Washington County
MARYLAND
PURCHASING DEPARTMENT
DIVISION OF BUDGET & FINANCE

PUR-1270
ADDENDUM NO. 1
INVITATION TO BID

CONOCOCHEAGUE TREATMENT PLANT ENR UPGRADE

DATE: Wednesday, April 6, 2016 **BIDS DUE: Wednesday, May 4, 2016**
(Revised due date – Addendum No. 1) **2:00 P.M.**

To Bidders:

This Addendum is hereby made a part of the Contract Documents on which all bids will be based and is issued to correct and clarify the original documents.

Please acknowledge receipt of this Addendum at the appropriate space on the Proposal Form. This Addendum consists of two (2) pages and two (2) attachments: (1) the Pre-Bid Conference Sign-In Sheets and (2) the Geotechnical Report.

NOTE: All bidders must enter the County Administration Building through the front door, 100 West Washington Street entrance, and must use the elevator to access the Purchasing Department to submit their bid. Alternate routes are now controlled by a door access system.

ITEM NO. 1: *Inquiry*: What is the estimated cost of the project?

Response: The Engineer's estimate is $25 million.

ITEM NO. 2: *Inquiry*: We request that a copy of the Conococheague Treatment Plant ENR Upgrade Pre-Bid Conference Sign-In sheet be issued by addendum.

Response: Please see the Pre-Bid Conference Sign-In Sheets attached.

ITEM NO. 3: The Geotechnical Report was inadvertently omitted from the original bid documents. It has been included as an attachment to this addendum.

ITEM NO. 4: All references in the bid document made to the bid submission deadline and bid opening time shall be changed to read **No later than 2:00 P.M., (EDST), Wednesday, May 4, 2016.**

***(NOTE:** The wording of all "Inquiries" submitted are displayed exactly as received.)*

ITEM NO. 5: A subsequent Addendum shall be issued with responses to questions and with additional information.

BY AUTHORITY OF:

Karen R. Luther, CPPO
Director of Purchasing

***(NOTE:** The wording of all "Inquiries" submitted are displayed exactly as received.)*

PUR-1270

Friday, April 1, 2016
10:30 A.M.

Pre-Bid Conference
CONOCOCHEAGUE WATER TREATMENT PLANT ENR UPGRADE

Representative's Name/E-mail *(Please Print)*	Company / County Dept.	Address City, State, Zip	Phone	Fax
Name Rick Curry E-mail rcurry@washco-md.net	Washington County Purchasing Department	100 West Washington Street, Rm. 320 Hagerstown, MD 21740	240-313-2330	240-313-2331
Name JOHN LARHOLE E-mail JLARHOLE@BH-BA.COM	BUCHART HORN	445 W. PHILADELPHIA ST YORK, PA. 17405	717-852-1410	717-852-1615
Name KEVIN NASH E-mail KNASH@RKK.COM	RK+K	81 MOSHER ST BALT. MD 21217	410 728 2900	
Name Jeffrey Carlton E-mail	Buchart Horn	445 W Philadelphia St York, PA 17405	717 852-1455	717.852-1615
Name DAN DiNITO E-mail DDINITO@WASHCO-MD.NET	WASHCO	—	240-313-2600	240-313-2601
Name John Reese E-mail johnreese@ugcontractors.com	Underground Contractors, Inc.	501 Sixth Ave St. Albans, WV 25177	304-722-4238 304-725-1987	304-722-4230
Name Troy E Cosner E-mail henrike@pactconstruction.com	Pact Two LLC	P.O. Box 74 Ringoes NJ 08551	908-788-1985	908-788-5780
Name Sam Merrell E-mail sam@bearingconstruction.net	Bearing Construction Inc	805 Shine Smith Rd. Sudlersville Md. 21668	410 556 6100	410 556 6574
Name George Bauer E-mail George b@AMESINC.COM	Ames, Inc	8918 Herrmann Dr. Columbia, MD 21045	301.621-8899 x 161	410.381.5760
Name Hart Showalter E-mail hart.showalter@ferguson.com	Ferguson Waterworks	625 McGhee Rd. Winchester, Va 22603	703-898-5334	540-667-6822

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Pre-Bid Conference
CONOCOCHEAGUE WATER TREATMENT PLANT ENR UPGRADE

Representative's Name/E-mail *(Please Print)*	Company / County Dept.	Address City, State, Zip	Phone	Fax
Name DAN McMANUS E-mail drco@adamsrobinson.com	ADAMS ROBINSON	2735 NEEDMORE RD. DAYTON, OH 45414	937-274 5318	937-274 0836
Name Karl Rice E-mail krice@quandel.com	Quandel Const.	3003 North Front St. Harrisburg, PA 17110	(717) 657 0909	(717) 652 6282
Name JEREMY PALMER E-mail JCpalmer@myactv.net	ANTIETAM ELECTRIC	16290 SPIELMAN ROAD WILLIAMSPORT MD 21795	301-223-1152	301-223-1155
Name David Bourdeau E-mail dbourdeau@ullmerschutte.com	Ullmer Schutte	7615 Standish Pl. Rockville, MD 20855	202-489-5627	301-545-0750 Call for FAX
Name NATE LEYBURN E-mail NLEYBURN@CHESEQUIP.com	CHESAPEAKE ENVIRONMENTAL EQUIPMENT	PO Box 790 FOREST HILL, MD 21050	443-993-3007	
Name Dean Fulk E-mail HFulk@wesco.com	wesco Dist.	221 S. 10TH St. Lemoyne Pa.	717-901-9372	
Name DAN COFFEE E-mail dcoffee@WESCO.com	WESCO DIST. INC.	221A S 10th Street Lemoyne PA 17043	717-622-1232	717-901-3965
Name William Smith E-mail w.smith@ke4llc.com	Kershner Environmental	206 Business Center Dr. Reisterstown MD 21136	410-581-0555	410-510-1700
Name MARK P SALAK E-mail MSALAK@QUANDEL.com	QUANDEL CONSTRUCTION	3003 NORTH FRONT STREET HARRISBURG PA 17112	(717) 657-0909	(717) 652-6282
Name Brian Mickatavage E-mail bmickatavage@quandel.com	Quandel Const.	3003 N. Front St. Harrisburg, PA 17112	7176570909	717652 6282

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Pre-Bid Conference
CONOCOCHEAGUE WATER TREATMENT PLANT ENR UPGRADE

Representative's Name/E-mail *(Please Print)*	Company / County Dept.	Address City, State, Zip	Phone	Fax
Name Terry Eshbach E-mail EshbachTJ@WickCon.com	Wickersham Const.	777 E. Ross St. Lancaster, Pa 17602	717-397-8282	717-397-5826
Name Bob Andryszak E-mail randryszak@rkk.com	RK&K	81 Mosher St. Baltimore, MD 21217	410-728-2900	410-728-2992
Name RANDY JOHNSON E-mail rjohnson@hriinc.com	HRI	1750 W. College Ave STATE COLLEGE, PA 16801	814-571-7296	
Name Adam Hackenberry E-mail ahackenberry@hriinc.com	HRI	1750 W. College Ave State College, PA 16801	814-548-6161	
Name MARK KRCHMAR E-mail MARK@CTSIWC.ORG	CTS	10005 GOODLUCK RD GLENNDALE MD. 20769	301-794-7500 240-367-0783	301-794-7200
Name JOHN ROSE E-mail JOHN.ROSE@TETONWV.COM	TETON CONSTRUCTION	P.O. BOX 908 NITRO, WV 25143	304-590-2449	304-755-1401
Name Terry Wray E-mail Twray@washco-md.net	WCDWQ		240-313-2631	
Name E-mail				
Name E-mail				
Name E-mail				

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Pre-Bid Conference
CONOCOCHEAGUE WATER TREATMENT PLANT ENR UPGRADE

Representative's Name/E-mail *(Please Print)*	Company / County Dept.	Address City, State, Zip	Phone	Fax
Name Tom Vance E-mail tom.Vance@xyleminc.com	Godwin Pumps Xylem	221 Commerce Dr. Upper Marlboro, MD 20774	301-332-6457	
Name Ben Miller E-mail benjamin.miller@clarkconstruction.com	Clark Construction	7500 Old Georgetown Rd. Bethesda, MD 20814	202-277-4702	
Name Randy Amoss E-mail ramoss@conewago.com	Conewago Enterprises Inc	Hanover PA 17331	717-632-7722	717-632-8665
Name JR Bothell E-mail JRBothell@CALLASCONTRACTORS.com	CALLAS CONTRACTORS, INC	10549 Downsville Pike Hagerstown, MD, 21740	240-818-1494	301-790-7946
Name Mark Bradshaw E-mail mbradshaw@washco-md.net	Wash CO		240-313-2600	
Name Julie Pippel E-mail jpippel@washco-md.net	Wash. Co. DEM		240-313-2600	
Name E-mail				
Name E-mail				
Name E-mail				
Name E-mail				

advantage engineers

GEOTECHNICAL ENGINEERING REPORT

CONOCOCHEAGUE WASTE WATER TREATMENT PLANT UPGRADES

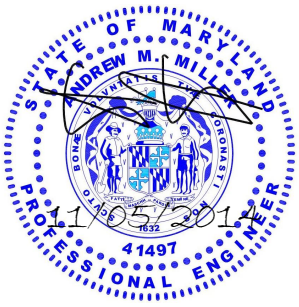
WILLIAMSPORT, WASHINGTON COUNTY, MARYLAND

PREPARED FOR:

MR. RANDY D. DEARDORFF, P.G.
BUCHART HORN, INC.
THE RUSSELL HORN BUILDING
445 WEST PHILADELPHIA STREET
YORK, PA 17405-7040

PREPARED BY:

KEVIN R. BARNHART
PROJECT MANAGER



ANDREW MILLER, P.E.
MARYLAND PROFESSIONAL ENGINEER
MD License No.: 41497

PROJECT NUMBER - 140091901

NOVEMBER 5, 2014

TABLE OF CONTENTS

1.0 INTRODUCTION

This report was prepared by Advantage Engineers, LLC (Advantage), on behalf of Buchart Horn, Inc., of York, Pennsylvania, and contains the results of a geotechnical engineering investigation conducted at the site of the proposed upgrades to the existing Conococheague Waste Water Treatment Plant located in Williamsport, Washington County, Maryland. The purpose of this investigation has been to define the stratification of subsurface soils and the engineering properties of these materials across the project site. Based on the results of our field investigation and laboratory analysis, foundation design, and construction recommendations have been formulated.

