- 763611 - TEMPORARY TRAFFIC CONTROL – MULTILANE DIVIDED HIGHWAYS – DOUBLE LANE CLOSURE (DE MUTCD CASE 9)**
- 763670 – TEMPORARY TRAFFIC CONTROL – WORK IN THE VICINITY OF AN EXIT RAMP ON A MULTILANE DIVIDED HIGHWAY (TA-42)**
- 763671 – TEMPORARY TRAFFIC CONTROL – WORK IN THE VICINITY OF AN ENTRANCE RAMP ON A MULTILANE DIVIDED HIGHWAY (TA-44)**

Description:

This work shall consist of all work performed by the Contractor to maintain vehicular, bicycle and pedestrian traffic through the location's work zone, including, but not limited to, the passage through the area of persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA) Title II, paragraph 35.130, to ensure the safe passage of all roadway users through the work zone. All work and temporary traffic control devices shall be performed in a manner that will reasonably provide the least practicable obstruction to all road users, including vehicular traffic, bicycle traffic and pedestrian traffic. All temporary traffic control and temporary traffic control devices shall comply with the contract documents and with the latest edition of the manual titled "Delaware Manual on Uniform Traffic Control Devices (MUTCD)," hereafter referred to as the "DE MUTCD", including all revisions as of the date of advertisement of this Contract.

Prior to the beginning of any work in a particular location, the Contractor shall first place temporary traffic control devices so as to effectively close that area to the passage of unauthorized vehicles, pedestrians or bicycles, and protect the work and personnel until the area is ready for public use.

The safety measures outlined herein the DE MUTCD shall be considered as elementary only, and not necessarily sufficient in every instance to guarantee the protection of the traveling public. The final responsibility for the installation of adequate safety precautions and for the protection of the traveling public, and its own personnel shall rest with the Contractor.

The Contractor shall be responsible for all temporary traffic control devices if specified in the job order. The Department reserves the right to set up and maintain traffic if indicated in the job order or as specified by the Engineer.

Schedule and Construction Control:

A temporary traffic control plan and construction schedule shall be required for all operations affecting the flow of traffic on all roadways where work is to be performed. The temporary traffic control plan shall be submitted to the engineer seven days in advance of the proposed work for approval. The plan must show all methods and devices the Contractor proposes for temporary traffic control.

The contractor shall plan the work such that no lanes of traffic are closed from Friday 3PM until Monday 9AM, with the exception of any weekend work to be allowed on Saturday and Sunday with prior approval from the Engineer. The contractor shall plan his work such that no lane closure occurs without approval during the following periods:

1. December 24 through December 27 (Christmas Day)
2. December 31 through January 3 (New Year's Day)
3. Friday prior to Easter through Easter Sunday
4. Thursday prior to Memorial Day through the Tuesday following Memorial Day
5. Dover International Speedway Race Weekends (Thursday prior to the race event through the day after the race event)
6. July 3 through July 5 (Independence Day)
7. Thursday prior to Labor Day through the Tuesday following Labor Day
8. Wednesday prior to Thanksgiving Day through Monday following Thanksgiving Day.
9. Exceptions to these restrictions can be made on a case by case basis with the approval of the Traffic Engineer and Chief Engineer.

No lane closures shall be allowed on multilane roadways between 6:00 AM and 7:00 PM on standard weekdays, i.e. Monday through Friday without prior permission from the Engineer. Consideration must be given to the duration of the closure, the number of lanes on the highway, the number of lanes affected by the closure and the conditions created by the closure. When prior permission is granted, the contractor shall ensure that lane closures are removed prior to peak periods on the roadway, typically from 6:00 AM to 9:00 A.M. and from 3:00 PM to 7:00 P.M. No lane closure on Two-lane roadways with AADT greater than or equal to 5000 vehicles shall occur between 6:00 AM to 9:00 A.M. and/or 3:00 PM to 7:00 P.M. on a standard weekday, i.e. Monday through Friday without prior permission from the Engineer. For Two-lane roadways with AADT less than 5000 vehicles per day lane closures typically will be allowed at any time. The contractor shall ensure that disruption to traffic is minimized at all times in all cases. Summer weekend operations may occur on non-beach route roadways subject to determination by the Engineer, but no summer weekend work shall take place on major beach routes. Nighttime work may occur on congested major roadway corridors and/or at locations as determined by the Engineer where day time lane closures will cause excessive disruption to traffic flow. Questions regarding the timing of lane closures on a particular roadway shall be directed to the DelDOT District Safety Officer. It shall be noted that the provisions above are for general guidance and that the Department can be more restrictive at its discretion.

Materials:

The contractor shall supply all temporary traffic control devices as necessary to protect the work area as provided for in the DE MUTCD

Construction Methods:

The method of installation shall be as prescribed in the DE MUTCD. The Temporary Traffic Control shall be distinguished based on the following roadway types and closures:

1. Two Lane, Two Way Shoulder Closure Within 10 Feet of Travelway
2. Two Lane, Two Way Lane Closure
3. Multilane, Divided, Non Access Controlled Highways – Shoulder Closure
4. Multilane, Access Controlled Highways and Interstates – Shoulder Work – Off Shoulder
5. Multilane, Access Controlled Highways and Interstates – Shoulder Work – On Shoulder
6. Multilane, Divided Highways and Interstates – Lane Closure
7. Multilane, Divided Highways and Interstates – Double Lane Closure

For Two Lane, Two Way roadways with Shoulder Closures, Case number 2–from the DE MUTCD shall be used for the temporary traffic control operations under this contract.

