Addendum #3 to
Spotsylvania County
IFB #20-09-EG
for
Lake Bottom Municipal Improvements Project
April 7, 2020

Addendum #3 to Invitation for Bid #20-09-EG is issued in accordance with the IFB Terms & Conditions and is intended to provide additional information and clarification to bidders.

Addendum #3 consists of eight (8) items which are listed below, attached hereto and made a part hereof to IFB #20-09-EG.

ITEM 1: - EXTENSION FOR QUESTIONS

Questions from Bidders extended to **12 noon on April 10, 2020.**

Questions must be e-mailed to Spotsylvania County – eguinn@spotsylvania.va.us. All responses to inquiries will be in writing in the form of an Addendum and will be posted on the Procurement Division website -http://www.spotsylvania.va.us/374/Solicitations. The County is not responsible for verbal clarification of information provided by parties other than staff of the Procurement Division.

ITEM 2 - BID OPENING DATE

**CHANGE** Bid Opening Date **FROM** 2:00 PM April 16, 2020 **TO APRIL 23, 2019 @ 2:00 PM**

ITEM 3 – REVISED TECHNICAL SPECIFICATIONS – ATTACHMENT A

Replace Section 01130- MEASUREMENT AND PAYMENT with the attached Revised Technical Specifications – Attachment A included in Addendum #3 and made part of Addendum #3 to IFB #20-09-EG.

ITEM 4 – REVISED DRAWINGS (PLANS) – ATTACHMENT C

Replaced Attachment C – Drawings with the attached Revised Drawings Attachment C included in Addendum #3 and made part of Addendum #3 to IFB #20-09-EG.

ITEM 5 – REVISED BID FORMS – ATTACHMENT D

Replace Attachment D – Bid Forms with Attachment D Revised Bid Forms included in Addendum #3 and made part of Addendum #3 to IFB #20-09-EG.
ITEM 6 – GEOTECHNICAL REPORT

Geotechnical Report attached and included in Addendum #3 and made part of Addendum #3 to IFB #20-09-EG

ITEM 7 – WETLAND PERMIT PLAN

Wetland Permit Plan attached and included in Addendum #3 and made part of Addendum #3 to IFB #20-09-EG

ITEM 8 – QUESTIONS AND ANSWERS

1. Appendix #1 for the wetland the plans says there is supposed to be one, but it is not shown. Could you furnish one?
   Original Dewberry Wetland Permit plan, Dated June 9, 2010, is included in Addendum #3 and attached and made part of Addendum #3 to IFB #20-09-EG

2. Lining Manholes shows T-Lock, is that the only approved liner? If so, who are the approved suppliers?
   AgruGrip and GSE Studliner are approved materials per the Spotsylvania County Design Standards Manual (DSM).

3. Pg 4, waterline enlargement is not showing a double check valve (jumper) placed between the 12’ line and 16” line. Will there be one placed there?
   No, a double check valve will not be placed between the 12” and 16” line. Note the location of the tie-in has been relocated to sta. 16+22. See 12” Water Line Temporary Connection Insert on sheet 4 for required valves.

4. 18” Sewer line – PS46, ASTM F679. Is this SDR 35?
   SDR 35 only goes up to 15” pipe. For pipe between 18” and 48” the pipe is classified as PS46, ASTM F679.

5. Pg. 3 #27, The hardware and fittings, Are they flouro kote?
   All pipe fittings shall meet the requirements of AWWA C110 or AWWA C153 and have a cement mortar lining and bituminous seal coating. All bolts for mechanical fittings shall be coated with FlouroKote, non-stick fluoropolymer coating, or approved equal.

6. Pg. 3 General Notes, Dispose of debris by grinding, mulching or other approved method. What are the other approved methods by the county?
   Bidders shall refer to Section 311000 Site Clearing and subsection 3.4 Clearing and Grubbing for specific methods and means to be used.

7. With the amount of traffic with heavy trucks on Jackson trail east and damages they may cause to the roadway that contractor may have to fix, is there any compensation for that?
   No, the contractor should use caution and limit heavy construction traffic on Jackson Trail East as well as monitor road condition throughout the project.
8. Pg. 19 #4, Sequence of construction, Is the contractor responsible for preparing a construction schedule of sufficient detail to enable the proper coordination of the separate water booster pump?

*The Contractor is responsible for preparing a construction schedule of sufficient detail; furthermore, the Bidders are hereby advised that it is the County’s intent to authorize work on the Water Booster Pump Station and associate water main construction along Brock Road by the end of 2020.*

9. Pgs. 19 #6, Are there any other manholes or abandoned lines/connections other then what’s shown on plans 77+00+112+00?

*There are no manholes and/or lines to be abandoned in this project.*

*Such work will be done after the new sanitary sewer pump station is installed and accepted (this will be a separate project to be bid at a later date).*

10. Pg4, the plans show select clearing and hand clearing. Hand clearing through the wetlands then select clearing throughout other places on the plans. Could you please explain the difference between the two?

*Bidders shall refer to the Nationwide Permit and the plans entitled “Wetland Jurisdictional and Impact Map” and specifically Sheet 2 of 6 for approved methods within jurisdictional impact areas and refer to Section 311000 Site Clearing for areas outside of DEQ jurisdiction. For areas outside of jurisdictional limits, the only condition placed on methods of removal are stumps and roots (larger than 3”) must be removed for a depth of 18 inches.*

11. Can pump station property be used for laydown area or dirt stockpile for NP property? In the meeting we discussed a laydown area where the booster pump station is, could you show us where that is on a set of plans? Also, any other known locations we could use for laydown areas?

*No, the sewer pump station along Jackson Trail East cannot be used for laydown area or dirt stockpile. The E&S plans (sheet 14-17) shows areas where you can stockpile dirt and use for laydown areas. They are shown on the Bid Plans at the following locations: Sta. 15+50 Left, Sta. 24+50 Left, Sta. 43+50 Right, Sta. 61+50 Right, Sta. 75+00 Right, and Sta. 75+00 Left. While most of these areas are somewhat narrow, the narrow ones can certainly be used to store pipe and manholes and fittings. Excess dirt really should leave the site daily.*

12. Rock excavation for bore and pipeline. We believe there will between 4 to 10 feet of rock excavation throughout the project. To bid the job as cheap as possible, we would like to know if the county would be willing to make rock excavation into a pay item?

*No, all material whether encounter while machine digging, during jack & bore or micro-tunneling shall be considered unclassified with no separate payment provided. The Geotechnical investigation have been performed and are provided to Bidders for their use. Spotsylvania County does not warrant the existence or non-existence of rock material within the proposed utility trenches and/or within the jack & bore or micro-tunneling prism. Bidders accept all risk and shall make no claims as to the nature of the material encountered during installation of the proposed infrastructure. The report has*
13. Is SDI furnishing the stake out for the limits of clearing and water/sewer lines? If so can you furnish a price for the stake out?
   The contractor is responsible for stake out of limits of clearing and the water and sewer lines. SDI has provided a quote for this work, refer to question # 24 for details.

14. We didn’t see buy American in the specs. Is this job considered buy American?
   No, this project is not considered but American.

15. I would like to clarify if we can use 18” PVC with bell restraints and spacers inside a 30” casing for the sanitary sewer creek crossings instead of the 20” HDPE pipe and 24” casing?
   Bidders may implement this specification and method at their option. This should be cited as a deviation in the Bid.

16. Wetland plantings were mentioned at the Pre-Bid but no information is provided in the bid documents. Please provide a planting schedule or confirm that this scope is not required.
   Bidders shall refer to the Nationwide Permit and the plans entitled “Wetland Jurisdictional and Impact Map” which is included as a part of Addendum No. 3, and specifically Sheet 2 of 6 and 6 of 6 for wetlands planting requirements and specifications. An item for wetland shrubs and wetland tree saplings has been added to the Revised Bid Form that is attached and made part of Addendum #3 to IFB #20-09-EG

17. Please consider adding a Unit Price to the bid form for Rock Removal. Without any boring information it is impossible to estimate an unknown quantity of possible rock and the prices will reflect this.
   Refer to Question 12 for details.

18. The contract documents speak of both Lump Sum and Unit Price payments. Please confirm if this is a Unit Price or Lump Sum contract in terms of payment procedure.
   The unit price for bid items will be paid for what has been installed each month. The lump sum price for bid items can be paid at a percentage of completion each month.

19. Plan sheet 4 shows installation of 24” RCP but scales as 18” RCP. Please confirm size & length of this RCP culvert crossing.
   The only storm pipe indicated on sheet 4 is an existing 18” RCP at Sta. 17+60. The Contractor shall replace the existing pipe with 52 L.F. of 24” Class III RCP.

20. Bid Item # 30 shows 76 LF of 18” RCP. I only see one 18” Culvert on plan sheet 5 @ 18 LF. Please verify this quantity.
   The Revised Bid Form indicates 18 L.F. of 18” RCP Class III pipe, 132 L.F. of 24” Class III RCP, and 24 L.F. of 36” Class III RCP. The Revised Bid Form is included attached and made part of Addendum #3 to IFB #20-09-EG.

In normal conditions there is 10’ horizontal separation between water and sewer lines and this is a standard note on all plans. In some areas of this project we have reduced the separation to 6’. In these areas DR-25 C-900 PVC shall be used for the gravity sewer. This is indicated on the plans.

22. Is the existing 18” pipe to be removed on plan sheet 4 asbestos?

The existing 18” pipe at Sta. 17+60 (approx.) is RCP, as indicated by field survey. If discovered conditions contradict this, the Contractor shall notify the Engineer prior to removal of the existing pipe.

23. Are there any additional access points to the site other than Jackson Trail East?

The Contractor may access the project from Brock Rd at the existing gravel driveway at Sta. 112+60.

24. During the Pre-Bid meeting the Design Engineering firm said they would provide a quote for the initial stake out work, can you provide that information?

Sullivan, Donahoe, & Ingalls has provided a quote of $43,500 for construction stakeout services. This fee will cover one-time stakeout for limits of disturbance, sanitary sewer, waterline, borings and culverts.