The scope of work for this project included the completion of a subsurface field investigation, laboratory testing program, and geotechnical engineering analysis. This report summarizes the results of the work performed and provides recommendations regarding foundation design, soil strength conditions, and general construction criteria.

2.0 SITE AND PROJECT DESCRIPTION

The project site currently consists of the existing Conococheague Waste Water Treatment Plant located in Williamsport, Washington County, Maryland. Existing topography across the project site is relatively flat, sloping gently down gradient towards the north, resulting in approximately 13.5 feet of grade variation across the construction areas. The site is immediately bordered to the north and east by commercial property, to the south by Elliott Parkway, and to the west by a wooded parcel. The approximate location of the site in relation to the surrounding area is presented on the *Topographic Map* (Dwg. No.: 140091901-A-100), presented within the Appendix.

Based on the Overall Site and Grading Plan (Plan), dated June 2014, the project will consist of constructing upgrades to the existing Conococheague Waste Water Treatment Plant which will consist of the following: a new clarifier, bio-mag building, methanol facility, and post anoxic zones. A brief description of the proposed structures is presented below:

- Final Clarifier No. 3 Tank: This tank will be constructed south of the existing secondary clarifier No. 2 tank, and will have a bottom elevation of 387 feet.
- Bio-Mag Building: This structure will be constructed at the southwest portion of the property with the bottom of the structure being situated at 401 feet.
- Methanol Facility: This structure is proposed to be constructed southeast of the existing solids handling building, and will have a bottom elevation of 402.5 feet.
- Post Anoxic Zones: Post anoxic zones No. 1 through 3 will be constructed west of the existing BNR tank No.3, and will have a bottom elevation situated at 404.24 feet.

3.0 SUBSURFACE INVESTIGATION PROGRAM

In an effort to evaluate subsurface conditions, 7 standard earth borings were conducted within the footprints of the proposed structures on October 20 and 21, 2014, in accordance with the following schedule:

- 2 test borings within the footprint of the proposed clarifier tank No. 3, extending to depths of approximately 11 and 11.5 feet below existing site grades.
- 2 test borings within the footprint of the proposed post anoxic zones (No.1 and No.3), extending to depths of approximately 9 and 12 feet below existing site grades.

- 2 test borings within the footprint of the proposed bio-mag building, extending to depths of approximately 5 and 12 feet below existing site grades.

- 1 test boring within the footprint of the proposed methanol facility, extending to a depth of approximately 7 feet below existing site grades.

Supervision and monitoring of the test boring operation was provided by a representative of Advantage, who field located the test borings based on stakes placed in the field by others. It should be noted that test boring B-7 was relocated approximately 15 feet to the northwest of the original location, due to a densely wooded area that the drilling equipment could not access. The approximate locations of the test borings, designated as B-1 through B-7, are shown on the *Test Boring Location Plan* (Dwg. No.: 140091901-A-102), presented in the Appendix.

The test borings were advanced using a truck-mounted drill rig equipped with hollow-stem augers. Split-spoon samples, conducted in accordance with ASTM standard D1586, were taken throughout the depth of the borings and the Standard Penetration Test (SPT) values were recorded for each sample obtained. The SPT values, which are a measure of relative density or consistency, are the number of blows required to drive a 2-inch (outer-diameter), split-barrel sampler 2 feet using a 140-pound weight dropped 30 inches. The number of blows required to advance the sampler over the 12-inch interval from 6 to 18 inches is considered the "N" value.

Data pertaining to the test boring operation was documented in the field and is presented in detail on the *Test Boring Profiles* and *Test Boring Logs*, presented within the Appendix. The Test Boring Profiles (Dwg. Nos.: 140091901-A-103) depict cross-sections of the subsurface conditions encountered within each test boring, including: soil and rock types, depths of individual strata, and recorded “N” values. The Test Boring Logs contain general information about the subsurface program and specific data regarding each test boring, including: sample depths, blow counts per 6 inches of penetration, and detailed characterizations of the subsurface materials encountered.

4.0 LABORATORY TESTING

All soils encountered at the site were visually reviewed and classified by Advantage personnel. Two (2) representative soil samples were subjected to laboratory analyses, in an effort to verify visual classification and to establish the engineering parameters required for foundation design analysis. The laboratory testing conducted on the samples consisted of standard classification testing, completed in accordance with ASTM standard D2487. The tests performed included Natural Moisture Content (ASTM D2216), Sieve Analysis (ASTM D422), and Atterberg Limits Determination (ASTM D4318).

Unified Soil Classification System (USCS) Group Symbols and ASTM Group Names have been assigned to the soils analyzed. Graphical depictions of the particle size analyses are presented in the Appendix. The results of the testing conducted are presented below in Table I.

TABLE I

LABORATORY RESULTS		
Location Number	B-1	B-4
Sample Depths (ft.)	4-8’	4-8’
Soil Type	Stratum I	Stratum I
Particle Size Distribution (Percent)		
Gravel	0.8	0.0
Sand	13.8	1.2
Silt/Clay	85.4	98.8
Atterberg Limits		
Liquid Limit	31	54
Plastic Limit	19	23
Plasticity Index	12	31
Natural Moisture Content	22.6%	24.3%
USCS Group Symbol	CL	CH
ASTM Group Name	Lean CLAY	Fat CLAY

5.0 DESCRIPTION OF SUBSURFACE CONDITIONS

5.1 GEOLOGY

According to the United States Geological Survey for Maryland, the project site is underlain by the Ordovician Rockdale Run Formation (Geologic symbol Orr). The project site within its geologic settings is presented on the G*eologic Map* (Dwg. No.: 140091901-A-101), found within the Appendix.

According to the United States Geological Survey for Maryland, the Rockdale Run Formation is comprised of cherty dolomite and dolomitic limestone within the upper one-third, while the lower two-thirds are found to consist of cherty argillaceous calcarenite and algal limestone within interbedded dolomite and oolitic limestone. The rock in this formation is of carbonate lithology, therefore is subject to the development of sinkholes.

5.2 SOIL

The surfaces of the test borings were found to be covered by approximately 6 to 12 inches of topsoil. Beneath the topsoil, subsurface conditions were found to be generally uniform, consisting of a layer of Fill, followed by a single, naturally occurring soil stratum, referenced herein as Stratum I. A general description of the soils encountered at the site is as follows:

Fill – Brown CLAY with gravel

The existing Fill was encountered in all the test borings completed, and extended to depths ranging from approximately 2 to 5 feet below existing site grades. The “N” values, recorded within this soil were found to range from 8 to greater than 58 blows over 7 inches, and shows the Fill to be generally very stiff in consistency.

Upon review the Fill was found to be poorly graded, plastic, and comprised of CLAY with secondary amounts of gravel. The Fill was found to be free of deleterious material (i.e. ash, cinder, slag, topsoil and/or organic debris). These samples were taken from discrete locations

and the possibility does exist for unsuitable materials to exist in uninvestigated portions of the site.

Stratum I – Tan to orange to brown CLAY with varying amounts of gravel

Stratum I was encountered immediately below the existing Fill, and extended to depths ranging from approximately 5 to 12 feet below existing site grades. The "N" values, recorded within this soil were found to range from 5 to greater than 50 blows over 1 inch, and shows Stratum I to range from medium stiff to very stiff in consistency.

Laboratory testing conducted on representative samples of Stratum I, show this soil to be poorly graded and highly plastic, with natural moisture contents of 22.6% and 24.3%. Stratum I is described under the Unified Soil Classification System (USCS) as Lean CLAY and Fat CLAY, with the accompanying group symbols of CL and CH, respectively.

5.3 BEDROCK

The bedrock surface was encountered within all the test borings completed, at depths ranging from approximately 5 to 12 feet below existing site grades. The bedrock surface was defined as the depth at which the drilling auger could no longer advance. The test boring locations, existing surface elevations, approximate depth to bedrock, corresponding bedrock surface elevations, and proposed bottom of structure elevations are presented below in Table II.

TABLE II

TEST BORING LOCATIONS	SURFACE ELEVATION (FT.)	APPROXIMATE DEPTH TO BEDROCK (FT.)	APPROXIMATE BEDROCK SURFACE ELEVATION (FT.)	BOTTOM OF STRUCTURE ELEVATION (FT.)
POST ANOXIC ZONE (No.1 and No. 3)				
B-1	411.45	12	399.45	404.24
B-2	**415.85**	**9**	**406.85**	**404.24**
FINAL CLARIFIER NO. 3 TANK				
B-3	**420.0**	**6.5**	**413.5**	**387.00**
B-4	**420.3**	**11**	**409.3**	**387.00**
METHANOL FACILITY				
B-5	407.3	7	400.3	402.50
BIO-MAG BUILDING				
B-6	407.07	12	395.07	401.00
B-7	**409.0**	**5**	**404.0**	**401.00**

*Shaded cells denote where the bedrock surface was encountered above proposed bottom of structure elevation

Data obtained from the test boring operation indicates the bedrock surface beneath the project site is highly pinnacled with a considerable variation in the elevation of the bedrock surface over short lateral distances. Therefore, possibility exists for the bedrock surface to be encountered at depths which vary significantly from those stated above during construction.