Case 6 from the DE MUTCD shall be used for the temporary traffic control operations under this contract.

For Multilane, Divided, Non-Access Controlled Highways with Shoulder Closures, Case 3 from the DE MUTCD shall be used for the temporary traffic control operations under this contract.

For Multilane Access Controlled Highways and Interstates with Shoulder Work that occurs off of the shoulder, Case 4 from the DE MUTCD shall be used for the temporary traffic control operations under this contract.

For Multilane, Access Controlled Highways and Interstates with Shoulder Work that occurs on the shoulder, Case 5 from the DE MUTCD shall be used for the temporary traffic control operations under this contract.

For a single lane closure on all Multilane, Divided Highways, including Interstates and Access Controlled Highways, Case 7 from the DE MUTCD shall be used for the temporary traffic control operations under this contract.

For double lane closures on all Multilane, Divided Highways, including Interstates and Access Controlled Highways, Case 9 from the DE MUTCD shall be used for the temporary traffic control operations under this contract.

Interior lane closures using Case 8 from the DE MUTCD shall not be allowed at any time for this contract.

Method of Measurement:

The quantity for Temporary Traffic Control shall be measured per Each for each case described in the DE MUTCD.

The Temporary Traffic Control shall be distinguished based on the following roadway types and closures:

1. Two Lane, Two Way Shoulder Closure – Within 10 Feet of Travelway
2. Two Lane, Two Way Lane Closure
3. Multilane, Divided, Non Access Controlled Highways – Shoulder Closure
4. Multilane, Access Controlled Highways and Interstates – Shoulder Work – Off Shoulder
5. Multilane, Access Controlled Highways and Interstates – Shoulder Work – On Shoulder
6. Multilane, Divided Highways and Interstates – Lane Closure
7. Multilane, Divided Highways and Interstates – Double Lane Closure

Basis of Payment:

The quantity for Temporary Traffic Control will be paid for at the Contract unit price per each. Price payment will constitute full compensation for set up, removal, furnishing and placing all material, labor, flaggers, flagger’s equipment, tools, appurtenances, drums, resetting of drums if required, signs, arrow panels and all incidentals necessary to complete the work. Each temporary traffic control item for the seven types of installations will be paid per one set up-take down cycle and shall cover all temporary traffic control required by the DE MUTCD. Each job order will indicate the number of allowable set up-take down cycles. The Basis of Payment is applicable to the following types of installations:

1. Two Lane, Two Way Shoulder Closure – Within 10 Feet of Travelway
2. Two Lane, Two Way Lane Closure
3. Multilane, Divided, Non Access Controlled Highways – Shoulder Closure
4. Multilane, Access Controlled Highways and Interstates – Shoulder Work – Off Shoulder
5. Multilane, Access Controlled Highways and Interstates – Shoulder Work – On Shoulder
6. Multilane, Divided Highways and Interstates – Lane Closure
7. Multilane, Divided Highways and Interstates – Double Lane Closure

Each of the above items shall include payment for the following:

1. Providing, transporting, locating, setting up, and maintaining of all necessary temporary traffic control devices as prescribed above.
2. Removal and transporting of all devices back to the storage yard upon completion of the job task.

SECTION 5. FEE STRUCTURES

- A. The **CONSULTANT** certifies that the **CONSULTANT** has thoroughly investigated the **DEPARTMENT**’s requirements and that the **CONSULTANT** shall claim no compensation in addition to the amounts set forth in this **SECTION 5** for work and services as set forth in this **AGREEMENT**, except as otherwise herein provided.
- B. The **DEPARTMENT** will compensate the **CONSULTANT** on an item by item basis as identified in **APPENDIX A** for all work identified in the **APPENDIX A**.
- C. Where the **DEPARTMENT** requests items of work not identified in **APPENDIX A**, the **CONSULTANT** shall submit a proposal for such work to the **DEPARTMENT** for review. Upon acceptance of such proposal, the new item will be added to **APPENDIX A**.
- D. When **PROJECT** work cannot be identified in **APPENDIX A**, the **DEPARTMENT** may agree to pay the **CONSULTANT**, including any **SUBCONSULTANT**, as follows:
 1. Department approved direct salary costs of productive technical personnel, which is defined as salaries paid to productive technical personnel engaged in fulfilling the work and services delineated in the **AGREEMENT**, plus payroll burdens and approved

indirect overhead expenses. No premium for overtime will be paid without prior written **DEPARTMENT** authorization. Payroll burden and indirect overhead cost shall not be applied to the premium portion of overtime.