25. Sanitary runs B1-C & G-G1 show pipe size conflicts - The description shows 20" SDR-11, but the bore shows 18" for the bores. Please clarify.

The sanitary sewer line between manhole B1 to Manhole C and Manhole G to Manhole G1 is to be bid as 20” HDPE pipe. The HDPE shall run between each manhole as shown on the plans. If the bidder would like to use 18” PVC, refer to question 15 for details.

The 18” dimension is the nominal inside diameter of the pipe, however HDPE DIPS is specified by its nominal outside diameter.

26. Do you have any soils information?

No. Soils information beyond that of the Geotechnical report is not available for this project. The project is considered unclassified.

27. Sanitary Stub-MH#50R shows as 15”. There is no bid item for this. Where do the cost go & what is the material?

Manhole 50R has been removed from this project. Please refer to the revised drawings (plans) that included and attached to Addendum #3 and made part of Addendum #3 to IFB#20-09-EG.

Bidder shall acknowledge receipt of this Addendum on the Bid Form.

Elaine Guinn        Date
Elaine Guinn        April 7, 2020
Procurement Officer I
PART 1 - GENERAL

1.1 GENERAL

A. The Contractor shall receive and accept the compensation provided in the Proposal and the Contract as full payment for furnishing all labor, materials, tools, equipment and services for performing all operations necessary to complete the work under the Contract, and also in full payment for all loss or damages arising from the nature of the work, or from any discrepancy between the actual quantities of work and the quantities herein estimated by the Engineer, or from action of the elements or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the Owner.

B. The lump sum and unit prices stated in the Proposal include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the Contract Drawings and specified herein. The basis of payment for a lump sum item shall be broken down and detailed in the Schedule of Values in accordance with the description of that item in this section.

C. The Contractor’s attention is called to the fact that the quotations for the various items of the work are intended to establish a total price for completing the work in its entirety. Should the Contractor feel that the cost for any item of work has not been defined by a Bid Form, he shall include the cost for that work in some other applicable bid item, so that his proposal for the work reflects his total price for completing the work in its entirety.

D. Items listed as CONTINGENT UNIT PRICE ITEMS or as ADD ALTERNATE in the proposal are to be used and will be paid for only at the written direction and authorization of the Engineer, if agreed to by the Owner. Payment under this section will be made for materials furnished and placed in addition to those shown or beyond the limits indicated or reasonably inferred by the Contract Documents. Measurement and payment will be in accordance with the proposal and will include, but not necessarily be limited to, furnishing, hauling, placing and installing of materials and the furnishing of such manpower and equipment as required to accomplish the work as directed in writing by the Engineer.

E. Alterations

1. The Owner reserves the right to change the alignment, grade, form, length, dimensions or material of the work under the contract, whenever conditions or obstructions are met that render the changes desirable or necessary. All such alterations shall be paid for under the total lump sum bid or at a unit price bid for these items of work, except as follows:

a. In the case that such alterations make the work less expensive to the Contractor, a proper deduction shall be made from the contract prices and the Contractor shall have no claim on this account for damages or for anticipated profits on the work that may be dispensed with.
b. In the case such alterations make the work more expensive to the Contractor, a proper addition shall be made to the contract prices.
c. Any additions or subtractions to the contract prices shall be proposed by the Contractor and then reviewed by the Engineer and approved by the Owner.
d. In case the quantity of work in individual unit price items of work increases or decreases greater than 25% of the bid quantity, unit prices may be renegotiated.

F. Engineer May Increase or Decrease Quantities

1. The Engineer reserves the right to increase or decrease the quantity of material to be furnished or work to be done under the Contract whenever he deems it advisable or necessary. Such increase or decrease shall in no way violate or invalidate the Contract.

2. For the unit price items included in the bid, the Contractor will be paid for the actual amount of the authorized work done or material furnished under each item of the proposal, at the unit price bid for that item. In case the quantity of any item is increased, the Contractor shall not be entitled to compensation over and above the unit bid for each item. In case the quantity is decreased, the Contractor shall have no claim for damages on account of loss of anticipated profits because of such decrease.

3. For the contingency items, the Contractor shall be paid for actual quantities installed, on written order of the Engineer.

G. Except as modified herein, measurement and payment shall be in accordance with the GENERAL CONDITIONS, Article 10 – Cost of the Work, Allowances, Unit Price Work and Article 15 – Payments and Completion.

1.2 MEASUREMENT

A. The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place and accepted by the Owner, in accordance with the General Conditions. A representative of the Contractor shall witness all field measurements.

1.3 PAYMENT

A. Payments during the course of the work for unit price items will be made on the basis of actual amount of the work item installed at the end of the pay period. Determination of the amount of the work item installed shall be made by the Contractor and reviewed and approve by the Engineer. Payments during the course of the work for lump sum items will be made on the basis of percentage of completion of the work items listed in the Schedule of Values for each lump sum item. The Schedule of Values shall be prepared by the Contractor and submitted to the Engineer within 15 days of the execution of the contract and shall serve as a breakdown of the lump sum bid for the purpose of arriving at a basis for the monthly estimate. The Schedule of Values shall be broken down into categories and each category further broken down into each applicable specification section. The schedule shall add up to 100% of the Lump Sum Bid.
1.4 ITEMS

A. Items 1 through 7: ___’ Dia. Pre-cast Concrete Manholes with Watertight Frame and Cover, ___’ to ____’ Height

1. Payment for Pre-cast concrete manholes of the specified diameter and height with watertight frame and cover shall be made at the unit price provided per manhole, actually installed, complete in place.

2. No measurement shall be made for this item.

3. The unit price provided per each manhole shall include all labor, materials, tools, equipment and services for furnishing and installing the specified [4'-0" or 5'-0"] diameter Pre-cast concrete manholes of the specified [6’ to 8’, 8’ to 10’, 10’ to 12’, 12’ to 14’, 14’ to 16’, and 16’ to 20’] height [with internal drop connections and/or manhole lining where called for on the Plans], including, but not limited to; traffic control, unclassified excavation and pavement removal, excavation including rock if required, trench support, dewatering, handling and placing of manhole sections, watertight frames and covers, outside coating, flexible pipe connections, steps, making connections, temporary blocking, stone bedding (No. 57 stone per County Utilities Manual Standards), testing, cleanup, removal and disposal of all unsuitable and excess material, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, and seeding and mulching and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the manholes.

B. Items 8 through 10: ___” Dia. Ductile Iron Pipe Cl.52, Zinc-Coated With V-Bio Wrap Waterline [either Fully Restrained or Partially Restrained]

1. Payment for furnishing and installing Ductile Iron Pipe waterline, zinc-coated with V-Bio Wrap, at all depths of unclassified excavation, of the specified diameter [either 12-inch or 16-inch diameter], and of the specified Pressure Class [Class 52] shall be made at the unit price provided per linear foot for the lengths of pipe actually installed, complete in place. Lengths designated fully restrained shall be restrained throughout, while lengths that are designated partially restrained shall be restrained per County standards.

2. Measurement of lengths will be made horizontally, along the centerline of the pipe. No deductions will be made in the measured length for manholes, gates, bends, tees, and wyes.

3. The unit price provided per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing the specified diameter [either 12-inch or 16-inch] and specified pressure class [Class 52] zinc-coated with V-Bio Wrap ductile iron pipe waterline including, but not limited to; traffic control, pavement removal, excavation including rock if required, all tree removal and clearing, removal and disposal of the existing pipe, all temporary bypass pumping operations, laying of the pipe, including pipe bedding (No. 57 stone per County Utilities Manual Standards), restraints where indicated or required by County standards, trench support, dewatering, making of joint connections, temporary blocking, cleanup, removal and disposal of all unsuitable and excess material, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, and seeding and mulching, and all restoration required to restore disturbed areas
to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

C. Items 11 through 14: ___” Dia. CIR. Gravity Sewer

1. Payment for furnishing and installing, at all depths of unclassified excavation, gravity sewer of the specified diameter and specified class of pipe shall be made at the unit price provided per linear foot for the lengths of pipe actually installed, compete in place.

2. Measurement of lengths will be made horizontally, along the centerline of the pipe. No deductions will be made in the measured length for manholes and wyes.

3. The unit price provided per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing gravity sewer of the specified diameter and specified class of pipe including, but not limited to; traffic control, pavement removal, excavation including rock if required, removal and disposal of the existing pipe, all temporary bypass pumping operations laying of the pipe, including pipe bedding (No. 57 stone per County Utilities Manual Standards), trench support, dewatering, making of joint connections, temporary blocking, cleanup, removal and disposal of all unsuitable and excess material, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, and seeding and mulching, and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the gravity sewer.

D. Items 15 through 18: ___” Plugs

1. Payment for furnishing and placing plugs will be made at the unit price provided per each for the various diameter plug. Payment for furnishing and placing and will be made at the unit price provided per each for the various plug items.

2. No measurement shall be made for these items.

3. The unit price provided per each plug shall include all labor, materials, tools, equipment and services for connection to the stub pipe including, but not limited to; traffic control, excavation, pavement removal, excavation including rock if required, testing, cleanup, removal and disposal of all unsuitable and excess material, replacement of grass, sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, and seeding and mulching and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline or sewer line.

E. Item 19: 16” Butterfly Valve

1. Payment for furnishing and installing 16-inch butterfly valves box shall be made at the unit price provided per for each butterfly valve actually installed, complete in place.

2. No measurement shall be made for this item.

3. The unit price provided per each 16-inch butterfly valve shall include all labor, materials, tools, equipment and services for furnishing and installing butterfly valves including, but
not limited to; traffic control, pavement removal, excavation including rock if required, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable and excess material, replacement of grass, sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

F. Item 20: Fire Hydrant Assemblies

1. Payment for furnishing and installing fire hydrant assemblies shall be made at the unit price provided per each fire hydrant assembly actually installed, complete in place.

2. No measurement shall be made for this item. Pipe from gate valve to fire hydrant shall be included in fire hydrant assembly.