In order to determine the composition and integrity of the bedrock present beneath the site, a single bedrock sample was retrieved through rock coring. The percent recovery and rock quality designation (RQD) was determined for the core sample retrieved. Percent recovery is calculated by dividing the length of the rock core retrieved from the core barrel by the total length of the core run, and multiplying by 100. RQD is calculated by summing the length of all

of the rock fragments in the core run which are greater than or equal to 4 inches in length, and dividing by the total length of the core run and multiplying by 100. The percent recovery and rock quality designation of the bedrock core sample is provided below in Table III.

TABLE III

BEDROCK CORING DATA SUMMARY				
CORE SAMPLE	**BEDROCK CORE SAMPLE (FT)**	**LENGTH OF CORE (FT)**	**PERCENT RECOVERY (%)**	**RQD VALUE (%)**
B-3/R-1	6.5 – 11.5	5.0	100	100

The bedrock recovered from the project site consisted of blue-grey LIMESTONE. Based on the percent recoveries and RQD values of the rock cores obtained, the limestone encountered is slightly weathered, slightly fractured, with a rock mass quality (RMQ) of excellent.

5.4 GROUNDWATER

Groundwater was not encountered during the test boring operation. These observations were made at the time of the field operation and the groundwater table elevation will vary with daily, seasonal, and climatological variations.

6.0 CONSIDERATIONS OF KARST GEOLOGY

The project site is underlain by carbonate lithology which is subject to dissolution and the development of sinkholes and other karst-geologic features. It should be noted that outcroppings were visually indentified across the project site, specifically in the area of the proposed Final Clarifier Tank No. 3 and within the wooded areas situated within the footprint of the proposed Bio-mag building, further indicating the presence of pinnacles. The following recommendations are provided in an effort to minimize the potential for the development of sinkholes at the site both during and following construction.

- Surface water should not be allowed to collect or pool in low lying areas of the site and should be directed to appropriate stormwater channels. Expeditious backfilling or grading of low-lying areas will also help minimize the potential for the development of sinkholes.
- The bases of all foundation excavations should be reviewed for unusually soft or wet soil conditions. Any unstable areas encountered should be further excavated and reviewed by the geotechnical engineer to determine the extent of any solution activity so that remedial measures can be designed and implemented.
- The extent of excavations should be kept to a minimum and the influx of surface water into excavations should be minimized.
- Positive drainage away from the proposed structures should always be maintained. Roof drains should also be directed away from the structures and into designated storm sewer facilities.
- Unpaved areas, swales or surface basins should be minimized adjacent to building/foundation areas.
- Exterior backfill around foundations should consist of fine-grained, on-site soils, (i.e. silt and clay) in an effort to limit stormwater infiltration in foundation areas.
- Stormwater conveyance piping should have water tight joints.

The site owner must recognize the risks associated with development in areas underlain by carbonate geologic formations. Contingencies should be made in the construction schedule and budget for the repair of sinkholes and unstable soil conditions encountered during development of the site.

7.0 SITE DEVELOPMENT CONSIDERATIONS

7.1 SITE PREPARATION

At the outset of the project, all topsoil should be stripped from all structural areas. Structural areas are defined as those areas to be covered by the proposed structures, extending to a minimum of 5 feet beyond the proposed structures, and any portion of the site to be covered by asphalt or concrete pavements. Any unstable or deleterious materials encountered should also be removed in their entirety.

The topsoil will not be suitable for use as structural fill during construction. The topsoil may be stockpiled on site for future use in landscaped areas or as general fill material in non-structural portions of the site (i.e. landscaping berms, curbed islands, etc.).

7.2 PROOF-ROLLING

Following removal of the topsoil, required excavation to reach proposed subgrade elevations, and prior to the placement of structural fill or construction of foundation elements, all structural areas should be compacted using a steel-drum, vibratory roller, having a minimum static weight of 10 tons. A minimum of 5 overlapping passes of the roller should be completed across the entirety of all structural areas. Following the compaction procedures, proof-rolling should be performed using the roller specified above or with a loaded, tandem-axle dump truck. Proof-rolling and compaction procedures are necessary to compact and verify the integrity of the upper zones of the soils and allow for a uniform distribution of loads. Any loose or unstable areas encountered during proof-rolling and compaction should be compacted in place or removed and replaced with structural fill, as outlined below in **Section 8.0** of this report.

In areas of the site where a cut or removal of soil is necessary to achieve the required soil subgrade elevation, proof-rolling and compaction of the surface may be waived until the proposed subgrade elevation is achieved.

The project site is underlain by a layer of Fill and a carbonate geologic formation. Proof-rolling of the project site, and specifically the proposed structural areas, is considered to be an integral part of the foundation design criteria for the project. Proof-rolling will allow for a final evaluation of subgrade conditions for indications of loose/soft soil conditions or incipient sinkhole activity prior to the placement of structural fill and/or construction of foundation elements, and should be carried out as specified above under direction of the Geotechnical Engineer of Record.

7.3 EXCAVATION CONSIDERATIONS

Excavation during construction of the proposed structures will take place within the existing Fill, naturally occurring soils of Stratum I and Bedrock. The existing Fill and soils of Stratum I may be removed using conventional earth moving equipment and techniques, while Bedrock excavation may require specialized equipment and/or techniques.

Based on the bottom elevation of the proposed structures, existing site grades, and conditions encountered within the test borings completed, significant bedrock excavation will be required in

order to reach the proposed subgrade elevations. Bedrock excavation will likely be difficult, and require the use of hydraulic "hammering" equipment for removal. Blasting can be considered, however, we do not recommend it due to the increased risk for sinkhole activity.

All excavations should be adequately sloped, benched, or supported to minimize collapse and protect personnel. All excavations should be completed in accordance with OSHA requirements.

8.0 STRUCTURAL FILL

8.1 IMPORTED FILL

Imported structural or load bearing fill should meet the following criteria:

- free of organic matter, ash, cinders, trash, or other unsuitable materials
- particle size distribution that is well-graded
- plasticity index less than 10; liquid limit less than 30
- less than 15 percent by weight rock fragments larger than 3" with no particle size exceeding 6", less than 30 percent by weight larger than the 3/4" and less than 30 percent smaller than the no. 200 sieve

Alternate soils proposed for use which differ from those specified above should be evaluated by the Geotechnical Engineer of Record regarding their suitability prior to placement at the site.

8.2 REUSE OF ON-SITE SOILS

Comments regarding the suitability of on-site soils for reuse as structural fill are provided below.

Fill – The existing Fill was found to be moderately graded, plastic, and predominately comprised of CLAY with secondary amounts of gravel. Based on this information, this soil is considered to be marginally suitable for use as structural fill provided any deleterious material, if encountered, is removed prior to its placement. **Due to the high amount of fines (clay), this soil may be moisture sensitive and difficult to place during periods of adverse weather.**

Stratum I – This soil was found to be poorly graded and highly plastic, and consists of Lean CLAY (CL) and Fat CLAY (CH) according to the USCS. Based on this information, this soil is considered to be marginally suitable for use as structural fill. **Due to the high amount of fines (clay), this soil may be moisture sensitive and difficult to place during periods of adverse weather.**

Our analysis of the suitability of the on-site soil for use as structural fill is based on data collected from the test borings completed at the site. Soil suitability should be confirmed in the field by the Geotechnical Engineer of Record during construction.

8.3 PLACEMENT & COMPACTION REQUIREMENTS

Structural fill should be placed in lifts not exceeding 10 inches in loose thickness and compacted with a vibratory roller having a minimum static weight of 10 tons. In areas where structural fill is placed and compacted with hand-operated compaction equipment, a maximum loose lift thickness of 4 inches is recommended. The optimum lift thickness and number of repetitive passes with compaction equipment necessary to achieve the required percentage compaction values should be determined in the field with test passes of the chosen compaction equipment.

All fill should be placed at, or deviate nominally from (±2%) the optimum moisture content as determined in accordance with ASTM D698 and compacted to the minimum percentage of the soil's maximum dry density as indicated below in Table IV.

TABLE IV

COMPACTION CRITERIA	
Fill Area	**Percent of Maximum Dry Density as per ASTM D698**
Foundation Support Fill	100%
Foundation Backfill	100%
Slab-On-Grade, Parking Areas	100%
Non-Structural Areas	92%

9.0 FOUNDATION DESIGN RECOMMENDATIONS

9.1 SHALLOW FOUNDATIONS

Provided the site development considerations are followed, firm and stable existing soils of Stratum I, suitable structural fill placed under engineering control, and/or the underlying bedrock surface may be utilized for the support of the proposed foundation elements using shallow foundation systems. The soil bearing conditions at the site were evaluated based on the information derived from this investigation. The following conclusions and engineering recommendations are provided regarding the proposed post anoxic zones, clarifier tank, methanol facility, and bio-mag building.