2. For billing purposes, payroll burden and overhead rate of salaries paid to productive technical personnel are a combined rate based on: the actual rate audited in accordance with the **Federal Acquisition Regulations (FAR) Part 31** for a set period of time and approved by the **DEPARTMENT**, or; a provisional overhead rate established by the **DEPARTMENT**. All overhead rate determinations will become a part of this **AGREEMENT** and attached hereto. Final payment for payroll burdens and indirect overhead under the **AGREEMENT** is subject to audit and will be based on actual costs. The **CONSULTANT'S** combined **FAR Part 31** audited payroll burden and overhead rate shall be submitted to the **DEPARTMENT** annually within six (6) months from the end of their fiscal year. Failure to submit a **FAR** audited rate in a timely manner will result in deduction of overhead payments until such time as the proper audited report is submitted. Rate preparation and audit costs are not chargeable to the projects.
 3. Costs plus fixed fee for profit payments. The fixed fee for profit shall be negotiated based on current **DEPARTMENT** policy on a task-by-task basis, or when the overhead rate is set or adjusted by the **DEPARTMENT**. The amount for fixed fee for profit shall not be expressed as a percentage in either the Task Order proposal or subsequent billings. Fixed fee for profit shall not be permitted on **NON-SALARY DIRECT COSTS**. Payments for fixed fee for profit are subject to review by the **DEPARTMENT** and must be supported by monthly progress reports showing an acceptable percentage of work completed as verified by a certified progress report.
- E. All **APPENDIX A** item costs are current for the length of this **AGREEMENT**.
- F. Reasonable reimbursable direct non-salary costs attributed to the **PROJECT** and not included in **APPENDIX A** will be compensated as follows:
1. Lodging and subsistence, actual cost not to exceed CONUS (Continental United States) Per Diem rates set for the location by the U.S. General Services Administration, and pre-approved by the **DEPARTMENT**.
 2. Mileage not included in **APPENDIX A** will be reimbursed in accordance with the

CONSULTANT'S written policy for mileage reimbursement. It shall represent the actual amount of reimbursement paid to employees for mileage, and only for approved project related mileage properly documented by a trip log. In no case can the rate exceed the Internal Revenue Service rate established for the year in which work is being performed. Said mileage will not include commuting to or from work. For measurement purposes, the point of beginning shall be taken from the official place of business for each of the **CONSULTANT'S** employees.

3. Procurement of any goods, services or documents not included in **APPENDIX A** will require prior written approval from the **DEPARTMENT**. Receipts or certified in-house listings of non-salary direct costs are required in support of billings. Non-salary direct costs are subject to audit review upon completion of the project.

SECTION 6. CONSULTANT PERFORMANCE OF WORK

The **CONSULTANT** agrees that it shall:

- A. Save harmless the State of Delaware and the **DEPARTMENT**, their agents, officers and employees, from all claims or liability but only to the extent of the negligence of the **CONSULTANT**, the **CONSULTANT'S** agents, assignees, servants, or employees. In meeting this obligation the **CONSULTANT** shall secure and furnish the **DEPARTMENT** a certificate of insurance evidencing regular Liability, Property Damage, Worker's Compensation, and Automobile insurance coverage from an insurance company authorized to do business in the State of Delaware. The minimum amounts of coverage for property damage and personal injury shall be \$1,000,000 combined single limit. The **CONSULTANT** shall also secure professional Errors and Omissions insurance coverage for a minimum amount of \$1,000,000 for the work to be performed under this **AGREEMENT**. The **DEPARTMENT** must be named a certificate holder on each of the certificates of insurance named above. The insurance company shall be authorized to do business in the State of Delaware. The **CONSULTANT** shall provide the **DEPARTMENT** with 30 days notice in the event either policy is cancelled or not renewed. Nothing contained in this section shall be construed as limiting **CONSULTANT'S** obligation to indemnify the **DEPARTMENT** due to the **CONSULTANT'S**, the **CONSULTANT'S** agents', assignees', servants' or employee's negligence. The **DEPARTMENT'S** Errors and Omissions policy is

- attached and made part of this **AGREEMENT** and any future supplemental agreements.
- B. Comply with all Federal and State laws applicable to the work and services to be done under this **AGREEMENT** and shall secure workmen's compensation for the **CONSULTANT'S** employees as required by law.
 - C. Provide all labor, technical and engineering services, all material such as prints, paper and the like necessary to complete the **PROJECT** except as otherwise provided herein. The **CONSULTANT** shall furnish the **DEPARTMENT** with copies of any studies, design information, cost analysis or other information upon request. In accordance with Paragraph H of this Section, all data becomes the sole property of the **DEPARTMENT**. The **CONSULTANT** shall hold the **CONSULTANT'S** work and records open at all times for the inspection and/or audit by the **DEPARTMENT**. The location of the inspection will be at the **DEPARTMENT'S** discretion.
 - D. Make no charges or claims for damages or the like for any delays or hindrances from any cause except delays and hindrances beyond the **CONSULTANT'S** control. Such delays shall be compensated by the **DEPARTMENT** by an extension of time and, if sufficiently justified by the facts, an allowance for increase in salaries if the delay is of such length that this occurs. Any final decision making as to whether the delay and hindrances are beyond the **CONSULTANT'S** control shall be vested in the Secretary of Transportation or in a manner of his or her choosing, pursuant to 17 Del. C. Section 152.
 - E. Notify the **DEPARTMENT** in writing if the **CONSULTANT** is of the opinion that any work or service is beyond the scope of the **AGREEMENT**. If by its sole discretion the **DEPARTMENT** concurs, in accordance with Delaware law, a Supplemental Agreement may be executed in writing. No work covered by Supplemental Agreements shall be begun unless ordered in writing by the **DEPARTMENT**.
 - F. Meet with the **DEPARTMENT** and others in the event that any matters arising out of this **AGREEMENT** cannot be resolved in a mutually satisfactory manner. At such meetings, all interested parties shall be present with the **SECRETARY** of the Delaware Department of Transportation, who shall hear all arguments and render a final decision on the controversy that shall be binding on all parties concerned.