3. The unit price provided per each fire hydrant assembly shall include all labor, materials, tools, equipment and services for furnishing and installing fire hydrant assemblies including, but not limited to; traffic control, pavement removal, excavation including rock if required, laying of the pipe, bedding (No. 57 stone per County Utilities Manual Standards), trench support, dewatering, making of joints connections, passive joint restraints, 6-inch pipe from gate to hydrant, straps, temporary blocking, testing, cleanup, removal and disposal of all unsuitable and excess material, replacement of grass, sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, and seeding and mulching and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

G. Items 21 and 22: 12-inch and 6-inch Gate Valves and Boxes

1. Payment for furnishing and installing 12-inch and 6-inch gate valves and valve box shall be made at the unit price provided per for each gate valve actually installed, complete in place.

2. No measurement shall be made for this item.

3. The unit price provided per each 12-inch or 6-inch gate valve and valve box shall include all labor, materials, tools, equipment and services for furnishing and installing gate valves and boxes including, but not limited to; traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, bedding (No. 57 stone per County Utilities Manual Standards), testing, cleanup, removal and disposal of all unsuitable and excess material, replacement of grass, sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, and seeding and mulching and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

H. Items 23 through 27: Fittings (Various Types and Sizes)
1. Payment for furnishing and installing fittings shall be made at the unit price provided per each type of fitting actually installed, complete in place.

2. No measurement shall be made for this item.

3. The unit price provided per each type of fitting shall include all labor, materials, tools, equipment and services for furnishing and installing fittings including, but not limited to; traffic control, pavement removal, excavation including rock if required, including bedding (No. 57 stone per County Utilities Manual Standards), trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable and excess material, replacement of grass, sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, and seeding and mulching and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper installation waterline

I. Item 28: T-Lock Manhole Line

1. Payment for furnishing and installing T-Lock Manhole Liners in accordance with Spotsylvania County Water and Sewer Design and Construction Manual Section 4.4.6 of the specified diameter shall be made at the unit price provided per each liner actually installed.

2. No measurement shall be made for this item.

3. The unit price provided per each type of fitting shall include all labor, materials, tools, equipment and services for furnishing and installing fittings including, but not limited to; traffic control, pavement removal, excavation including rock if required, including bedding (No. 57 stone per County Utilities Manual Standards), trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, testing, cleanup, removal and disposal of all unsuitable and excess material, replacement of grass, sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, and seeding and mulching and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper installation sewerline

J. Items 29 through 31: ___” RCP Culvert Pipe

1. Payment for furnishing and installing RCP Culvert Pipe of the specified diameter shall be made at the unit price provided per linear foot of culvert pipe actually installed.

2. Measurements of lengths will be made horizontally, along the centerline of the culvert pipe.

3. The unit price provided per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing the Reinforced Concrete Pipe of the specified diameter including, but not limited to; traffic control, pavement removal, excavation including rock if required, all tree removal and clearing, removal and disposal of the existing pipe, all temporary bypass pumping operations, laying of the pipe, including pipe bedding (Class C), trench support, dewatering, making of joint connections, temporary blocking, cleanup, removal and disposal of all unsuitable and excess material, backfill and surface materials, including the replacement of gravel, asphalt, and concrete roadways and
driveways, and seeding and mulching, and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the culvert pipe.

K. Items 32 and 33: 12” by 12” Tapping Sleeve and 12-inch Tapping Valve

1. Payment for furnishing and installing 12-inch by 12-inch tapping sleeves and 12-inch tapping valves shall be made at the unit price provided per for each actually installed, complete in place.

2. No measurement shall be made for these items.

3. The unit price provided per each 12-inch by 12-inch tapping sleeve and 12-inch tapping valve shall include all labor, materials, tools, equipment and services, and other incidental items required for the proper operation of the 12-inch connection; all tapping connections shall be made under the inspection of the County.

L. Items 34 and 35: Air Release Valve and 8” by 6” Reducer

1. Payment for furnishing and installing air release valves and 8” by 6” reducers shall be made at the unit price provided per for each actually installed, complete in place.

2. No measurement shall be made for this item.

3. The unit price provided per each air release valve or reducer shall include all labor, materials, tools, equipment and services for furnishing and installing valves including, but not limited to; traffic control, pavement removal, excavation including rock if required, laying of the pipe, trench support, dewatering, making of joints connections, passive joint restraints, temporary blocking, bedding (No. 57 stone per County Utilities Manual Standards), testing, cleanup, removal and disposal of all unsuitable and excess material, replacement of grass, sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper operation of the waterline.

M. Items 36 and 37: ___-Inch Steel Casing Pipe by Jack and Bore or Microtunneling

1. Payment for furnishing and installing the specified diameter [either 24-inch or 30-inch diameter] steel casing pipe by jack and bore or microtunneling shall be made at the unit price provided per linear foot of steel casing pipe actually installed.

2. Measurements of lengths will be made horizontally, along the centerline of the encasement pipe.

3. The unit price provided per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing the specified diameter [either 20-inch or 30-inch] steel casing pipe including, but not limited to; pavement removal and replacement if required, excavation of jacking and receiving pits, storage and reuse of excavated materials, offsite disposal of unsuitable and excess excavated material, installation of
carrier pipe within steel casing pipe, making of joints, temporary blocking, testing, backfill and surface materials, including the replacement of gravel, asphalt, and concrete driveways, and seeding and mulching and all restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and any other incidental items required for the proper operation of the casing pipe and carrier pipe.

N. Item 38: 2” PVC Conduit

1. Payment for furnishing and installing 2” PVC conduit shall be made at the unit price provided per linear foot actually installed.

2. Measurements of lengths will be made horizontally, along the centerline of the conduit.

3. The unit price provided per linear foot shall include all labor, materials, tools, equipment and services for furnishing and installing the specified conduit.

O. Item 39: Construction Entrance

1. Payment for construction entrances shall be made at the unit price provided each of the construction entrances, complete in place.

2. No measurement shall be made for this item.

3. The unit price provided for construction entrances shall include all labor, materials, tools, equipment, and services for furnishing and installing the construction entrances including, but not limited to, maintenance and other incidental items required for proper operation of the construction entrance.

P. Item 40: Topsoil, Seeding, Fertilizing, and Mulch

1. Payment for furnishing and installing topsoil, seeding, fertilizing, and mulch shall be made at the unit price provided per acre of permanent seeding, fertilizing, and mulch installed, complete in place.

2. Measurement for acres of topsoil, seeding, fertilizing, and mulch shall be made along the centerline of the utility easement. The length shall then be multiplied by the combined widths of temporary and permanent sanitary sewer easements to obtain the area of topsoil shall be at unit price provided per acre of permanent seeding, fertilizing, and mulch installed, complete in place.

3. The unit price provided for each acre of topsoil, seeding, fertilizing, and mulch shall include all labor, materials, tools, equipment, and services for furnishing and installing topsoil, seeding, fertilizing, and mulch including, but not limited to; handling and placing of topsoil, fine grading, handling and placing of permanent seed, temporary seeding as required to stabilize disturbed areas, handling and placing of mulch and wetland seeding, handling and placing of fertilizer and lime, watering, testing and any other incidental items required for proper growth in the seeded area.

Q. Items 41: Outlet Protection (OP)
1. Payment for outlet protection shall be made at the unit price provided per each outlet protection constructed, complete in place.

2. No measurement is anticipated for this item.

3. The unit price provided for each outlet protection shall include all labor, materials, tools, equipment, and services for furnishing and installing the outlet protection including, but not limited to, maintenance and other incidental items required for proper operation of the outlet protection.

R. Item 42: Culvert Inlet Protection (CIP)

1. Payment for culvert inlet protection shall be made at the unit price provided each of the culvert inlet protection actually installed, complete in place.

2. No measurement shall be made for this item. Culvert Inlet Protection will be paid at 90% of the unit price provided, the remainder of the unit price (10%) will be paid upon removal and proper disposal of the culvert inlet protection measure.

3. The unit price provided for culvert inlet protection shall include all labor, materials, tools, equipment, and services for furnishing and installing and removal of the culvert inlet protection including, but not limited to, maintenance and other incidental items required for proper operation of the culvert inlet protection measure.

S. Items 43 and 44: Silt Fence and Safety Fence Complete, In-Place

1. Payment for furnishing, installing, maintaining and removing silt fencing and safety fencing shall be made at the respective unit price provided per linear foot for lengths of silt fencing and safety fencing actually installed and removed.

2. Measurement lengths shall be made horizontally, along the center of the fence. The actual length of the fence installed will be paid at 90% of the unit price provided, the remainder of the unit price (10%) will be paid upon removal and proper disposal of the fence.

3. The unit price provided per each linear foot of silt fence and safety fence shall include all labor, materials, tools, equipment, and services for installing, as well as removal and proper disposal of the fence including, but not limited to; excavation including rock if required, storage of excavated materials, backfill, installation of posts, installation of fence mesh, maintenance, replacement as required and any other incidental items required for the proper operation of the silt fencing and safety fencing.

T. Items 45 and 46: Stream Crossings

1. Payment for stream crossings shall be made at the respective unit price provided each of the stream crossings maintained, complete in place, and removed upon the completion of work.

2. No measurement shall be made for this item.

3. The unit price provided for stream crossing shall include all labor, materials, tools, equipment, and services for furnishing and installing the crossings including, but not
limited to, maintenance and other incidental items required for proper operation of each stream crossing, actually placed and removed.

U. Item 47: Riprap

1. Payment for furnishing and installing the riprap in accordance with Virginia Soil and Erosion Control standards shall be made at the unit price provided per square yard of riprap actually installed, complete in place.

2. Measurements of the square yard area will be made in the field for this item.

3. The unit price provided per each square yard of riprap shall include all labor, materials, tools, equipment, and services for its proper installation including, but not limited to; excavation including rock if required, placement of fabric and stone, and other incidental items required for proper operation of the riprap protection.