1. Firm and stable naturally-occurring soils of Stratum I, properly placed structural fill, and/or the underlying bedrock may be utilized for support of the proposed structures' foundation elements. **The foundations should <u>not</u> be situated on the existing Fill layer.**

2. A maximum allowable bearing capacity of **3,000** pounds per square foot (psf) may be utilized in design of the proposed anoxic zones, clarifier tank, methanol facility, and bio-mag building**.**

3. The bottom of all exterior foundations and those in unheated areas should be at least 36 inches below the final exterior grades in order to minimize the potential for frost heave.

4. All foundation bottoms should be completely cleaned of loose material or debris immediately prior to the placement of concrete.

5. Concrete should be placed in excavated foundation areas as quickly as possible to minimize degradation to the foundation subgrade due to exposure.

6. The actual bearing conditions of the soil at the foundation subgrade elevation should be confirmed in the field during excavation by inspection under the supervision of a Professional Engineer qualified in Geotechnical Engineering.

7. Where encountered, the bedrock surface should be over-excavated a minimum of 6 inches beyond subgrade elevations and backfilled with crushed aggregate to the subgrade elevation prior to the placement of concrete. Proceeding in this manner

will minimize the potential for point loading and allows for a uniform distribution of loads.

Prior to the placement of concrete, all foundation bottoms should be densified and compacted using a walk-behind vibratory roller, gas-powered automatic tamper, or similar equipment. Densification is required to provide uniform density of the foundation subgrade and allow for proper distribution of loads. Proper compaction and densification of the foundation soils should be verified by a qualified geotechnical engineer prior to placement of concrete.

It is emphasized that caution should be exercised to not disturb foundation subgrade soils. Should the subgrade be disturbed, the soil should be compacted in place or removed until firm soil is encountered and the resulting excavation backfilled with concrete or controlled structural fill as described above. Every effort should be made to prevent water from entering open foundation excavations. Any water which may accumulate in the bottoms of the excavations should be removed immediately. It is recommended that footing excavation and placement of concrete be performed on the same day and during fair weather conditions. Installation of the foundations should be carried out in accordance with applicable ACI guidelines, under the direction of a licensed Professional Engineer.

9.2 SETTLEMENT

Based on the conditions encountered and our understanding of the proposed construction, total and differential post-construction settlement of the proposed anoxic zones, clarifier tank, methanol facility, and bio-mag building are not expected to exceed 1.0 inch and 0.5 inch, respectively. Since the potential exists for adjacent foundations to be supported on bedrock and soil, respectively, differential settlement may equal total settlement.

9.3 SEISMIC SITE CLASS

According to *Table 1613.5.2 - Site Class Definitions* of the 2012 International Building Code, the stratigraphic profile underlying the proposed construction area meets the characteristics of *Site Class C, Very Dense Soil and Soft Rock.*

10.0 FLOOR SLAB SUPPORT

Conventional slabs-on-grade may be supported on properly placed structural fill or firm and stable existing soils of Stratum I. These soils are expected to exhibit a modulus of subgrade reaction of approximately 150 psi/in provided they are compacted to a minimum of 100% of its maximum dry density as determined by ASTM D698.

It is recommended that the floor slabs should be underlain by a layer of granular fill to provide a capillary break. The granular fill should have a minimum thickness of 4 inches and should be free-draining and compactable, with a maximum of 30% by weight passing the No. 100 sieve. The granular fill should be compacted to a minimum of 100% of its maximum dry density as determined by ASTM D698.

11.0 LATERAL EARTH PRESSURES

The following data is provided for the design of any below-grade structures which may be constructed at the site. The data presented is based on the use of the existing Fill and naturally occurring soils of Stratum I and placed under engineering control for backfill of all retaining walls. Should different soil be used, design data should be re-evaluated and changed according to the specific material. Table V, presented below, provides the Earth Pressure Design Data for the use of the above referenced soils.

TABLE V

EARTH PRESSURE DESIGN DATA	
Parameter	**Fill/Stratum I**
Angle of Internal Friction	20º
Unit Weight of Soil	115 pcf
Coefficient of Active Earth Pressure	0.49
Coefficient of Passive Earth Pressure	2.04
Coefficient of At-Rest Earth Pressure	0.66
Cohesion	500 psf

Adequate drainage must be maintained adjacent to all earth retaining walls in an effort to minimize the buildup of hydrostatic pressures on the structures. At a minimum, a drainage blanket consisting of clean, crushed aggregate should be placed behind the retaining wall. The drainage blanket should be connected to a drain at the base of the retaining wall with all water directed to dedicated stormwater channels.

12.0 CONSTRUCTION DEWATERING

Groundwater was not encountered during the test boring operation. Should groundwater or perched water be encountered during construction, a dewatering specification should require the contractor to provide an adequate dewatering system capable of maintaining the groundwater table a minimum of 2 feet below subgrade elevations during earthwork, foundation construction, concrete placement, and backfilling operations.

13.0 CONSTRUCTION OBSERVATION AND TESTING

Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that conditions between the test borings and below the depths explored may be different from those encountered, that conditions are not as anticipated by the designers, or that the construction process has altered the subsurface conditions. Therefore, geotechnical engineering construction observation should be performed under the supervision of the Geotechnical Engineer who is familiar with the intent of the recommendations presented herein. Construction observation is recommended to evaluate whether the conditions anticipated in the design actually exist or whether the recommendations presented herein should be modified where necessary.

14.0 LIMITATIONS

This report has been prepared in accordance with generally accepted geotechnical design practices for specific application to this project. This report has been based on assumed conditions and characteristics of the proposed development where specific information was not available.

The conclusions and recommendations contained in this report are based upon the subsurface data obtained during this investigation and on details stated in this report. The validity of the projections, conclusions and recommendations contained in this report is necessarily limited by the scope of field investigation and by the number of test borings that were made. It is understood that the number of test borings made are consistent with good engineering practice but, given the nature of subsurface conditions, there is a possibility that actual conditions encountered may differ significantly from those projected in this report. Should conditions arise which differ from those described in this report, Advantage should be notified immediately and provided with all available information regarding subsurface conditions.

Our recommendations are based upon the assumption that the services of a qualified Geotechnical Engineer will be retained for observation of the proof-rolling procedures, structural fill placement, foundation subgrade review, and all critical earthwork operations. Advantage has the capability of providing these services and would be pleased to present a proposal to do the on-site quality control observation.

The subject property is underlain by carbonate lithology which carries with it the potential for sinkhole development. The Owner must evaluate this risk and come to their own conclusion regarding their tolerance for risk with regard to the impact of sinkholes on the planned construction. Advantage makes no warranty or guarantee with regard to the development of sinkholes on the project site.

The scope of this investigation was limited to the evaluation of the load-carrying capabilities and load stability of the subsoils. Oil, hazardous waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this study. Their presence and/or absence are not implied, inferred or suggested by this report or results of this study.