- G. Retain all books, documents, papers, accounting records and any other material pertaining to cost incurred under this **AGREEMENT** for a minimum period of three years after final payment by the **DEPARTMENT** and shall make the material available upon request for inspection and audit by the **DEPARTMENT**. The **CONSULTANT**, or applicable **SUBCONSULTANT**, shall be liable for **DEPARTMENT** costs incurred for subsequent audit reviews requested by the **CONSULTANT**, as per **DEPARTMENT** guidelines.
- H. Agree that all study data, surveys, documents, reports, designs, plans, specifications, maps, computations, digital media, charges and the like prepared or obtained under the terms of this **AGREEMENT** shall be the sole property of the **DEPARTMENT** and upon request shall be delivered to the **DEPARTMENT**.
- I. Agree to participate and become a party to any lawsuit, administrative and/or arbitration proceeding in which the **CONSULTANT**'s work product pursuant to this **AGREEMENT**, supplemental agreement, the project and/or related activities shall be the subject of any such proceeding. The **CONSULTANT** shall make its files available, to require its officers and employees to participate in and be subject to the jurisdiction of any such proceeding; including but not limited to, the preparation of testimony, the production of records and documents, the explanation of such records and documents and/or such expert testimony as the aforesaid officers and employees of the **CONSULTANT** are qualified to give. **CONSULTANT** further agrees that it is hereby subject to the jurisdiction of any such proceeding and shall be bound by its findings with regard to such findings of liability, responsibility for payment of any judgements, claims or awards made at such proceedings or its appeal process. The **CONSULTANT** shall bear the cost of any obligation undertaken pursuant to these provisions, in which the work product of the **CONSULTANT** is the subject of the inquiry, to the extent that it is negligent in its required performance. If the **CONSULTANT** is not a party to an arbitration proceeding, administrative hearing or lawsuit and is requested to produce records, assist in preparation and/or participate in a proceeding at the request of the **DEPARTMENT**, it shall do so at such rates as are listed in a supplemental agreement, subject to escalation if appropriate due to time delays. If the **CONSULTANT** is not found to be negligent in the performance of its duties under the agreement and is a party to such administrative hearing, arbitration, the **CONSULTANT** shall be reimbursed for his

costs or they shall be prorated accordingly. Pursuant to 17 Del. C. Section 152, the Secretary of the Department of Transportation shall have final responsibility and be the final arbitrator of such disputes accompanying costs, time delays, or reimbursement to the **CONSULTANT** for performance of its duties under the agreement.

- J. Assign only technical employees approved by the **DEPARTMENT**. The approval shall be obtained for each project.

SECTION 7. CONSULTANT CERTIFICATION

- A. The **CONSULTANT** certifies that it has not employed or retained any company or person, working primarily for the **CONSULTANT**, to solicit or secure this **AGREEMENT** by improperly influencing the **DEPARTMENT** or any of its employees, and **CONSULTANT** has not paid or agreed to pay any person, company, corporation, individual or firm, other than a bona fide employee working primarily for the **CONSULTANT**, any fee, commission, percentage, gift or any other consideration, contingent upon or resulting from the award or making of this **AGREEMENT**. The **DEPARTMENT** shall have the right to terminate this **AGREEMENT** for violation of this certification without liability and, at its discretion, to deduct from the **AGREEMENT** price, or otherwise recover the full amount of such fee, commission, percentage, gift or consideration.
- B. Notwithstanding anything in the Errors and Omissions policy to the contrary, the standard of performance with which the **CONSULTANT** must comply is that degree of care and skill ordinarily exercised under similar conditions by consultants currently practicing in this state.

SECTION 8. DEPARTMENT SERVICES

The **DEPARTMENT** agrees that it shall:

- A. Furnish the **CONSULTANT** with copies or plans, specifications, photographs, reports, calculations, surveys, model plans, CADD standards, available traffic data and studies, and any other pertinent public records as are readily available to the **DEPARTMENT** and which are applicable to the **PROJECT**.
- B. As far as possible, cooperate with the **CONSULTANT** in coordination and in obtaining the necessary information and approvals from appropriate government officials.

SECTION 9. AGREEMENT TERMINATION

This **AGREEMENT** may be terminated at any time by the **DEPARTMENT** upon written notice to the **CONSULTANT** by registered mail, return receipt requested. In the event of termination for any reason, the **CONSULTANT** and the **CONSULTANT'S** agents, successors or assigns, members, partners, etc. shall be entitled to compensation under this **AGREEMENT** only for work and services completed by the **CONSULTANT** prior to termination of the **AGREEMENT**, which is both useful and available to the **DEPARTMENT**. Any claim for compensation must be filed in writing with the **DEPARTMENT** within 120 calendar days after termination of this **AGREEMENT**. In the event this **AGREEMENT** is terminated for any cause, all study data, plans, surveys, specifications, maps, charts, computations, documents, reports, designs, computer-aided drafting and design files, databases, computer programs, and source code developed by the consultant for the project, and the like, are and shall be the sole property of the **DEPARTMENT**.

SECTION 10. SCOPE OF AGREEMENT

This **AGREEMENT** and Competitive Sealed Proposal 1692 & 1693 constitutes the sole understanding by and between the **CONSULTANT** and the **DEPARTMENT** and nothing outside of these documents shall be modified except in writing subscribed by both parties.