V. Item 48: Mobilization

1. Payment for the cost to mobilize labor, materials, tools, and equipment to perform the work shown on the Contract Drawings and specified in the Specifications shall be made at the lump sum cost for the item Mobilization.

2. No measurement shall be made for this item.

3. Lump sum cost for mobilization shall include such items as bonds, insurance, construction stakeout, equipment and labor mobilization, field office, progress photographs, project sign, permits, shop drawings, Contractor’s test pits, and other incidental items required prior to commencement of construction. Mobilization shall not exceed 5.0% of the total price bid. Application for maximum 50% payment of mobilization may be made on the first “Request for Payment”.

W. Items 49 and 50: Traffic Control and Site Clearing

1. Payment for all labor, materials, tools, and equipment to perform traffic control work and site clearing work as shown on the Contract Drawings and specified in the Specifications shall be made at the lump sum cost for the respective items Traffic Control and Site Clearing.

2. No measurement shall be made for these items.

3. Lump sum cost for traffic control shall include such items as drums, cones, flagmen, and other incidental items required to provide traffic control in accordance with VDOT standards. Lump sum cost for Site Clearing shall include such items as removal and disposal of vegetation, abandonment of structures where called for on the Plans, and other incidental items required to prepare the site and allow for the proper construction of specified improvements.

X. Item 51: Allowance for Testing and Lab Testing Services

1. Payment for Testing and Lab Testing Services shall be made up to the $10,000 allowance for Testing and Lab Testing actually performed.
2. No measurement shall be made for this item.

3. The allowance for a third party inspection, field testing, and lab testing performed shall include all labor, materials, tools, equipment and services for performing field compaction test and associated lab testing including, but not limited to; testing, cleanup, removal and disposal of all unsuitable material, replacement of sod, shrubs, backfill and surface materials, including the replacement of gravel, asphalt and concrete driveways, including restoration required to restore disturbed areas to a condition equal to or better than pre-construction conditions, and other incidental items required for the proper function and maintenance of the waterline.

Y. Contingency Item 54: Re-grade Gravel Road

1. Payment for the Contingency Item, Re-grade Gravel Road shall be made at the unit price bid per square foot of gravel road re-graded, complete in place, if and when authorized by the Engineer.

2. Measurement shall be made per square foot of re-graded gravel road installed, complete in-place.

3. The unit price bid for Re-grade Gravel Road shall include all labor, materials, tools, equipment, and services for furnishing and installing the 21-A Stone as shown on the plans to eliminate any holes and ridges and to provide a minimum 4” depth of stone within the stipulated area including, but not limited to, traffic control, clean up, maintenance, and other incidental items required for proper operation of the gravel road.

Z. Contingency Item 55: Over-excavation and Backfill with No. 57 Stone Aggregate

1. Payment for over-excavating and disposal of unsuitable material below the trench subgrade and furnishing and backfilling with additional VDOT No. 57 stone aggregate will be made at the unit price bid per ton. Measurement shall be made based upon approved (in writing by the Engineer or County) compacted material (in excess of normal requirements), in-place, actually installed, complete-in-place.

2. Measurement will be made in the field and witnessed by the Engineer; unwitnessed measurements will not be compensated.

3. The unit price bid per ton shall include all labor, materials, tools, equipment and services for over-excavation, furnishing and placing No. 57 Stone Aggregate including, but not limited to, disposal of unsuitable material, transportation, trench support, placing of select material, compaction, dewatering, and any other incidental item required for proper function and maintenance of the water and/or sewer lines.

1.5 PAYMENT FOR MATERIALS NOT INCORPOATED INTO THE WORK

A. Storage of Materials

1. Payment for equipment and materials stored on the site, or elsewhere as specified in the GENERAL CONDITIONS, and not actually incorporated in the work will be made on the basis of 90% of the amount of paid invoices submitted to the Engineer for incorporation in the monthly estimate.
B. Authorization for Payment

1. Payment will be authorized after the delivery to the construction site or other approved location and after being certified by the Engineer as being stored in conformance with the manufacturer’s recommendations and satisfactory evidence is provided that the items are as specified.

2. Title to all items of equipment and materials upon which payment has been made shall rest with the Owner and documents transferring title shall be executed by the Contractor. Transfer of ownership shall not relieve the Contractor of continuing insurance coverage and of protecting stored items against damage, deterioration, theft or loss of any kind.

3. Should materials or equipment become damage or be stored improperly or contrary to the manufacturer’s recommendations, being therefore subject to later damage, then the Engineer will reduce the next following monthly payment by an amount sufficient to repair or replace such units.

4. To initiate a request for partial payment the Contractor shall submit his request in writing to the Engineer with all necessary evidence.

5. Items of material or equipment to which partial payment applies includes and is limited to the following:
   a. Gravity Sanitary Sewer Pipe, Precast Concrete Manholes, Frames, and Covers
   b. Waterline Pipe, Tees, Bends, Butterfly Valves, and Gate Valves & Boxes
   c. Allowances as determined and directed by the engineer

ADDENDUM NO 3. Added two Pay Items, Wetland Shrubs and Wetland Tree Saplings (Item Nos. 52 and 53 respectively) which shall be measured by the number of each type of planting actually installed in accordance with the Nationwide Permit associated with this Project. The unit price provided for Wetland Shrubs and Wetland Tree Saplings shall include all labor, materials, tools, equipment, and services for furnishing and installing the planting per permit requirements.

END OF SECTION 01130
18' SANITARY SEWER AND 16' WATER LINE
PROPOSED STREAM CROSSING TO BE BUILT PERMANENT CULVERTS TO BE INSTALLED FOR CONSTRUCTION / MAINTENANCE ACCESS USING COUNTERCAMS AS NEEDED.
TEMPORARY TIMBER MATS TO BE INSTALLED DURING CONSTRUCTION FOR HISTORIC RESOURCE PROTECTION.
REvised LAKE BOTTOM UTILITY WETLAND IMPACT TABLE
NOTE: FIGURE = BORE DUGY / UNDERGROUND CONSTRUCTION AREA

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NOTE: Information above may be subject to site visit and use with other site impacts.

LAKE BOTTOM SEWER INTERCEPTOR OAKLEAN MUNICIPAL DISTRICT SPOTSYLVANA COUNTY, VIRGINIA WETLAND IMPACT TABLE

SEE LAKE BOTTOM SEWER INTERCEPTOR WETLAND JURISDICATIONAL AND IMPACT MAP, DATED JUNE 9, 2013 BY DEEMBERY & DAVIS, LLC. ALL WETLAND IMPACTS ASSOCIATED WITH UNDERGROUND SANITARY SEWER SHOWN, AUTHORIZED BY NAO 2008-2622.
ATTACHMENT D
REVISED Bid Form
IFB #20-09-EG
Lake Bottom Municipal Improvements Project

In compliance with this Invitation for Bid, Addenda and to all the Terms and Conditions imposed therein and hereby incorporated by reference, the authorized undersigned offers and agrees to furnish the goods/services at the price(s) indicated on the Bid Form, in accordance with this Signed Bid Form.

The signer of this bid form must be an authorized officer of the company.
(Please include any documentation of authority. For example, resolution of the board of directors, articles of incorporation, etc.)

Name and Address of Firm:

___________________________________________ Date:   _____________________________________________
___________________________________________ By:      _____________________________________________
(Signature In Ink)
___________________________________________ Name:  _____________________________________________
(Please Print)
___________________________________________ Zip Code: _________ Title:    _____________________________________________
EIN:_______________________________________       E-mail: ____________________________________________
Phone:  (_____)______________________________      Fax:  (_____)________________________________________
If Corporation or LLC, list State of Incorporation or Corporation:__________________________________________
Contractors License Number: _____________________________
Commonwealth of Virginia State Corporation Commission Number:____________________________________
D-U-N-S Number: _______________________________________

The named party hereby submits a bid in response to this Spotsylvania County IFB to furnish construction services and materials as described in the Specification and bid form to this IFB. The entire Bid form, including Response Statement, license certifications, and any supplemental materials required to be provided by the bidder pursuant to the terms and conditions of the IFB, constitute the entire bid submission.

The party hereby certifies that such bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion or communication or conference, with any person to fix the bid price or affiant or any bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against Spotsylvania County or any person interested in the proposed contract.

The party submitting the forgoing bid acknowledges the provisions, terms and conditions of this IFB including all attachments and addenda, and agrees to be bound by those provisions, terms and conditions. Further, the party certifies that all information submitted in response to this IFB is correct and true.

Receipt of the following Addenda are acknowledged:

Addendum No. ____________, dated ____________    Addendum No. ____________, dated ____________
Addendum No. ____________, dated ____________    Addendum No. ____________, dated ____________
Addendum No. ____________, dated ____________    Addendum No. ____________, dated ____________

(RETURN THIS FORM)
Response Statement

This Response Form is to be completed by the Bidder to more specifically describe and define the proposed services. Any deviations from the IFB specifications shall be stated on this form or attached to this form.

1. **Item Description**

   **Lake Bottom Municipal Improvements Project**

2. **Deviations from IFB Specifications**

   Sign here to confirm accuracy of Bid Form and conformity with provisions of IFB #20-09-EG

   Signature: _______________________________ Name of Firm: _______________________________

   (RETURN THIS FORM)
ATTACHMENT D
REVISED Bid Form
IFB #20-09-EG
Lake Bottom Municipal Improvements Project

A list of 3 References for which the Contractor has provided similar work over the last 5 years similar in Scope to that which is described herein shall be provided with the Bid Package. **Spotsylvania County cannot be listed as a reference.**

Please list references below:

Company Name:  _________________________
Address:   _________________________

Phone Number:  _________________________
Email Contact:          _________________________
Project Name:   _________________________
Location Address:  _________________________

Additional Information:          _________________________

Company Name:  _________________________
Address:   _________________________

Phone Number:  _________________________
Email Contact:          _________________________
Project Name:   _________________________
Location Address:  _________________________

Additional Information:          _________________________

Company Name:  _________________________
Address:   _________________________

Phone Number:  _________________________
Email Contact:          _________________________
Project Name:   _________________________
Location Address:  _________________________

Additional Information:        _________________________

**Sign here to confirm accuracy of Bid Form and conformity with provisions of IFB #20-09-EG**

Signature:_______________________________ Name of Firm:__________________________________

(RETURN THIS FORM)
ATTACHMENT D
REVISED Bid Form
IFB #20-09-EG
Lake Bottom Municipal Improvements Project

Provide construction services and materials to complete the Lake Bottom Municipal Improvements Project as described in the Spotsylvania County IFB #20-09-EG Specifications, and Construction Drawings.