APPENDIX

TOPOGRAPHIC MAP

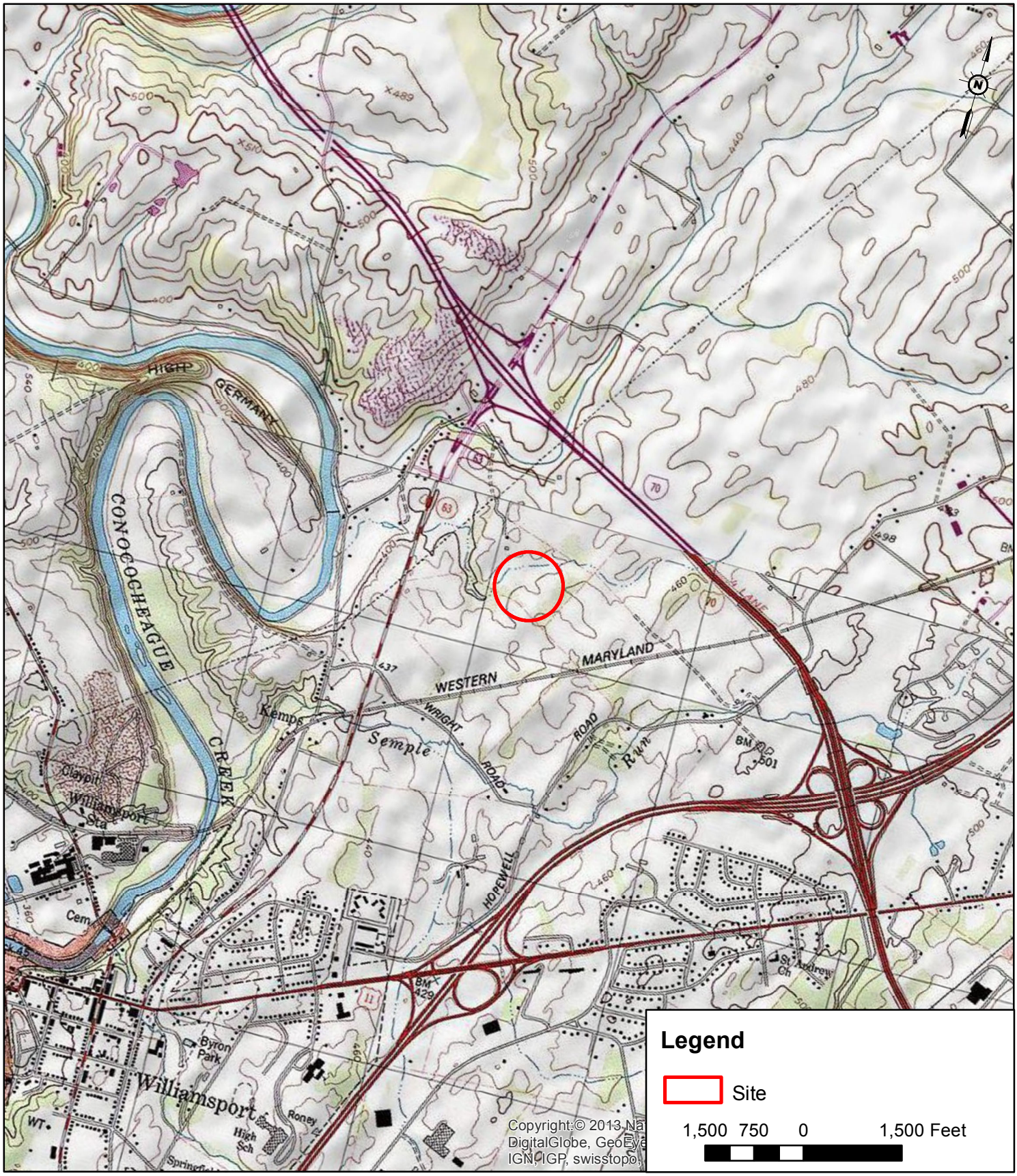
GEOLOGIC MAP

TEST BORING LOCATION PLAN

TEST BORING PROFILES

LABORATORY TEST RESULTS

TEST BORING LOGS



*Source - USGS 15 - Minute Topographic Quadrangle, Provided by ESRI

SCALE:	DRAWING NUMBER:
AS SHOWN	140091901-A-100
DRAWN BY: C. WEEMS	CHECKED BY: D. BUCKWALTER
APPROVED BY: D. SCHAUBLE	DATE: 10-22-2014

TOPOGRAPHIC MAP

PREPARED FOR

CONOCOCHEAGUE WWTP UPGRADES

WILLIAMSPORT WASHINGTON COUNTY MARYLAND

advantage engineers
435 INDEPENDENCE AVE, SUITE C
MECHANICSBURG, PA 17055
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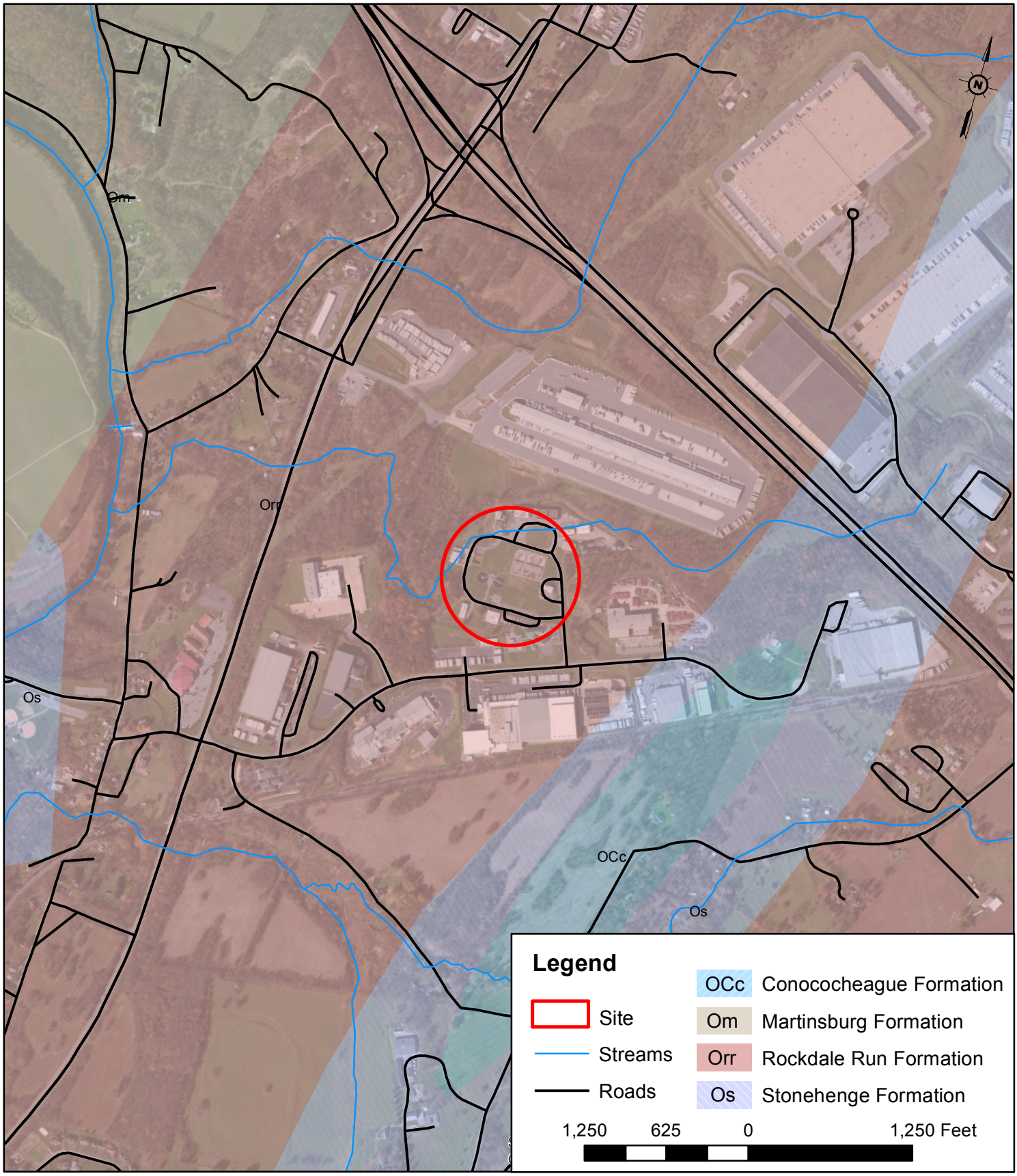

*Source - Map 61 - Atlas of Preliminary Geologic Quadrangle Maps of Maryland, 1981, Pa Geological Survey

SCALE: AS SHOWN	DRAWING NUMBER: 140091901-A-101
DRAWN BY: C. WEEMS	CHECKED BY: D. BUCKWALTER
APPROVED BY: D. SCHAUBLE	DATE: 10-22-2014

GEOLOGIC MAP

PREPARED FOR

CONOCOCHEAGUE WWTP UPGRADES

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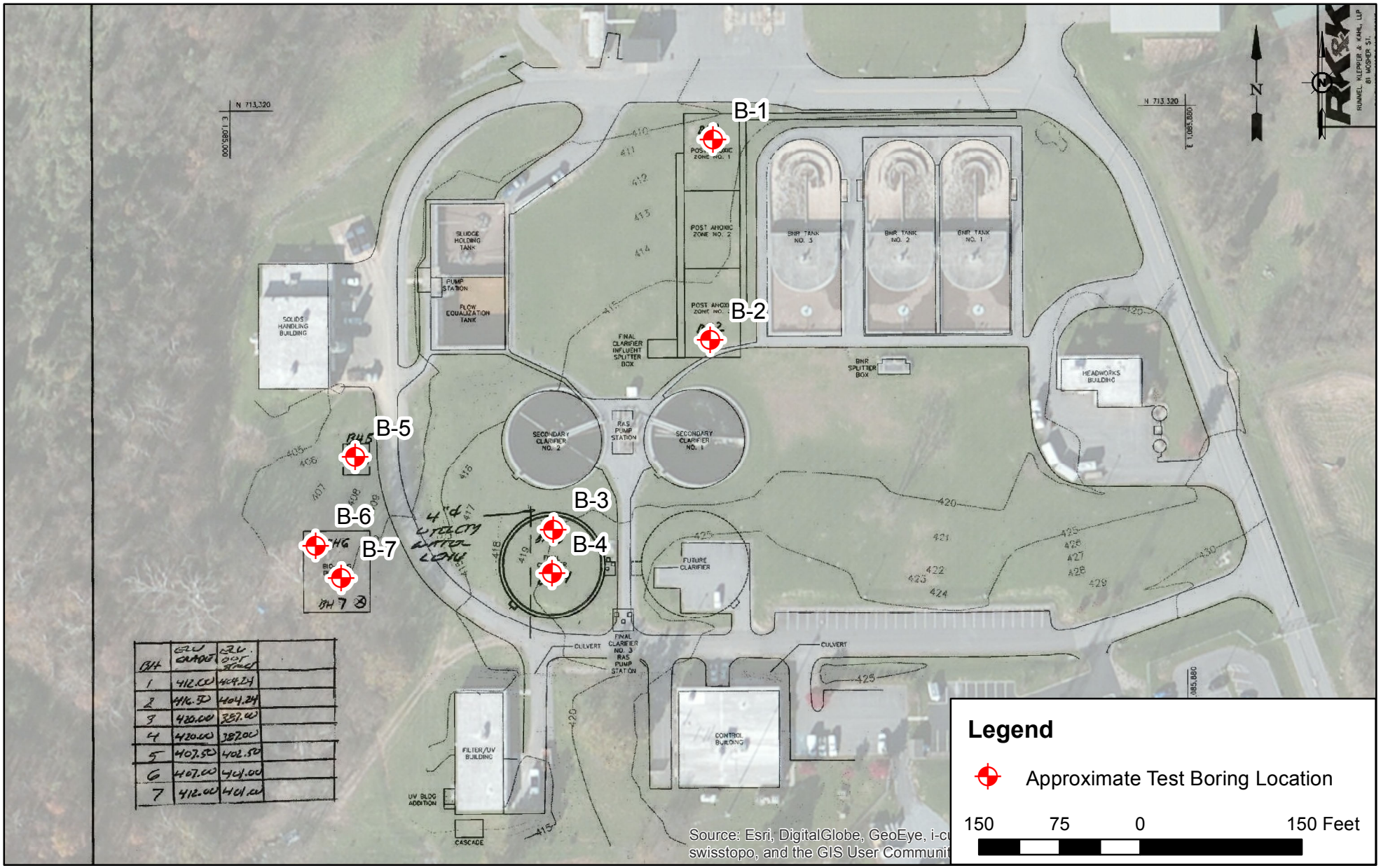