SECTION 11. SUB-CONTRACTS

- A. The **CONSULTANT** shall not subcontract, sublet, sell, transfer, assign, or otherwise dispose of the **AGREEMENT** or any portion thereof, or of its right, title or interest therein, without written consent from the **DEPARTMENT**. The **CONSULTANT** shall submit a certified copy of the **CONSULTANT**/subconsultant agreement and any and all other agreements with any other person, firm, or organization for review and approval by the **DEPARTMENT**. Each sub-agreement shall be in writing and shall contain and state that all pertinent provisions and requirements of this **AGREEMENT** are incorporated into the sub-agreement. It shall be the **CONSULTANT'S** responsibility to determine that all such provisions are included and such provisions shall be implied where not specifically included.
- B. As part of the **CONSULTANT'S** team, Department approved sub-consultants for this agreement are listed in **APPENDIX B**. Approved sub consultants may be added to, or

removed from, this Agreement upon signature of the **CONSULTANT** and the **DEPARTMENT** as indicated in **APPENDIX B**.

- C. All approved subconsultant work shall be performed and billed in accordance with the terms, conditions, and limitations of this **AGREEMENT**.
- D. Subconsultants shall be paid on a cost plus fixed fee for profit basis unless otherwise approved in advance by the **DEPARTMENT**. The **CONSULTANT** shall make payment to the subconsultants for services performed within one week after receiving payment from the **DEPARTMENT** for those services.

SECTION 12. SUCCESSOR AND ASSIGNMENTS

The **DEPARTMENT** and the **CONSULTANT** each binds itself, its successors, legal representative, agents, employees, officers, and assigns, to each other to this Contract. The **CONSULTANT** shall not assign, sell or in any way transfer its interest in this **CONTRACT** without the prior written consent of the **DEPARTMENT**.

SECTION 13. NONDISCRIMINATION

Compliance with Title VI of the Civil Rights Act of 1964 and implementing regulations issued by the Department of Transportation.

During the performance of this **AGREEMENT**, the **CONSULTANT**, the **CONSULTANT'S** assignees, agents, members, partners, officers, and successors, in interest hereinafter referred to as the **CONSULTANT**, agrees as follows.

- A. COMPLIANCE WITH REGULATIONS:** The **CONSULTANT** shall comply with the Regulations of the Department of Transportation relative to nondiscrimination in Federally-assisted programs of the Department of Transportation Title 49, Code of Federal Regulations, Part 21, as amended from time to time, hereinafter referred to as the **REGULATIONS**, which are incorporated by reference and made a part of this **AGREEMENT**.

SECTION 14. LAWS OF DELAWARE

This **AGREEMENT** and the terms thereof shall be construed in accordance with the laws of the State of Delaware.

BID PAGE 1 of 5
GEOTECHNICAL SUBSURFACE INVESTIGATION
CSP 1692-1693

ITEM NO.	QUANTITY	DESCRIPTION	PRICE / UNIT
605539	1	SOIL BORING, WATER (ATV)* <i>* including permit if needed</i>	\$ _____ Linear Foot
605540	1	ADDITIONAL STANDARD PENETRATION TESTS (SPT)	\$ _____ Each
605541	1	UNDISTURBED SAMPLING (SHELBY TUBE)	\$ _____ Each
605542	1	AUGER DRILL WITHOUT SAMPLING* <i>* including permit if needed</i>	\$ _____ Linear Foot
605543	1	ROCK CORE DRILLING (NXM)* <i>* including permit if needed</i>	\$ _____ Linear Foot
605544	1	OBSERVATION WELLS* <i>* including permit if needed</i>	\$ _____ Linear Foot
605545	1	SOIL BORINGS, LAND* <i>* including permit if needed</i>	\$ _____ Linear Foot
763587	1	MAN-HOUR OF MISCELLANEOUS WORK	\$ _____ Hour
763589N	1	MOBILIZATION OF TRUCK MOUNTED BORING RIG New Castle County	\$ _____ Each
763589K	1	MOBILIZATION OF TRUCK MOUNTED BORING RIG Kent County	\$ _____ Each
763589S	1	MOBILIZATION OF TRUCK MOUNTED BORING RIG Sussex County	\$ _____ Each

BID PAGE 2 of 5
GEOTECHNICAL SUBSURFACE INVESTIGATION
CSP 1692-1693

ITEM NO.	QUANTITY	DESCRIPTION	PRICE / UNIT
763590N	1	MOBILIZATION OF ALL TERRAIN VEHICLE OR SKID MOUNTED BORING RIG - New Castle County	\$ _____ Each
763590K	1	MOBILIZATION OF ALL TERRAIN VEHICLE OR SKID MOUNTED BORING RIG - Kent County	\$ _____ Each
763590S	1	MOBILIZATION OF ALL TERRAIN VEHICLE OR SKID MOUNTED BORING RIG - Sussex County	\$ _____ Each
763591N	1	MOBILIZATION OF BARGE MOUNTED BORING RIG New Castle County	\$ _____ Each
763591K	1	MOBILIZATION OF BARGE MOUNTED BORING RIG Kent County	\$ _____ Each
763591S	1	MOBILIZATION OF BARGE MOUNTED BORING RIG Sussex County	\$ _____ Each
18	1	MAN-HOUR OF PROJECT MANAGEMENT	\$ _____ Hour
19	1	PIEZOMETER INSTALLTION & REMOVAL <i>* including permit if needed</i>	\$ _____ Each