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Name of Firm: ____________________________

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<td>Culvert Inlet Protection</td>
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<td>Riprap</td>
<td>SY</td>
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<td>395</td>
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<tr>
<td>53</td>
<td>Wetland Tree Saplings</td>
<td>Each</td>
<td>84</td>
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Name of Firm: _______________________

(RETURN THIS FORM)
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<td>55</td>
<td>CONTINGENCY Over-excavation and backfill w/No. 57 Stone Aggregate</td>
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**TOTAL BID PRICE = Items 1 through 55**

Sign here to confirm accuracy of Bid Form and conformity with provisions of IFB #20-09-EG

Signature: ____________________________  Name of Firm: ____________________________

(RETURN THIS FORM)
Lake Bottom Municipal Improvements
Spotsylvania County, Virginia

CLARIFICATION OF UNCLASSIFIED MATERIAL

Geotechnical investigations [attached herewith] have been performed and are provided to the Bidders for their use. Spotsylvania County does not warrant the existence or non-existence of rock material within the proposed utility trenches and/or within the jack & bore or micro-tunneling prism.

Bidders accept all risk and shall make no claims as to the nature of the material encountered during the installation of proposed infrastructure.
Mr. Rick Furnival, P.E.
SDI - Sullivan Donahoe & Ingalls, PC
10720 Columbia Drive
Fredericksburg, VA 22404

Re: Report of Subsurface Exploration and Geotechnical Engineering Analysis
Lake Bottom Sewer Interceptor
Spotsylvania County, Virginia
Project No. 4054

Dear Mr. Furnival:

Dominion Engineering Associates, Inc. (DEA) is pleased to present this report of our subsurface exploration and geotechnical engineering analysis for the proposed Lake Bottom Sewer Interceptor.

The following report describes the project characteristics, subsurface exploration, data obtained from the exploration, and our geotechnical evaluations and recommendations. Soil samples obtained from the study are stored in our Fredericksburg Soils Laboratory and will be discarded after 60 days unless you request otherwise.

We have enjoyed being of service to SDI during the design phases of this project. If you should have any questions regarding the information and recommendations contained in this report, or if we can be of further assistance, please do not hesitate to contact us.

Respectfully,
Dominion Engineering Associates, Inc.

Kevin L. Parris
President

Russell S. Harris, Jr.
Principal Engineer

Attachments:
Important Information About Your Geotechnical Engineering Report
Soil Classification Chart/Reference Notes for Boring Logs
Boring Location Diagram
S:\GEOTECHREPORTS\2011\4054 Lake Bottom Sewer
**Important Information About Your Geotechnical Engineering Report:**

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/ The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

**A Geotechnical Engineering Report Is Based On A Unique Set Of Project-Specific Factors:**

A geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include the general nature of the structure involved, its size and configuration; the location of the structure on the site and its orientation, physical concomitants such as access roads, parking lots, and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program. To help avoid costly problems consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting geotechnical engineer indicates otherwise, *your geotechnical engineer report should not be used:*

- When the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one.
- When the size or configuration of the proposed structure is altered.
- When the location or orientation of the proposed structure is modified.
- When there is change in ownership, or
- For application to an adjacent site.

*Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their report's development have changed.*
More Geotechnical "Findings" Are Professional Estimates:

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are extrapolated by geotechnical engineers who then render the option about overall subsurface conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no geotechnical engineer no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact. For this reason, most experienced owners retain their geotechnical consultants through the construction stage, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Subsurface Conditions Can Change:

Subsurface conditions may be modified by constantly changing natural forces. Because a geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, construction decisions should not be based on a geotechnical engineering report whose adequacy may have been affected by time. Speak with the geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

Geotechnical Services Are Performed For Specific Purposes And Persons:

Geotechnical engineers’ reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems. No individual other than the client
should apply this report for its intended purpose without first conferring with the geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.

**A Geotechnical Engineering Report Is Subject To Misinterpretation:**

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical engineers report. To help avoid these problems, the geotechnical engineer should be retained to work with other appropriate design professionals to explain relevant geotechnical findings and to review the adequacy of their plans and specifications relative to geotechnical issues.

**Boring Logs Should Not Be Separated From The Engineering Report:**

Final boring logs are developed by geotechnical engineers based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples. Only final boring logs customarily are included in geotechnical engineering reports. *These logs should not under any circumstances be redrawn* for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To minimize the likelihood of boring log misinterpretation, *give contractors ready access to the complete geotechnical engineering report* prepared or authorized for their use. Those who do not provide such access may proceed under the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes which aggravate them to disproportionate scale.

**Read Responsibility Clause Closely:**

Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical engineers. To help prevent this problem, geotechnical engineers have developed model clauses for use in written transmittals. These are *not* exculpatory clauses designed to foist geotechnical engineers' liabilities onto someone else. Rather they are definitive clauses which identify where
geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report and you are encouraged to read them closely. Your geotechnical engineer will be pleased to give full and frank answers to your questions.

**Other Steps You Can Take To Reduce Risks:**

Your consulting geotechnical engineer will be pleased to discuss other techniques which can be employed to mitigate risk. In addition ASFE has developed a variety of materials which may be beneficial. Contact ASFE for a complimentary copy of its publications directory.

Published By:

ASFE, The Association of Engineering Firms Practicing in the Geosciences
8811 Colesville Road/ Suite 0106/ Silver Springs, Maryland 20910
(301)-565-2733
Dominion Engineering Associates, Inc. (DEA) is pleased to present this report of our subsurface exploration and geotechnical engineering analysis for the proposed Lake Bottom Sewer Interceptor sanitary sewer in Spotsylvania County, Virginia. This letter report presents the findings of our subsurface exploration, evaluations, and recommendations regarding geotechnical-related design and construction considerations for the site.

Purpose

The purpose of our work was to explore the subsurface conditions in the areas of the proposed sanitary sewer, and to provide geotechnical recommendations for site work. Our findings of the exploration and recommendations are provided within this letter report.

Drilling Procedures

Dominion's fieldwork included drilling four (4) auger borings in areas related to the proposed sanitary sewer line with the approximate locations shown on the attached boring location diagram. DEA personnel used the site plan provided by SDI. SDI survey located borings B-1, B-3 and B-4. B-3 was moved approximately 50 feet east as the drillers could not access the surveyed location. B-2 was field located by DEA.

The soil borings were performed utilizing a CME-45 ATV-mounted drill rig. The borings were drilled using continuous-flight, solid-stem augers to advance the boreholes. The drill crews maintained a field log of the soils encountered in the borings. After recovery, each sample was removed from the sampler and visually classified. Representative portions of each sample were then sealed in glass jars and brought to our soils laboratory in Fredericksburg, Virginia for further visual observation and laboratory testing.

Soil samples were obtained by means of the split-barrel sampling procedure in accordance with ASTM Specification DI 586. In this procedure, a 2-inch outside diameter split-barrel sampler is driven into the soil a distance of 18 inches by a 140-pound hammer falling 30 inches. After an initial 6-inch seating interval, the number of blows required to drive the sampler through the next 12-inch interval is termed the N-value and is indicated for each sample on the boring logs. This value can be used as a qualitative indication of the in-place relative density of cohesionless soils. The N-value can be also used as an indication of the in-place consistency of cohesive soils. These indications are qualitative, since many factors such as drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies can affect the N-value and correlation between blow counts and strength and compressibility of soils.

Soil boring logs were prepared based on the field classification by the drillers and the visual classification within the laboratory of Dominion Engineering Associates, with final logs including soil classifications. Logs of the soil borings are attached to this report.
Subsurface Profile

In the Piedmont region, the boundary between soil and rock is not clearly defined. A transitional zone called Partially Weathered Rock (PWR) is normally found above the parent bedrock. For the purposes of this report, the transitional zone is further divided into the following groups:

**Highly Weathered:**
More than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a continuous framework or as corestones.

**Completely Weathered:**
All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.

**Residual Soil:**
All rock material is converted to soil. The mass structure and material fabric is destroyed.

PWR/rock is defined herein, for engineering purposes, as residual material with standard penetration resistance of 50 blows per 2 inches or greater, or auger refusal. Irregular patterns of differential weathering may also result in zones of rock and PWR embedded within the more completely weathered coarse-grained soils. Depending on the bedding orientation and degree of weathering, a track-hoe with rock teeth or a track hoe with a hoe ram should be able to remove these materials to the depths drilled and as shown at the respective borings. Removal with this type of equipment should be considered difficult excavation and detailed in the contract documents. Rock and partially weathered rock could require blasting in some instances.

Residual native soils were encountered at each boring location and consisted of loose to medium dense clayey Sand (SC), silty Sand (SM) and medium stiff to hard sandy Silt (ML) soils to boring termination depths. Auger refusal was not encountered in any borings. However, very dense/hard soil conditions that include Completely Weathered Rock/soil (See attached Boring Summary) was encountered in each boring, generally about 10 to 12 feet below existing grades except for boring B-3 where the completely weathered rock soils were not encountered until about 18 feet below existing grade. Rock coring was excluded from the scope of services for this report, so the competency and type of weathered rock/rock has not been determined.

Groundwater was not encountered in any of the borings except B-3. In boring B-3, groundwater was encountered at 5 feet below existing grades. Where the proposed utility passes through the lower areas (wetlands) of the easement, groundwater should be anticipated. Groundwater may also affect the stability of the excavated trenches. The Cave-In depth is noted on each boring log and most often is an indication of the presence of groundwater and/or perched groundwater.