*Source - Overall Site and Grading Plan - Provided by RK&K, June 2014

SCALE: AS SHOWN	DRAWING NUMBER: 140091901-A-102
DRAWN BY: C.WEEMS	CHECKED BY: D. BUCKWALTER
APPROVED BY: D. SCHAUBLE	DATE: 10-22-2014

TEST BORING LOCATION PLAN

PREPARED FOR

CONOCOCHEAGUE WWTP UPGRADES

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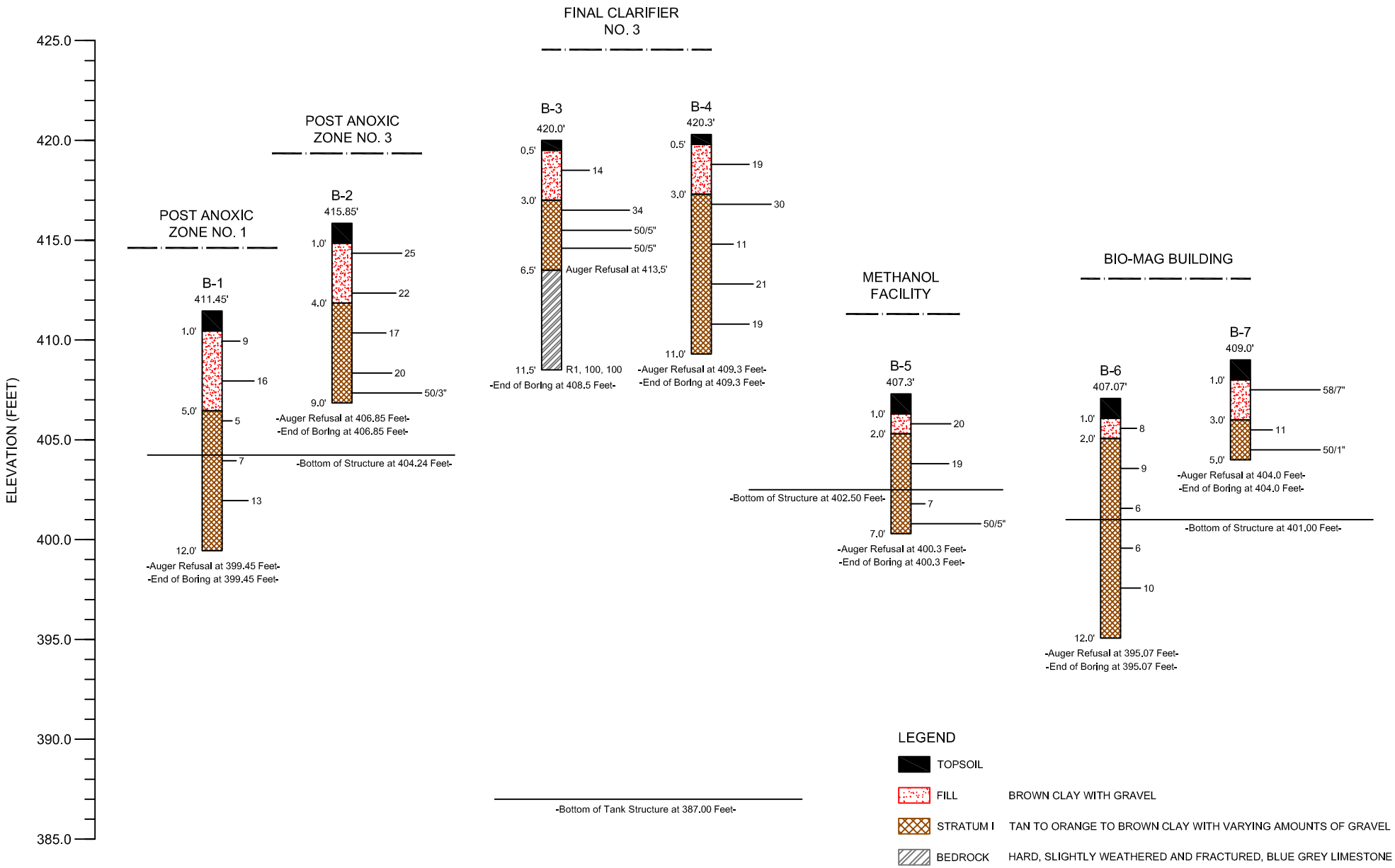
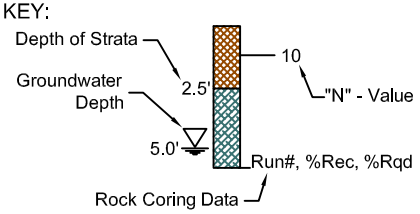


SCALE: AS SHOWN	DRAWING NUMBER: 140091901-A-103
DRAWN BY: C. WEEMS	CHECKED BY: D. BUCKWALTER
APPROVED BY: D. SCHAUBLE	DATE: 10-22-2014

KEY:



TEST BORING PROFILES

PREPARED FOR

CONOCOCHEAGUE WWTP UPGRADES

WILLIAMSPORT WASHINGTON COUNTY MARYLAND

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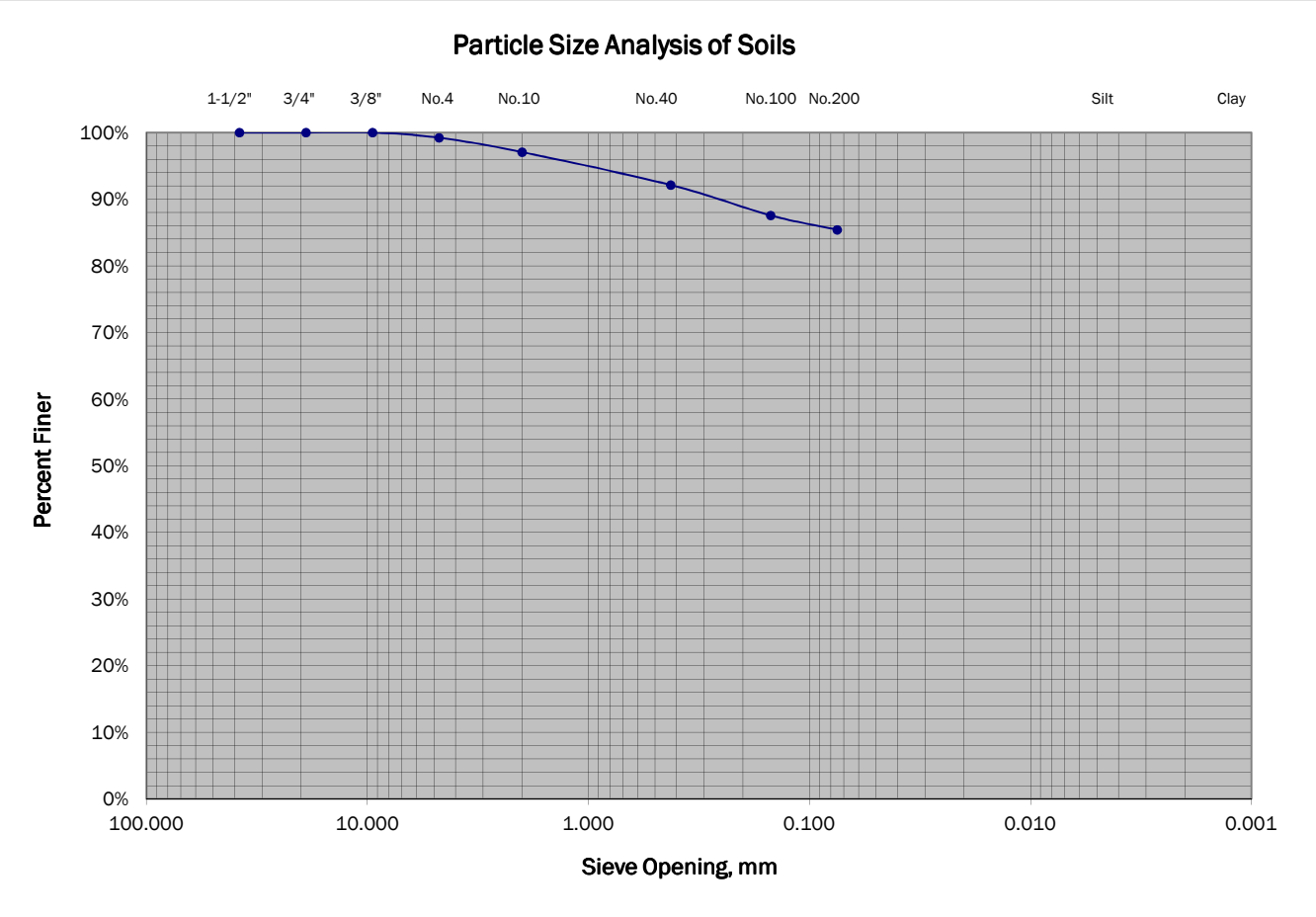
Soil Classification Report