BID PAGE 3 of 5
GEOTECHNICAL SUBSURFACE INVESTIGATION
CSP 1692-1693

ITEM NO.	QUANTITY	DESCRIPTION	PRICE / UNIT
763605	1	TEMPORARY TRAFFIC CONTROL, TWO LANE, TWO WAY WITH SHOULDER CLOSURE	\$ _____ Each
763606	1	TEMPORARY TRAFFIC CONTROL, TWO LANE, TWO WAY WITH LANE CLOSURE	\$ _____ Each
763607	1	TEMPORARY TRAFFIC CONTROL, MULTILANE, DIVIDED, NON ACCESS CONTROLLED HIGHWAYS WITH SHOULDER CLOSURE	\$ _____ Each
763608	1	TEMPORARY TRAFFIC CONTROL, MULTILANE, DIVIDED HIGHWAYS AND INTERSTATES WITH LANE CLOSURE	\$ _____ Each
763609	1	TEMPORARY TRAFFIC CONTROL, MULTILANE, ACCESS CONTROLLED HIGHWAYS AND INTERSTATES SHOULDER WORK - OFF SHOULDER	\$ _____ Each
763610	1	TEMPORARY TRAFFIC CONTROL MULTILANE, ACCESS CONTROLLED HIGHWAYS AND	\$ _____ Each
763611	1	TEMPORARY TRAFFIC CONTROL MULTILANE DIVIDED HIGHWAYS - DOUBLE LANE CLOSURE	\$ _____ Each
763670	1	TEMPORARY TRAFFIC CONTROL WORK IN THE VICINITY OF AN EXIT RAMP ON A MULTILANE DIVIDED HIGHWAY	\$ _____ Each
763671	1	TEMPORARY TRAFFIC CONTROL WORK IN THE VICINITY OF AN ENTRANCE RAMP ON A MULTILANE DIVIDED HIGHWAY	\$ _____ Each

NAME OF TTC SUBCONTRACTOR: _____

BID PAGE 4 of 5
GEOTECHNICAL SUBSURFACE INVESTIGATION
CSP 1692-1693

ITEM NO.	QUANTITY	DESCRIPTION	
27	1	DOUBLE RING INFILTRATION TEST New Castle County	\$ _____ Each
28	1	DOUBLE RING INFILTRATION TEST Kent County	\$ _____ Each
29	1	DOUBLE RING INFILTRATION TEST Sussex County	\$ _____ Each
30	1	BACKHOE - OPERATED AND MAINTAINED New Castle, Kent, Sussex County	\$ _____ Per Day
31	1	DOZER - OPERATED AND MAINTAINED New Castle, Kent, Sussex County	\$ _____ Per Day
32	1	HAND AUGER - MOBILIZATION AND DEMOBILIZATION New Castle, Kent, Sussex County	\$ _____ Each
33	1	HAND AUGER New Castle, Kent, Sussex County	\$ _____ Per Day

BID PAGE 5 of 5
GEOTECHNICAL SUBSURFACE INVESTIGATION
CSP 1692-1693

ITEM NO.	QUANTITY	DESCRIPTION	
34	1	BOREHOLE ABANDONMENT New Castle, Kent, Sussex County	\$ _____ Linear Foot
35	1	TEST PITS, GREATER THAN 10' IN DEPTH New Castle, Kent, Sussex County	\$ _____ Per Day
36	1	MAN-HOUR, WEEKEND/OVERTIME RATE	\$ _____ Per Hour
37	1	WELL DEVELOPMENT New Castle, Kent, Sussex County	\$ _____ Per Hour
38	1	SLOPE INCLINOMETERS, 3" OR GREATER New Castle, Kent, Sussex County	\$ _____ Linear Foot
39	1	SETTLEMENT PLATES New Castle, Kent, Sussex County	\$ _____ Each
40	1	STANDPIPES OR CURB-BOXES FURNISHED AND INSTALLED	\$ _____ Each
41	1	BOREHOLE INFILTRATION TEST New Castle County	\$ _____ Each
42	1	BOREHOLE INFILTRATION TEST Kent County	\$ _____ Each
43	1	BOREHOLE INFILTRATION TEST Sussex County	\$ _____ Each
44	1	MOBILIZATION FOR CONE PENETROMETER EQUIPMENT	\$ _____ Each

45	1	SOIL BORING - CONE PENETRATION TEST (CPT)	\$ Each
46	1	LIGHT DUTY SUPPORT VEHICLE	\$ Each
47	1	MOT (WEEKEND/OVERTIME) RATE	\$ Each

APPENDIX B

AGREEMENT XXXX

(Insert Title of Agreement)

DEPARTMENT approved subconsultants for this Agreement:
(Consultant must submit signed subconsultant contracts prior to signatures)

Subconsultant's full Name:

No subconsultants at this time

Recommended by CONSULTANT:

insert name
Consultant Project Manager

Dated: _____

Recommended by DEPARTMENT:

insert name
Department Project Manager

Dated: _____

Approved as to Process:

Wendy Henry
Consultant Control Coordinator

Dated: _____

(Note: Project Manager signatures not required if no subconsultants listed)

**POLICY IMPLEMENT
STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
P.I. number: A-26
Errors and Omissions Policy**

References:

Issued: 1/1/1999
Revised: n/a
Expires: n/a

This document includes a general discussion on errors and/or omissions occurring during project implementation, how to initiate a correction for an error or omission, and what each party's responsibilities are in making the correction. The Department intends to seek reimbursement for additional costs (defined below) associated with correcting errors and omissions during planning, design and construction, including but not limited to, multiple report rewrites, construction costs, and construction engineering.