Long-term water level readings were not obtained since borings were backfilled for safety reasons. The position of the groundwater table or perched water condition is anticipated to fluctuate depending on variability in the amount of precipitation, surface runoff, evaporation, and similar factors. Sometimes gray colorations in the soil samples suggest an indication of slow
internal drainage or perched water conditions that may occur during wet times of the year. It should be noted that if rock is blasted for removal, resultant fractures could relieve groundwater that could affect construction activities. The geotechnical engineer should be contacted during construction if groundwater is encountered to provide appropriate recommendations. Dewatering and on-site drainage should be the responsibility of the contractor.

**Recommendations**

Dominion Engineering Associates, Inc. (DEA) has completed a subsurface exploration and geotechnical engineering analysis for the proposed Lake Bottom Sewer Interceptor. If the proposed alignment is different than described within this report, we request the opportunity to review our recommendations in light of the new information and revise them, as necessary.

**Excavation into Dense Subsurface Conditions**

The soil borings encountered residual soils and completely weathered Rock at each location drilled as noted on the boring logs. Completely Weathered Rock was encountered at each boring location (see attached Boring Location Diagram). Utility excavations greater than 10 feet will most likely require heavy duty construction equipment.

For budget and planning purposes, we recommend a definition of rock be provided to the contractor. Two sample definitions of rock are provided below. A definition of rock should be stated in the contract with the contractor.

"Rock excavation for trenches and pits includes removal and disposal of materials and obstructions encountered that cannot be excavated with a track-mounted power excavator, equivalent to a Caterpillar Model No. 215C LC, rated not less than 115 HP flywheel power and 32,000-pound drawbar pull equipped with a short stick and a 42-inch wide, short tip radius rock bucket rated at 0.81 cubic yard (heaped) capacity. Trenches in excess of 10 ft in width and pits in excess of 30 ft in either length or width are classified as open excavation."

"Rock excavation in open excavations includes removal and disposal of materials and obstructions that cannot be dislodged and excavated with modem, track-mounted, heavy-duty excavating equipment without drilling or blasting. Rock excavation equipment is defined as Caterpillar Model No. 973 or equivalent track-mounted loader, rated at not less than 210 HP flywheel power and developing minimum of 45,000-pound breakout force (measured in accordance with SAE 1732). Typical materials classified as rock are boulders 1 cubic yard or more in volume, solid rock, rock in ledges, and rock-hard cementitious deposits. Intermittent drilling or blasting performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation."
Utility Subgrades

The exposed utility subgrades should be observed and evaluated by the Geotechnical Engineer. Any soft or yielding areas should be undercut and replaced with approved fill materials. Utilities should be bedded and backfilled on both sides of pipe in accordance with the pipe manufacturer's specifications as well as County requirements. Groundwater and/or perched groundwater may affect utility installation, particularly at the soil interface between weathered rock and/or hard soils. Dewatering and other onsite drainage controls should be the responsibility of the contractor.

Trench Excavations

Excavated trenches should adhere to OSHA safety guidelines (CFR 29) to include sloping, shoring, or shielding. Soils encountered during this investigation consisted of Type A, B, and C soils as defined by OSHA. Generally, from existing grades up to 10 feet, trenches could be subject to cave-in (Cave-In depths are noted on the boring logs). Appropriate safety precautions are the responsibility of the contractor. If the contractor is unsure of the soil Type, they should assume Type C, the least stable soil.

General Comments

This report has been prepared for SDI and Spotsylvania County to aid in the evaluation of the referenced project in Spotsylvania County, Virginia and to assist the civil engineer in the design of this project. The report has been prepared in accordance with generally acceptable geotechnical engineering practices and no other warranties, either expressed or implied, are made.

The scope is limited to the specific project and locations described herein and our description of the project represents our understanding of the significant aspects relative to soil and foundation characteristics. In the event that any changes in the nature or location of the proposed construction or loading outlined in this report are planned, we should be informed so that the changes can be reviewed and the conclusions of this report modified or approved in writing by the geotechnical engineer.

It is recommended that all construction operations dealing with earthwork and foundations be reviewed by an experienced geotechnical engineer to provide information as to whether the design requirements are fulfilled in the actual construction. We also welcome the opportunity to provide field construction services for you during construction.

The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings and tests performed at the locations as indicated on the Boring Location
Diagram and other information referenced in this report. This report does not reflect any variations that may occur between the borings. In the performance of the subsurface exploration, specific information is obtained at specific locations at specific times. However, variations in soil conditions exist on most sites between boring locations and also such situations as groundwater levels vary from time to time. The nature and extent of variations may not become evident until the course of construction. If site conditions vary from those identified during the explorations, the recommendations contained in this report may require revision.
# Soil Classification Chart

## Major Divisions

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<thead>
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<th>Gravel and Gravelly Soils</th>
<th>Graph Leiter</th>
<th>Typical Descriptions</th>
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<tr>
<td>Clean Gravels (little or no fines)</td>
<td>GW</td>
<td>Well-graded gravels, gravel-sand mixtures, little or no fines</td>
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<tr>
<td>Gravels with Fines (appreciable amount of fines)</td>
<td>GP</td>
<td>Poorly-graded gravels, gravel-sand mixtures, little or no fines</td>
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<tr>
<td>Silty Gravels, Gravel-sand mixtures, little or no fines</td>
<td>GM</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
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<tr>
<td>Clayey Gravels, gravel-sand-clay mixtures</td>
<td>GC</td>
<td>Clayey gravels, gravel-sand-clay mixtures</td>
</tr>
<tr>
<td>Clean Sands (little or no fines)</td>
<td>SW</td>
<td>Well-graded sands, gravelly sands, little or no fines</td>
</tr>
<tr>
<td>Silty Sands, sand-silt mixtures</td>
<td>SP</td>
<td>Poorly-graded sands, gravelly sand, little or no fines</td>
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<td>Clayey Sands, sand-clay mixtures</td>
<td>SM</td>
<td>Silty sands, sand-silt mixtures</td>
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<tr>
<td>INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY</td>
<td>ML</td>
<td>Clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays</td>
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<td>INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS</td>
<td>CL</td>
<td>Organic silts and organic silty clays of low plasticity</td>
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<tr>
<td>INORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS</td>
<td>OL</td>
<td>Organic silts and organic silty clays of medium to high plasticity</td>
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<tr>
<td>INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS</td>
<td>MH</td>
<td>Organic clays of high plasticity</td>
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<tr>
<td>INORGANIC CLAYS OF HIGH PLASTICITY</td>
<td>CH</td>
<td>Organic clays of medium to high plasticity, organic silts</td>
</tr>
<tr>
<td>ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS</td>
<td>OH</td>
<td>Highly organic soils</td>
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<tr>
<td>PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS</td>
<td>PT</td>
<td>Note: Dual symbols are used to indicate borderline soil classifications</td>
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</table>
Reference Notes for Boring Logs/Test Pits

I. Drilling and Sampling Symbols:

**SS** - Split Spoon Sampler  
**ST** - Shelby Tube Sampler  
**RC** - Rock Core: NX, BX, AX  
**PM** - Pressuremeter  
**DC** - Dutch Cone Penetrometer  
**RB** - Rock Bit Drilling  
**BS** - Bulk Sample of Cuttings  
**PA** - Power Auger (no sample)  
**HAS** - Hollow Stem Auger  
**WS** - Wash Sample  

Standard Penetration (Blows/Ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2-inch O.D. split spoon sampler, as specified in ASTM D-1586. The blow count is commonly referred to as the N-value.

II. Correlation of Penetration Resistances to Soil Properties:

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<tr>
<td>0-4</td>
<td>Very loose</td>
<td>&lt;2 Very soft</td>
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<tr>
<td>5 - 10</td>
<td>Loose</td>
<td>2-4 Soft</td>
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<tr>
<td>11 - 30</td>
<td>Medium dense</td>
<td>5-8 Medium stiff</td>
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<tr>
<td>31 - 50</td>
<td>Dense</td>
<td>9-15 Stiff</td>
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<tr>
<td>51 andover</td>
<td>Very dense</td>
<td>16-30 Very Stiff</td>
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<td>31 and greater</td>
<td>Hard</td>
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III. Unified Soil Classification Symbols: Reference ASTM D2488

| GP    | Poorly Graded Gravel | SC    | Clayey Sand |
| GW    | Well-Graded Gravel   | ML    | Low Plasticity Silt |
| GM    | Silty Gravel         | MH    | High Plasticity Silt |
| GC    | Clayey Gravel        | CL    | Low Plasticity Clay |
| SP    | Poorly Graded Sand   | CH    | High Plasticity Clay |
| SW    | Well-Graded Sand     | OL    | Low Plasticity Organic Soil |
| SM    | Silty Sand           | OH    | High Plasticity Organic Soil |

IV Water Level Measurement Symbols:

| WL    | Water Level         | BCR   | Before Casing Removal |
| WS    | While Sampling      | ACR   | After Casing Removal  |
| WD    | While Drilling      | WCI   | Wet Cave In          |
|       |                    | DCI   | Dry Cave In          |

The water levels are those water levels actually measured at the time of the exploration after cave-in has occurred (removing auger bits from borehole) in the borehole/test pit exploration indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils, but fine grained soils may require several days, or even longer, for the water levels to stabilize. The position of the ground water table or perched water condition is anticipated to fluctuate depending on variability in the amount of precipitation, surface runoff, evaporation, and similar factors. To obtain accurate water level readings, a water observation well would need to be installed to measure the ground water levels over a period of time, typically this is beyond the scope of services provided by a geotechnical exploration.
**BORING NUMBER B-1**

**PROJECT NAME** Lake Bottom Sewer Interceptor  
**PROJECT LOCATION** Spotsylvania County, Virginia

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<tr>
<td>LOGGED BY</td>
<td>Kevin Parris</td>
</tr>
<tr>
<td>CHECKED BY</td>
<td>Russell Harris</td>
</tr>
</tbody>
</table>