Per ASTM Designations D 2487 - 00 and D 2488 - 00



As-Received Moisture 22.6%									
USCS Classification: Lean CLAY (CL)									
Gravel: 0.8%	**Coarse:** 0.0%				**Fine:** 0.8%				
Sand: 13.8%	**Coarse:** 2.2%	**Medium:** 4.9%		**Fine:** 6.7%					
Fines: 85.4%	**Silt:**		**Clay:**						
Gravel Description: Sub angular									
Sand Description: Sub rounded									
Consistency: Firm		**Dry Strength:** Medium							
Dilatancy: Slow		**Toughness:** Medium							
Structure: Homogeneous		**Cementation:** N/A							

Particle Size Distribution

US Standard Sieve Size		Opening (mm)	%Finer
GRAVEL Coarse	1-1/2"	38.0	100.0%
GRAVEL	3/4"	19.0	100.0%
GRAVEL Fine	3/8"	9.50	100.0%
GRAVEL Fine	No. 4	4.75	99.2%
SAND Coarse	No. 10	2.00	97.1%
SAND Medium	No. 40	0.425	92.1%
SAND	No. 100	0.150	87.6%
SAND Fine	No. 200	0.075	85.4%
Hydrometer Analysis	Silt Size	0.005	
Hydrometer Analysis	Clay Size	0.001	

D_{60}:	D_{30}:	D_{10}:	Cu:	Cc:

Boring: B-1									
Sample: S3/S4	**Depth:** 4-8'								
Project: Conococheague WWTP Upgrades									
Client: Buchart Horn, Inc.									
Advantage Project Number: 140091901									

Atterberg Limits	**LL:** 31	**PL:** 19	**PI:** 12		
Description: Tan to brown					
Remarks: Stratum I					
Report Date: October 24, 2014					

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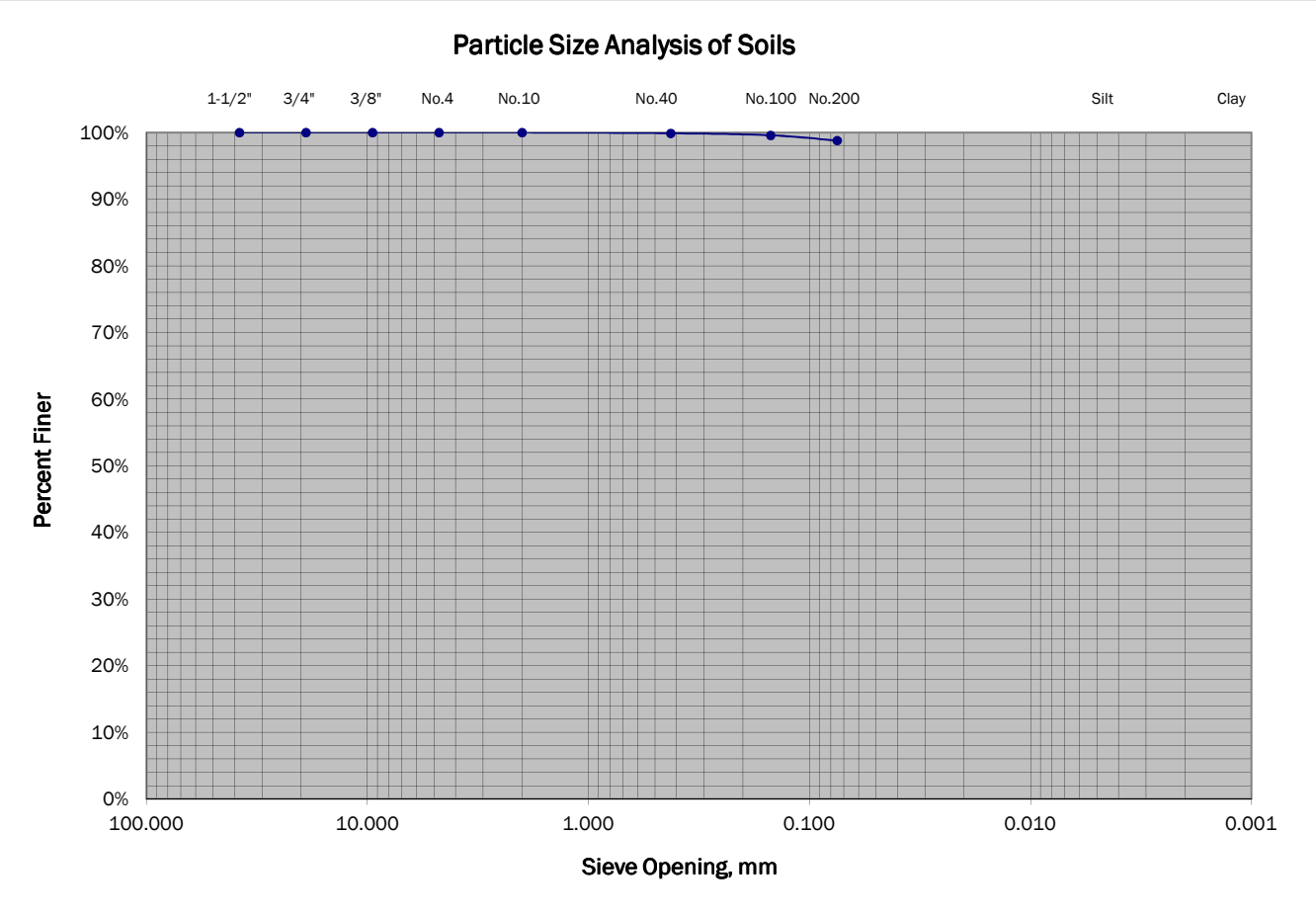
Soil Classification Report

Per ASTM Designations D 2487 - 00 and D 2488 - 00



As-Received Moisture 24.3%

USCS Classification: Fat CLAY (CH)

Gravel:	0.0%	**Coarse:**	0.0%			**Fine:**	0.0%
Sand:	1.2%	**Coarse:**	0.0%	**Medium:**	0.1%	**Fine:**	1.1%
Fines:	98.8%	**Silt:**		**Clay:**			

Gravel Description: N/A

Sand Description: Sub rounded

Consistency: Hard **Dry Strength:** Very High

Dilatancy: Slow **Toughness:** High

Structure: Homogeneous **Cementation:** N/A

Particle Size Distribution

		Opening (mm)	%Finer
GRAVEL Coarse	1-1/2"	38.0	100.0%
GRAVEL	3/4"	19.0	100.0%
GRAVEL Fine	3/8"	9.50	100.0%
GRAVEL Fine	No. 4	4.75	100.0%
SAND Coarse	No. 10	2.00	100.0%
SAND Medium	No. 40	0.425	99.9%
SAND	No. 100	0.150	99.6%
SAND Fine	No. 200	0.075	98.8%
Hydrometer Analysis	Silt Size	0.005	
Hydrometer Analysis	Clay Size	0.001	

D_{60}:	D_{30}:	D_{10}:	Cu:	Cc:

Boring: B-4

Sample: S3/S4 **Depth:** 4-8'

Project: Conococheague WWTP Upgrades

Client: Buchart Horn, Inc.

Advantage Project Number: 140091901

Atterberg Limits **LL:** 54 **PL:** 23 **PI:** 31

Description: Orange to brown

Remarks: Stratum I

Report Date: October 24, 2014

TEST BORING LOG

PROJECT NAME: Conococheague WWTP Upgrades

BORING NO.: B-1 (Post Anoxic Zone No.1)

PROJECT NUMBER: 140091901 CLIENT: Buchart Horn, Inc.

LOCATION: See Test Boring Location Plan (140091901-A-102)

[X] FIELD SURVEYED [ ] TOPO ESTIMATE

ELEV TOP OF GROUND: ±411.45'

GROUNDWATER DATA: Dry

DEPTH: Not Encountered Time: Completion

DEPTH (feet)	SAMPLE NUMBER	SAMPLE DEPTH (ft)	BLOWS PER 6"	SOIL DESCRIPTION		REMARKS
				0.0' - 1.0'	Dark brown sandy clay with organic debris	**Topsoil**
	S1	0' - 2'	5-5-4-5	1.0' - 5.0'	Stiff brown CLAY with gravel	
	S2	2' - 4'	5-8-8-8		Very stiff brown CLAY with gravel	
5						**Fill**
	S3	4' - 6'	2-3-2-2	5.0' - 12.0'	Medium stiff tan to brown CLAY	
	S4	6' - 8'	2-3-4-6		Stiff tan to brown CLAY, slightly moist	
10	S5	8' - 10'	5-7-6-7		Very stiff tan to brown CLAY, slightly moist	
						Stratum I
				-Auger Refusal at 12.0 Feet-		
				-End of Boring at 12.0 Feet-		
15						
20						
25						
30						

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RIG TYPE: Truck-Mounted CME-55

DRILLING METHOD: Hollow Stem Auger

ADVANTAGE REPRESENTATIVE: C. Weems

DATE DRILLED: October 20, 2014

DRAWN/COMPILED BY: C. Weems

TEST BORING LOG

PROJECT NAME: Conococheague WWTP Upgrades

BORING NO.: B-2 (Post Anoxic Zone No.3)

PROJECT NUMBER: 140091901 CLIENT: Buchart Horn, Inc.