I. INSURANCE

This document does not address the types of liability insurance a firm may need to carry. Insurance usually carried by consultants includes Comprehensive General Liability, Comprehensive Automobile Liability, Workers' Compensation and Employers' Liability, Professional Liability, and other specialty insurance required in an agreement or that a firm may consider prudent based on the scope of work. The actual agreement covering the work will specify the minimum insurance requirements.

II. ASSIGNMENT OF RESPONSIBILITY

Services procured under the auspices of this document are considered "Professional Services". This in itself infers that, no matter what the scope of work entails, there are associated, industry professional, standards which are expected to be met. For projects involving public safety, meeting these standards takes on even more significance. Firms selected through the process described in the DelDOT Professional Services Procurement Manual are the best technically qualified, with a proven history of meeting similar contract obligations. Such designation carries with it an acknowledgement of the firm's responsibility to know the accepted standards for doing business in Delaware.

Because of the Department's review process and the involvement of many internal support sections as well as other state agencies, utility companies, public groups, municipalities, and the like, acceptance of the responsibility for an error and/or omission in a professional manner will depend on good project monitoring. The Project Manager must ensure that full and complete review and comment records are kept by both the Consultant and the Department. It is required that an office copy of each marked or edited review submission and comments be prepared and retained for future reference. Detailed minutes of project review meetings are also required.

Because of the underlying expectation that a firm will comply with established standards throughout project development, there are occasions when a Project Manager and their Section Head will determine that a firm may not have met this obligation. When discovered, the error and/or omission should be reported immediately to the Consultant for resolution. While invoices should annotate the time and associated costs for correcting the lapse, the Department shall not be charged to correct errors and/or omissions.

III. ERROR AND/OR OMISSION DISCOVERY

Definitions:

Errors are defined as unknown, ignorant, or unintentional deviations from accuracy or correctness. Errors may arise from mistaken judgement, misplaced confidence, incorrect belief as to the existence or effect of matters of fact, or other actions. Errors also include failure to meet established Delaware requirements, or design standards for that type of project, (i.e., AASHTO, FHWA, EPA, FTA, DeIDOT or other established government requirements or design standards).

Omissions are defined as missing or unmentioned detail or requirements through either failure to perform properly, neglect, or failure to use reasonable care. Omissions also include failure to identify and implement cost-effective solutions.

Additional costs refers to that portion of the project cost the consultant is responsible for which includes those expenses over and above the cost the Department would have incurred had the error or omission not been made.

Example #1: A mistaken quantity that results in an unbalanced bid situation shall constitute an error whereas a mistaken quantity that results in the expense of additional materials to the Department shall not cause additional costs to the consultant except for the recalculation.

Example #2: If the consultant under-designs a sign structure, the consultant shall be responsible for the re-design as well as the construction cost, if any, of the under-designed structure. Likewise, if the consultant over-designs a sign structure, the consultant shall be responsible for the re-design as well as the increased cost of the over-designed structure.

Example #3: The Department will pay the expense of the first re-write of any reports being developed under contract. The cost of report re-writes after that first re-write will be considered additional costs to the consultant.

During Project Development:

Errors and/or omissions discovered during project development are relatively easy to resolve when identified early because the Consultant's Project Manager and the Department's Project Manager are both aware of the circumstances surrounding the problem. The major issue remaining involves arriving at a mutual agreement on whether full, partial or no compensation is due the Consultant to correct the problem. (See Resolution below.)

During Implementation or Construction

Most often it will be obvious if a Consultant error and/or omission truly occurred. Frequently, however, there is a time lapse between the completion of professional services to develop the project and actual implementation of the plan, project, or construction. Associated with this delay is the updating and modification of completed work because of changes in specifications, updated regulations, legislative initiatives, or additional valid comments for improving a project. Most often, corrections or modifications are performed by Department staff; however, they must be immediately reported to the Department's Project Manager and in turn, to the Consultant. In essence, the quality and content of a project become a shared responsibility. Changes of specifications, updated regulations, legislative initiatives, or comments for improving a project after acceptance of the final design, shall in no way be construed as an error/or omission.

Professional responsibility of the Consultant preparing the project does not terminate with acceptance of the product and/or final payment for its development. Failure to discover the error and/or omission during the design, review or implementation of the project does not relieve the Consultant of their responsibility to correct the effects of the error and/or omission. The extent of the responsibility of the consultant for payment for correcting any errors and/or omissions may be in question, but the active participation of the firm in resolving a problem upon request is mandatory. The level of the Consultant's participation shall be determined by the Department.

The procedure to initiate the correction of an error and/or omission lies with the person responsible for ensuring proper implementation of the plan, project, or construction. At the first indication of an error and/or

omission, the Department's representative should notify the project Supervisor. All subordinates should be instructed to keep detailed documentation on the work being performed.

At this same time, the Department's Project Manager responsible for developing the project, if not the person identifying the error and/or omission, should be notified. Depending upon how critical a correction is to project scheduling, report preparation and review may be impractical. When such timing is critical, the Project Manager is verbally notified, and guidance is requested with emphasis on what additional data is needed to document and resolve the error and/or omission. The Department's Project Manager, in turn, should immediately advise the consultant, the supervisor, and up through the chain of command as necessary.

The Department holds the prime Consultant responsible for all work performed or not performed under an agreement including that of any subconsultants. When necessary, based on the opinion of the Department's Project Manager, section head, District Engineer, Deputy Director, and/or Director, the prime consultant will be notified of the problem and requested to participate in a solution in cooperation with Department staff. There will be no compensation to either the prime or subconsultant for services related to the verification and correction of an error and/or omission unless as otherwise agreed. The primary objective is to keep the project on schedule by proposing a viable alternative. Records should be kept of any immediate action taken to correct the situation.