**GROUND WATER LEVELS:**

<table>
<thead>
<tr>
<th>AT TIME OF DRILLING</th>
<th>Orv</th>
</tr>
</thead>
</table>

**AT END OF DRILLING:**

**NOTES**

Cave-In Depth: 10.2 ft

---

**MATERIAL DESCRIPTION**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Medium dense to very loose, Brown and orangish brown silty fine to medium sand (SM) with fine to medium gravel, Moist.</td>
</tr>
<tr>
<td>5</td>
<td>Medium dense, Gray fine to medium poorly graded sand (SP), trace silt, Moist.</td>
</tr>
<tr>
<td>10</td>
<td>Very dense, Tannish gray fine to medium silty sand (SM) with mica, Moist.</td>
</tr>
</tbody>
</table>

**FOOTING PILES**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Completely Weathered Rock - Difficult Excavation</td>
</tr>
</tbody>
</table>

**Bottom of hole at 18.0 feet.**
Boring Number B-2

PROJECT NAME: Lake Bottom Sewer Interceptor
PROJECT LOCATION: Spotsylvania County, Virginia

DATE STARTED: 1/31/91 - COMPLETED: 1/30/91

GROUND ELEVATION: 6'

HOLE SIZE: 6'

GROUND WATER LEVELS:
'SI AT TIME OF DRILLING: 8.5' - 'ft' -
'AT END OF DRILLING: 7.0' - 'ft' -

MATERIAL DESCRIPTION:

Loose, Grayish brown clayey fine to medium Sand (SC) trace mica, Moist.

Stiff to hard. Brownish gray sandy Silt (ML) with mica, Moist.

Weathered Rock from 8.5 to 9.5 feet

Hard, Greenish gray and dark orangish brown fine sandy Silt (ML) with mica, Moist.

Completely Weathered Rock - Difficult Excavation
No Driller Refusal

Bottom of hole at 20.0 feet.
Boring Number B-3

Client: Sullivan Donahoe Ingalls

Project Name: Lake Bottom Sewer Interceptor

Project Number: 4054

Project Location: Spotsylvania County, Virginia

Date Started: 1/31/11

Completed: 1/31/11

Ground Elevation: HOLE SIZE 6

Ground Water Levels:

At Time of Drilling: 5.0 ft

At End of Drilling --

Notes:

Cave-In Depth: 2.0 ft

Drilling Contractor: Connelly Drilling

Drilling Method: Hollow Stem Auger

Logged By: Kevin Parris

Checked By: Russell Harris

Drilling Contractor: Connelly Drilling

Drilling Method: Hollow Stem Auger

Log Sheet:

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Topsoil</td>
</tr>
<tr>
<td></td>
<td>Loose, Brown and orangish brown, clayey fine to medium sand (SC) with fine to coarse gravel. Moist.</td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very loose, Gray silty fine to medium Sand (SM), Wet.</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loose, Gray silty fine to medium Sand (SM) with medium to coarse gravel, Wet.</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stiff to Hard, Greenish gray fine sandy Silt (ML) with mica, Moist. Completely Weathered Rock - Difficult Excavation</td>
</tr>
<tr>
<td></td>
<td>No Driller Refusal</td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottom of hole at 20.0 feet.</td>
</tr>
</tbody>
</table>

Bottom of hole at 20.0 feet.
**BORING NUMBER B-4**

**PROJECT NAME** Lake Bottom Sewer Interceptor

**PROJECT LOCATION** Spotsylvania County, Virginia

**GROUNDS ELEVATION**

**GROUND WATER LEVELS:**

<table>
<thead>
<tr>
<th>AT TIME OF DRILLING</th>
<th>D'itre:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PL</td>
</tr>
<tr>
<td></td>
<td>MC</td>
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<td></td>
<td>LL</td>
</tr>
</tbody>
</table>

**AFTER DRILLING**

<table>
<thead>
<tr>
<th>MATERIAL DESCRIPTION</th>
<th>A SPT N VALUE A</th>
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<tbody>
<tr>
<td>Topsoil</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Stiff, Orange and brown fine sandy Silt (ML) trace organics, Moist.</td>
<td></td>
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<tr>
<td></td>
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<td>FILL</td>
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</tr>
<tr>
<td>Medium stiff, Gray and dull orange fine sandy Fat Clay (CH), Moist.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible Fill</td>
<td></td>
</tr>
<tr>
<td>Stiff to very stiff. Orange and tan fine sandy Silt (ML), Moist.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES** Cave-In Depth: 13.4 ft

**DATE STARTED** 1/31/11  **COMPLETED** 1/31/11

**DRILLING CONTRACTOR** Dominion Engineering Associates, Inc.

**LOGGED BY** Kevin Parris  **CHECKED BY** Russell Harris

**PROJECT NUMBER** 4054

**DATE STARTED** 1/31/11  **COMPLETED** 1/31/11

**GROUNDS ELEVATION**

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**DRILLING CONTRACTOR** Dominion Engineering Associates, Inc.

**LOGGED BY** Kevin Parris  **CHECKED BY** Russell Harris

**PROJECT NUMBER** 4054

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**LOGGED BY** Kevin Parris  **CHECKED BY** Russell Harris

**PROJECT NUMBER** 4054

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**NOTES** Cave-In Depth: 13.4 ft

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**DRILLING CONTRACTOR** Dominion Engineering Associates, Inc.

**LOGGED BY** Kevin Parris  **CHECKED BY** Russell Harris

**PROJECT NUMBER** 4054

**DATE STARTED** 1/31/11  **COMPLETED** 1/31/11

**GROUNDS ELEVATION**

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</table>

**NOTES** Cave-In Depth: 13.4 ft

**DATE STARTED** 1/31/11  **COMPLETED** 1/31/11

**DRILLING CONTRACTOR** Dominion Engineering Associates, Inc.

**LOGGED BY** Kevin Parris  **CHECKED BY** Russell Harris

**PROJECT NUMBER** 4054

**DATE STARTED** 1/31/11  **COMPLETED** 1/31/11
© B-4 Performed at Pump Station
(Not on this Plan)

Not to Scale

Source:
SDI
Schematic Plan

Boring Location Diagram
Lake Bottom Sewer Interceptor
DEA Project No 4054
Spotsylvania County, VA
February 9, 2011
Mr. Kevin Northridge  
Sullivan, Donahoe & Ingalls, PC  
10720 Columbia Drive  
P.O. Box 614  
Fredericksburg, Virginia 22404  

Re: Subsurface Exploration  
Lake Bottom Municipal Improvements  
Water Booster Pump Station  
Spotsylvania County, Virginia  
(DEA Project No. 7054)  

Dear Mr. Northridge:

Dominion Engineering Associates, Inc. (DEA) has completed the requested subsurface exploration for the proposed water booster pump station associated with the Lake Bottom Municipal Improvements, off of Brock Road, in Spotsylvania County, Virginia. The attached Boring Logs depict the general soil profile at each boring location along with the groundwater conditions observed during the drilling operations. The approximate boring locations, plotted on the Lake Bottom Municipal Improvements 16' Water Line and 12” Water Lines "A" and "B", dated July 8, 2015, are also attached.

DEA's fieldwork included drilling of two (2) hollow stem auger/Standard Penetration Test (SPT) borings (B-1 through B-2) at the project site in June of 2019. The borings were performed in the general area of the proposed improvements associated with the proposed water booster pump station. A stake was placed in the field by a survey team from Sullivan Donahoe and Ingalls, PC (SDI) in the area of the pump station and the borings performed at 15 ft offsets from the stake. The borings were drilled to depths on the order of 15 ft below existing grades. The attached BLD depicts the approximate boring location on the above referenced SDI plan.

The soil borings for the current study were performed by SRM Drilling, Inc. utilizing a Diedrich D-50 ATV-mounted drill rig. The borings were drilled using continuous-flight, hollow-stem augers to advance the boreholes. The drill crews maintained a field log of the soils encountered in the borings. After recovery, each sample was removed from the sampler and visually classified. Representative portions of each sample were then sealed in glass jars and brought to our soils laboratory in Fredericksburg, Virginia for further visual observation and laboratory testing.

Machine boring soil samples were obtained by means of the split-barrel sampling procedure in accordance with ASTM Specification D1 586. In this procedure, a 2-inch outside diameter split-barrel sampler is driven into the soil a minimum distance of 18 inches by a 140-pound hammer falling 30 inches. After an initial 6-inch seating interval, the number of blows required to drive the sampler through the next 12-inch interval is termed the N-value and is indicated for each sample on the boring logs. This value can be used as a qualitative indication of the in-place relative density of cohesionless soils. The N-value can be also used as an indication of the in-place consistency of cohesive soils. These indications are qualitative, since many factors such as drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies can affect the N-value and correlation between blow counts and strength and compressibility of soils.
Soil boring logs for the DEA borings were prepared based on the field classification by the drillers and the visual classification within the laboratory of Dominion Engineering Associates, with final logs including soil classifications. Logs of the soil borings are attached to this report.

Limitations

This letter and attached information has been prepared for SDI and Spotsylvania County to aid the civil engineer in the design of this project and the County for construction of the project. The subsurface exploration and attached Boring Logs have been prepared in accordance with generally acceptable geotechnical engineering practices and no other warranties, either expressed or implied, are made.

The scope is limited to the specific project and locations described herein. It is recommended that all construction operations dealing with earthwork be reviewed by an experienced geotechnical engineer to provide information as to whether the design requirements are fulfilled in the actual construction. We also welcome the opportunity to provide field construction services for you during construction.

This information presented on the attached Boring Logs does not reflect any variations that may occur between the borings. In the performance of the subsurface exploration, specific information is obtained at specific locations at specific times. However, it should be understood that variations in soil conditions exist on most sites between boring locations and also such situations as groundwater levels vary from time to time. The nature and extent of variations may not become evident until the course of construction. If site conditions vary from those identified during the explorations, the recommendations contained in this report may require revision.