LOCATION: See Test Boring Location Plan (140091901-A-102)

[X] FIELD SURVEYED [ ] TOPO ESTIMATE

ELEV TOP OF GROUND: ±415.85'

GROUNDWATER DATA: Dry

DEPTH: Not Encountered Time: Completion

DEPTH (feet)	SAMPLE NUMBER	SAMPLE DEPTH (ft)	BLOWS PER 6"	SOIL DESCRIPTION		REMARKS
				0.0' - 1.0'	Dark brown sandy clay with organic debris	**Topsoil**
	S1	0' - 1.9'	4-10-15-50/5"	1.0' - 4.0'	Very stiff brown CLAY with gravel	
	S2	2' - 4'	8-9-13-9		Very stiff brown CLAY with gravel	**Fill**
5				4.0' - 9.0'		
	S3	4' - 6'	3-5-12-11		Very stiff orange to brown CLAY	
	S4	6' - 8'	9-12-8-8		Very stiff orange to brown CLAY	
	S5	8' - 8.3'	50/3"		Very stiff orange to brown CLAY with gravel	**Stratum I**
10				**-Auger Refusal at 9.0 Feet-** **-End of Boring at 9.0 Feet-**		
15						
20						
25						
30						

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RIG TYPE: Truck-Mounted CME-55

DRILLING METHOD: Hollow Stem Auger

ADVANTAGE REPRESENTATIVE: C. Weems

DATE DRILLED: October 20, 2014

DRAWN/COMPILED BY: C. Weems

TEST BORING LOG

PROJECT NAME: Conococheague WWTP Upgrades

BORING NO.: B-3 (Final Clarifier No.3)

PROJECT NUMBER: 140091901 CLIENT: Buchart Horn, Inc.

LOCATION: See Test Boring Location Plan (140091901-A-102)

[X] FIELD SURVEYED [ ] TOPO ESTIMATE

ELEV TOP OF GROUND: ±420.0'

GROUNDWATER DATA: Dry

DEPTH: Not Encountered Time: Completion

DEPTH (feet)	SAMPLE NUMBER	SAMPLE DEPTH (ft)	BLOWS PER 6"	SOIL DESCRIPTION	REMARKS
				0.0' - 0.5' Dark brown sandy clay with organic debris	**Topsoil**
	S1	0' - 2'	5-8-6-7	0.5' - 3.0' Very stiff brown CLAY with gravel	**Fill**
	S2	2' - 4'	22-21-13-14	3.0' - 6.5' Very stiff tan to brown CLAY	
5	S3	4' - 4.9'	6-50/5"	Very stiff orange to brown CLAY with gravel	
				Very stiff orange to brown CLAY with gravel	**Stratum I**
	S4	6' - 6.4'	50/5"	6.5' - 11.5' **-Auger Refusal at 6.5 Feet-**	
10				Hard, slightly weathered and fractured, blue-gray LIMESTONE	**REC: 100%** **RQD: 100%** **Bedrock**
	R1	6.5' - 11.5'	Run #1	**-End of Boring at 11.5 Feet-**	
15					
20					
25					
30					

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RIG TYPE: Truck-Mounted CME-55

DRILLING METHOD: Hollow Stem Auger

ADVANTAGE REPRESENTATIVE: C. Weems

DATE DRILLED: October 21, 2014

DRAWN/COMPILED BY: C. Weems

TEST BORING LOG

PROJECT NAME: Conococheague WWTP Upgrades

BORING NO.: B-4 (Final Clarifier No.3)

PROJECT NUMBER: 140091901 CLIENT: Buchart Horn, Inc.

LOCATION: See Test Boring Location Plan (140091901-A-102)

[X] FIELD SURVEYED [ ] TOPO ESTIMATE

ELEV TOP OF GROUND: ±420.3'

GROUNDWATER DATA: Dry

DEPTH: Not Encountered Time: Completion

DEPTH (feet)	SAMPLE NUMBER	SAMPLE DEPTH (ft)	BLOWS PER 6"	SOIL DESCRIPTION	REMARKS
				0.0' - 0.5' Dark brown sandy clay with organic debris	**Topsoil**
	S1	0' - 2'	6-11-8-18	0.5' - 3.0' Very stiff brown CLAY with gravel	**Fill**
	S2	2' - 4'	16-15-15-17	3.0' - 11.0' Very stiff orange to brown CLAY	
5					
	S3	4' - 6'	4-4-7-9	Stiff orange to brown CLAY	
	S4	6' - 8'	8-10-11-9	Very stiff orange to brown CLAY	
10	S5	8' - 10'	9-9-10-11	Very stiff orange to brown CLAY with gravel	**Stratum I**
				-Auger Refusal at 11.0 Feet- **-End of Boring at 11.0 Feet-**	
15					
20					
25					
30					

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RIG TYPE: Truck-Mounted CME-55

DRILLING METHOD: Hollow Stem Auger

ADVANTAGE REPRESENTATIVE: C. Weems

DATE DRILLED: October 20, 2014

DRAWN/COMPILED BY: C. Weems

TEST BORING LOG

PROJECT NAME: Conococheague WWTP Upgrades

BORING NO.: B-5 (Methanol Facility)

PROJECT NUMBER: 140091901 CLIENT: Buchart Horn, Inc.

LOCATION: See Test Boring Location Plan (140091901-A-102)

[X] FIELD SURVEYED [ ] TOPO ESTIMATE

ELEV TOP OF GROUND: ±407.3'

GROUNDWATER DATA: Dry

DEPTH: Not Encountered Time: Completion

DEPTH (feet)	SAMPLE NUMBER	SAMPLE DEPTH (ft)	BLOWS PER 6"	SOIL DESCRIPTION	REMARKS
				0.0' - 1.0' Dark brown sandy clay with organic debris	**Topsoil**
	S1	0' - 2'	7-13-7-7	1.0' - 2.0' Very stiff brown CLAY with gravel	**Fill**
				2.0' - 7.0'	
	S2	2' - 3.7'	7-9-10-50/2"	Very stiff tan to brown CLAY	
5					
	S3	4' - 6'	3-3-4-4	Stiff tan to brown CLAY	
	S4	6' - 6.9'	5-50/5"	Very stiff tan to brown CLAY with gravel	**Stratum I**
				-Auger Refusal at 7.0 Feet-	
				-End of Boring at 7.0 Feet-	
10					
15					
20					
25					
30					

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RIG TYPE: Truck-Mounted CME-55

DRILLING METHOD: Hollow Stem Auger

ADVANTAGE REPRESENTATIVE: C. Weems

DATE DRILLED: October 21, 2014

DRAWN/COMPILED BY: C. Weems

TEST BORING LOG

PROJECT NAME: Conococheague WWTP Upgrades

BORING NO.: B-6 (Bio-Mag Building)

PROJECT NUMBER: 140091901 CLIENT: Buchart Horn, Inc.

LOCATION: See Test Boring Location Plan (140091901-A-102)

[X] FIELD SURVEYED [ ] TOPO ESTIMATE

ELEV: TOP OF GROUND: ±407.07'

GROUNDWATER DATA: Dry

DEPTH: Not Encountered Time: Completion

DEPTH (feet)	SAMPLE NUMBER	SAMPLE DEPTH (ft)	BLOWS PER 6"	SOIL DESCRIPTION	REMARKS
				0.0' - 1.0' Dark brown sandy clay with organic debris	**Topsoil**
	S1	0' - 2'	4-4-4-5	1.0' - 2.0' Stiff brown CLAY with gravel	**Fill**
				2.0' - 12.0'	
	S2	2' - 4'	4-4-5-6	Stiff tan to brown CLAY, slightly moist	
5					
	S3	4' - 6'	2-3-3-4	Stiff tan to brown CLAY with gravel, slightly moist	
	S4	6' - 8'	3-3-3-3	Stiff tan to brown CLAY with gravel, slightly moist	
10	S5	8' - 10'	4-5-5-6	Stiff tan to brown CLAY, moist	
					Stratum I
				-Auger Refusal at 12.0 Feet-	
				-End of Boring at 12.0 Feet-	
15					
20					
25					
30					

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RIG TYPE: Truck-Mounted CME-55

DRILLING METHOD: Hollow Stem Auger

ADVANTAGE REPRESENTATIVE: C. Weems

DATE DRILLED: October 21, 2014

DRAWN/COMPILED BY: C. Weems

TEST BORING LOG

PROJECT NAME: Conococheague WWTP Upgrades

BORING NO.: B-7 (Bio-Mag Building)

PROJECT NUMBER: 140091901 CLIENT: Buchart Horn, Inc.

LOCATION: See Test Boring Location Plan (140091901-A-102)

☐ FIELD SURVEYED ☒ TOPO ESTIMATE

ELEV

TOP OF GROUND: ±409.0'

GROUNDWATER DATA: Dry

DEPTH: Not Encountered Time: Completion

DEPTH (feet)	SAMPLE NUMBER	SAMPLE DEPTH (ft)	BLOWS PER 6"	SOIL DESCRIPTION		REMARKS
				0.0' - 1.0'	Dark brown sandy clay with organic debris	**Topsoil**
	S1	0' - 2'	6-8-50/1"	1.0' - 3.0'	Very stiff brown CLAY with gravel	**Fill**
	S2	2' - 4'	5-7-4-9	3.0' - 5.0'	Stiff orange to brown CLAY with gravel	
5	S3	4' - 4.6'	4-50/1"		Very stiff orange to brown CLAY with gravel	**Stratum I**
				-Auger Refusal at 5.0 Feet-		
				-End of Boring at 5.0 Feet-		
10						
15						
20						
25						
30						

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RIG TYPE: Truck-Mounted CME-55

DRILLING METHOD: Hollow Stem Auger

ADVANTAGE REPRESENTATIVE: C. Weems

DATE DRILLED: October 21, 2014

DRAWN/COMPILED BY: C. Weems