Resolution

The Department's Project Manager shall document the error and/or omission that was identified, collect all supporting materials, review their findings with the Consultant, determine the required action to correct the error and/or omission and analyze the cost impact of the resolution (including but not limited to materials, overtime, and force account). All documentation shall be presented to the Section Head. The prime Consultant is expected to participate at the appropriate level, from site visits to preparation of corrective documents. Much of this participation is mutually agreed to as solutions are developed.

The Section Head (or Assistant Chief Engineer for Project Management Team) will review the materials, discuss the resolution options with the Consultant and make a final recommendation to their Assistant Director (or Chief Engineer for Project Management Team) for review. At the conclusion of the Assistant Director's review, the recommendation will be presented to the Director or Deputy Director for approval. For the Project Management Team, the Chief Engineer's decision shall govern.

Appeal

Should the Consultant not participate in the resolution process or disagree with the finding of financial responsibility as presented, the Consultant can schedule a review with the Deputy Director or Director (Chief Engineer for Project Management Team). The Deputy Director or Director can modify the terms of the resolution or refer the appeal to the Secretary per the Consultant agreement's appeal process.

Default

Should the Consultant not honor the terms of the final resolution, the Department, for just and definable acts, has the option of filing a Consultant insurance claim, filing legal process for restitution, terminating all current agreements, or barring the firm from further work with the Department for up to five years, or any combination thereof.

End

TRUTH-IN-NEGOTIATION CERTIFICATION

KNOW ALL MEN BY THESE PRESENCE, that the professional service firm hereinafter listed, by and through the undersigned, its lawful agent, in accordance with 29 Del. C. §6982 (b) (3), and pursuant to **AGREEMENT NUMBER XXXX** by and between said professional service firm and the State of Delaware, Department of Transportation, **HEREBY CERTIFIES THAT:**

Wage rates and other factual unit costs supporting the compensation under the aforesaid **AGREEMENT** are accurate, complete and current at the time the **AGREEMENT** was executed.

The undersigned, on behalf of the professional service firm hereinafter listed below, further **CERTIFIED** that said firm **AGREES** that:

In the event that the State of Delaware, Department of Transportation determines the compensation was, in fact, increased due to inaccurate, incomplete or noncurrent wage rates or other factual unit costs, the original compensation and additions thereto shall be adjusted to exclude any such sum. All such adjustments shall be made within one year following the termination of said **AGREEMENT**.

IT IS AGREED that this document be attached to the aforementioned **AGREEMENT** and become a part thereof.

SIGNED, SEALED AND DATED THIS _____ **day of** _____ **20**____

FIRM: _____

ADDRESS: _____

(authorized signer)
(name of consultant firm)

State of _____

County of _____

SWORN TO AND SUBSCRIBED before me, a Notary Public, for the State and County aforesaid, in this _____ day of _____ 20____.

Signature of Notary Public _____

My Commission Expires _____

State Cont. No. _____
Fed.-Aid Proj. No. _____
State : _____

CERTIFICATION OF CONSULTANT

I hereby certify that I am an officer and duly authorized representative of the firm of XXXXXXXXXXXXXXXXXXXXXXXXXXXX, whose address is XXXXXXXXXXXXXXXXXXXXXXXXXXXX and that neither I, nor the above firm I hereby represent, has:

- (a) employed or retained for a commission, percentage, brokerage, contingent fee, or other consideration, any firm or person (other than a bona fide employee working solely for me or the above consultant) to solicit or secure this contract,
- (b) agreed, as an express or implied condition for obtaining this contract, to employ or retain the services of any firm or person in connection with carrying out the contract, or
- (c) paid, or agreed to pay, to any firm, organization or person (other than a bona fide employee working solely for me or the above consultant) any fee, contribution, donation, or consideration of any kind for, or in connection with, procuring or carrying out the contract;

except as here expressly stated (if any):

I acknowledge that this certificate is to be furnished to the State **DEPARTMENT OF TRANSPORTATION** and the **FEDERAL HIGHWAY ADMINISTRATION** in connection with this contract involving participation of Federal-aid highway funds, and is subject to applicable, State and Federal Laws, both criminal and civil.

Date

(Signature)

CONSULTANT'S CERTIFICATION STATEMENT
[U.S. DOT SUSPENSION AND DEPARTMENT REGULATIONS (49 CFR 291)]

" _____, under
(president or authorized official of consultant)
penalty of perjury under the laws of the United States, certifies that, except as noted below,

(the company)
or any person associated therewith in the capacity of (owner, partner, director, officer, principal investigator, project director, manager, auditor, or any position involving the administration of federal funds):

is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency:

has not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency:

has not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past three years;

does not have a proposed debarment pending; and

has not been indicted, convicted, or had a civil judgment rendered against (it) by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

Exceptions will not necessarily result in denial of award, but will be considered in determining consultant responsibility. For any exception noted, indicate below to who it applies, initiating agency, and dates of action. Providing false information may result in criminal prosecution or administrative sanctions."

(insert exceptions)

CONSULTANT

SIGNATURE

TITLE

Sworn to before me, this ____ day of _____, 20____
My Commission Expires _____.

NOTARY PUBLIC

Certification of Federal-Aid Contracts

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of the Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. code. Any persons who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such sub-recipients shall certify and disclose accordingly.

DATE

SIGNATURE