Dominion Engineering Associates appreciates the opportunity to be of service to you on this project. Should you have any questions, or require further assistance, please contact our office.

Respectfully:

Dominion Engineering Associates, Inc.

[Signature]

William T. Griffith, ill, C.P.G.
Senior Project Geologist

CC: Mr. Rick Furnival, P.E.-SDI

Attachment: Soil Classification Chart
Reference Notes for Boring Logs
Boring Logs (B-1 through B-2)
Boring Location Plans
HIGHLY ORGANIC SOILS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS
Reference Notes for Boring Logs/Test Pits

I. Drilling and Sampling Symbols:

SS – Split Spoon Sampler
ST - Shelby Tube Sampler
RC – Rock Core: NQ, NX, BX, AX
PM - Pressuremeter
DC – Dutch Cone Penetrometer

RB – Rock Bit Drilling
BS – Bulk Sample of Cuttings
PA – Power Auger (no sample)
HSA – Hollow Stem Auger
WS – Wash Sample

Standard Penetration (Blows/Ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2-inch O.D. split spoon sampler, as specified in ASTM D-1586. The blow count is commonly referred to as the N-value.

II. Correlation of Penetration Resistances to Soil Properties:

<table>
<thead>
<tr>
<th>SPT-N</th>
<th>Descriptive Term</th>
<th>SPT-N</th>
<th>Description of Consistency</th>
<th>Unconfined Compressive Strength, Qp, psf</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 4</td>
<td>Very loose</td>
<td>&lt; 2</td>
<td>Very soft</td>
<td>Less than 250</td>
</tr>
<tr>
<td>5 - 10</td>
<td>Loose</td>
<td>2 – 4</td>
<td>Soft</td>
<td>250-500</td>
</tr>
<tr>
<td>11 - 30</td>
<td>Medium dense</td>
<td>5 – 8</td>
<td>Medium stiff</td>
<td>500-1000</td>
</tr>
<tr>
<td>31 - 50</td>
<td>Dense</td>
<td>9 – 15</td>
<td>Stiff</td>
<td>1000-2000</td>
</tr>
<tr>
<td>51 and over</td>
<td>Very dense</td>
<td>16 – 30</td>
<td>Very Stiff</td>
<td>2000-4000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31 and greater</td>
<td>Hard</td>
<td>4000+</td>
</tr>
</tbody>
</table>

III. Unified Soil Classification Symbols: Reference ASTM D2488

GP Poorly Graded Gravel
GW Well-Graded Gravel
GM Silty Gravel
GC Clayey Gravel
SP Poorly Graded Sand
SW Well-Graded Sand
SM Silty Sand
SC Clayey Sand
ML Low Plasticity Silt
MH High Plasticity Silt
CL Low Plasticity Clay
CH High Plasticity Clay
OL Low Plasticity Organic Soil
OH High Plasticity Organic Soil

IV. Water Level Measurement Symbols:

WL Water Level
WS While Sampling
WD While Drilling

BCR Before Casing Removal
ACR After Casing Removal
WCI Wet Cave In
DCI Dry Cave In

The water levels are those water levels actually measured at the time of the exploration after cave-in has occurred (removing auger bits from borehole) in the borehole/test pit exploration indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils, but fine grained soils may require several days, or even longer, for the water levels to stabilize. The position of the ground water table or perched water condition is anticipated to fluctuate depending on variability in the amount of precipitation, surface runoff, evaporation, and similar factors. To obtain accurate water level readings, a water observation well would need to be installed to measure the ground water levels over a period of time, typically this is beyond the scope of services provided by a geotechnical exploration.
### Project Details

**Client:** Spotsylvania County  
**Project Name:** Lake Bottom Water Booster  
**Project Number:** 7054  
**Project Location:** Spotsylvania County, Virginia  
**Date Started:** 6/3/19  
**Completed:** 6/3/19  
**Ground Elevation:**  
**Hole Size:** 2.25"  
**Drilling Contractor:** SRM Drilling  
**Ground Water Levels:**  
**Logging:** Matthew Kline  
**Checked by:** Bill Griffith  
**Notes:** Cave In 12.6 Feet

### Drilling Log

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>Blow Counts (in Value)</th>
<th>Pocket Pen. (tsf)</th>
<th>Dry Unit Wt. (pcf)</th>
<th>SPT N Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4 Inches of Topsoil</td>
<td>SS 1</td>
<td>67</td>
<td>6-8-14 (22)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very Stiff, Brown, Sandy Lean CLAY (CL), Trace Gravel and Mica, Contains Root Fragments, Moist</td>
<td>SS 2</td>
<td>100</td>
<td>10-6-7 (13)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stiff, Grayish Brown, Sandy Lean CLAY (CL), Trace Gravel and Mica, Contains Root Fragments, Moist</td>
<td>SS 3</td>
<td>100</td>
<td>4-6-13 (19)</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>Very Stiff, Dark Gray, Micaceous, Sandy SILT (ML), Trace Gravel, Moist</td>
<td>SS 4</td>
<td>56</td>
<td>8-9-10 (19)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>SS 5</td>
<td>100</td>
<td>8-9-12 (21)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bottom of hole at 15.0 feet.
CLIENT: Spotsylvania County

PROJECT NUMBER: 7054

DATE STARTED: 6/3/19

DATE COMPLETED: 6/3/19

GROUND ELEVATION: 0

HOLE SIZE: 2.25"

DEA Inc
8511 Indian Hills Ct Suite 202
Fredericksburg, Va 22407
Telephone: 540-710-9339

PROJECT NAME: Lake Bottom Water Booster

PROJECT LOCATION: Spotsylvania County, Virginia

DRILLING CONTRACTOR: SRM Drilling

GROUND WATER LEVELS:

DRILLING METHOD: Hollow Stem Auger

LOGGED BY: Matthew Kline

CHECKED BY: Bill Griffith

NOTES: Cave in 12.3 Feet

---

GRAPHLIC BORING LOG

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>GRAPHIC CLOG</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>RECOVERY %</th>
<th>BLOW COUNTS (NVERAGE)</th>
<th>POCKET PEN.</th>
<th>DRY UNIT WT. (pcf)</th>
<th>▲SPT N VALUE▲</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>4 Inches of Topsoil</td>
<td>SS 1</td>
<td>89</td>
<td>3-4.5</td>
<td>DRY</td>
<td>20 40 60 80</td>
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<tr>
<td>5</td>
<td></td>
<td>Stiff, Brown, Sandy SILT (ML), Trace Gravel and Mica, Contains Root Fragments, Moist</td>
<td>SS 2</td>
<td>100</td>
<td>6-6.7</td>
<td>DRY</td>
<td>20 40 60 80</td>
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<tr>
<td>10</td>
<td></td>
<td>Medium Dense, Grayish Brown, Clayey SAND (SC), With Gravel, Trace Mica, Moist</td>
<td>SS 3</td>
<td>33</td>
<td>6-5.6</td>
<td>DRY</td>
<td>20 40 60 80</td>
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</tr>
<tr>
<td>15</td>
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<td>Hard, Dark Gray, Micaceous, Sandy SILT (ML), With Gravel, Moist</td>
<td>SS 4</td>
<td>100</td>
<td>10-16-20</td>
<td>DRY</td>
<td>20 40 60 80</td>
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<tr>
<td>15</td>
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<td>SS 5</td>
<td>100</td>
<td>19-29-40</td>
<td>DRY</td>
<td>20 40 60 80</td>
<td></td>
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</tbody>
</table>

Bottom of hole at 15.0 feet.
Not to Scale

Source:
Lake Bottom Municipal Improvements
16” Water Line and 12” Water Lines “A” and “B”
Sullivan, Donahoe & Ingalls
July 9, 2015

Boring Location Diagram
LAKE BOTTOM WATER BOOSTER PUMP STATION
DEA Project No. 7054
JUNE 12, 2019
LAKE BOTTOM SEWER INTERCEPTOR
WETLAND JURISDICTIONAL AND IMPACT MAP

CHANCELLOR MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

ENGINEER: Dewberry & Davis LLC
13573 HEATHCOTE BLVD.
GAINESVILLE, VA 20155
PHONE: 703.468.2211
FAX: 703.468.2212

PROPERTY OWNERS:
BASHEER-EDGEMORE-WHITEHALL, L.L.C.
2071 CHAIN BRIDGE ROAD, SUITE 510
VIENNA, VIRGINIA 22182
PHONE: (703) 849-8700
FAX: (703) 849-8760
CONTACT: MARK FIELDS

UNITED STATES OF AMERICA
NATIONAL PARK SERVICE

UTILITY OWNER:
SPOTSYLVANIA COUNTY
UTILITIES DEPARTMENT
600 HUDGINS ROAD
FREDERICKSBURG, VIRGINIA 22406-4147
PHONE: (540) 507-7300
CONTACT: BRENT ELAM

REVIEW NOTE: THIS PLAN, LAKE BOTTOM SEWER INTERCEPTOR - WETLAND JURISDICTIONAL AND IMPACT MAP, DATED DECEMBER 22, 2009, WAS ORIGINALLY SUBMITTED TO THE CORPS OF ENGINEERS FOR REVIEW AND COMMENT UNDER THE PLAN TITLE, LAKE BOTTOM SEWER INTERCEPTOR - UTILITY IMPROVEMENTS PLAN, DATED AUGUST 4, 2006. THE ORIGINAL SUBMISSION REVIEW GENERATED COMMENTS FROM THE CORPS OF ENGINEERS TO SPOTSYLVANIA COUNTY DATED MAY 7, 2009 (REF. AECOM PROJECT NUMBER 60091435) AS SIGNED BY A. SCOTT MCDOWELL, AECOM-WATER.

PLAN DATE: FEBRUARY 17, 2010
REVISED: JUNE 9, 2010

SHEET 1 OF 6
SHEET 4: STATION 10420 + 3745
SHEET 5: STATION 3745 + 6845
SHEET 6: STATION 6845 + 1645

MAN EX-243